HIV/AIDS IN ASIA AND THE PACIFIC REGION

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Preface

The HIV/AIDS epidemic poses a very serious health and developmental problem in many countries of the Asia Pacific region. Given the presence of risk behaviours and the population size representing 60% of the world’s people, the potential for epidemic growth is very real. Since the extensive spread of HIV began at the end of the 1980s, more than 7 million people in the region have become infected. In the year 2003 alone, it is estimated that more than 500 000 died of AIDS in Asia – about 1500 a day!

Experiences in the region have shown that intervention activities can successfully bring about reductions in HIV prevalence, provided they are combined with high-level political commitment and leadership. The priority is to implement HIV interventions among those sections of the population with high-risk behaviour, such as sex workers and their clients, injecting drug users, and migrant workers. In Thailand and Cambodia, condom promotion activities have brought about behavioural changes and a subsequent reduction in HIV prevalence and incidence – a major achievement. There are, however, still many areas of concern. Interventions are needed urgently to prevent HIV relating to injecting drug use and high-risk sexual behaviour and to scale up the coverage of these interventions in all countries so that they have nationwide impact on HIV prevalence.

Besides prevention, care and treatment are also urgently needed, integrated together as one intervention package. We are committed to contribute fully to the achievement of the “3 by 5” target announced recently by Dr JW Lee, WHO Director-General. Already much progress has been made in the region, but considerable additional efforts are needed to enhance access to antiretroviral therapy by the patients who need it and also to ensure that the drugs are used appropriately and rationally.

The first joint SEARO/WPRO report on HIV in the Asia Pacific region was published in 2001 and was well received as an example of a collaborative effort between the two regional offices, particularly in the area of HIV/AIDS. Within the framework of UNAIDS, WHO plays a leading role in the health sector response to HIV/AIDS. Within that context, collecting data and analysing the current status and future prospects for HIV/AIDS, including its implications, is an important priority for WHO. It is hoped that this report, like the last one, will contribute to a better understanding of the epidemic in the Asia Pacific region, and that countries will use the information it contains to guide them in better responding to the HIV/AIDS epidemic. The report should help also in mobilizing resources, including those from the Global Fund to fight AIDS, TB and Malaria.
WHO is committed to supporting countries in strengthening HIV surveillance systems on a continuous basis and providing feedback on regional and country-specific data on the extent, trends and determinants of the HIV epidemic in Asia and the Pacific. Using strategic information of this nature to plan appropriate strategies and interventions, we can make a difference.

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Regional Director
WHO Regional Office for Western Pacific
Acknowledgements

The Western Pacific Regional Office and the South-East Asia Regional Office of the World Health Organization would like to thank the epidemiologists and experts who have generated and shared the results of surveillance activities, with particular thanks to Dr. James Chin, and the staff of World Health Organization and UNAIDS Headquarters for their contributions to this document.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AIDS</td>
<td>acquired immune deficiency syndrome</td>
</tr>
<tr>
<td>AFRO</td>
<td>Regional Office for Africa</td>
</tr>
<tr>
<td>AMRO</td>
<td>Regional Office for the Americas</td>
</tr>
<tr>
<td>ANC</td>
<td>antenatal clinic attendees</td>
</tr>
<tr>
<td>BSS</td>
<td>behavioural surveillance survey</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td>EMRO</td>
<td>Regional Office for the Eastern Mediterranean</td>
</tr>
<tr>
<td>EURO</td>
<td>Regional Office for Europe</td>
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<tr>
<td>FSW</td>
<td>female sex workers</td>
</tr>
<tr>
<td>GDP</td>
<td>gross domestic product</td>
</tr>
<tr>
<td>GNP</td>
<td>gross national product</td>
</tr>
<tr>
<td>GPA</td>
<td>Global Programme on AIDS</td>
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<tr>
<td>HAART</td>
<td>highly active antiretroviral therapy</td>
</tr>
<tr>
<td>HIV</td>
<td>human immunodeficiency virus</td>
</tr>
<tr>
<td>HSS</td>
<td>HIV sentinel surveillance</td>
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<tr>
<td>IDU</td>
<td>injecting drug users</td>
</tr>
<tr>
<td>MSM</td>
<td>men who have sex with men</td>
</tr>
<tr>
<td>NGO</td>
<td>nongovernmental organization</td>
</tr>
<tr>
<td>NGU</td>
<td>non-gonococcal urethritis</td>
</tr>
<tr>
<td>PLWHA</td>
<td>People living with HIV/AIDS</td>
</tr>
<tr>
<td>RBG</td>
<td>risk-behaviour groups</td>
</tr>
<tr>
<td>RFSW</td>
<td>registered female sex workers</td>
</tr>
<tr>
<td>SEARO</td>
<td>Regional Office for the South East Asia</td>
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<tr>
<td>SSA</td>
<td>Sub-Saharan Africa</td>
</tr>
<tr>
<td>STD</td>
<td>sexually transmitted disease</td>
</tr>
<tr>
<td>STI</td>
<td>sexually transmitted infection(s)</td>
</tr>
<tr>
<td>SW</td>
<td>sex workers</td>
</tr>
<tr>
<td>UNAIDS</td>
<td>Joint United Nations Programme on HIV/AIDS</td>
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<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<tr>
<td>WPRO</td>
<td>Regional Office for the Western Pacific</td>
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</tbody>
</table>
1. HIV/AIDS status and trends in the Asia Pacific Region

Introduction

The 2001 WPRO/SEARO report on HIV/AIDS in Asia and the Pacific region presented an overview of the HIV/AIDS pandemic, followed by a description of the general patterns and prevalence of HIV risk behaviours and HIV prevalence trends in the region, as well as in individual countries in the region. This vast geographic region combines the WHO South-East Asia Region and the Western Pacific Region which comprises 60% of the total world population. Thus, even low HIV infection rates in this region will contribute to millions of additional people living with HIV/AIDS (PLWHA) and deaths to the already staggering global toll of AIDS. This report provides an update on HIV/AIDS in the region and focuses on the continuing HIV prevalence trends noted in the previous report and some changes that may be occurring with regards to the public health surveillance and epidemiology of HIV/AIDS. In addition, the epidemiological patterns of HIV, especially the current HIV transmission dynamics, are described for each country in this vast and diverse region.

HIV is primarily a sexually transmitted infection (STI) and, as with all STI, the major driving force of the pandemic is heterosexual transmission. Although high rates (50% and higher) have been found and may still occur among injecting drug users
(IDU) and men who have sex with men (MSM), more than 90% of the global total of estimated adult infections are due to heterosexual transmission. HIV/AIDS is present at varying prevalence levels in MSM in several regions of the world. Explosive spread of HIV still occurs among IDU populations worldwide and sexual transmission occurs throughout the world in both males and females, especially in those who have unprotected sex with multiple and concurrent partners, such as female sex workers (FSW). Extensive or epidemic heterosexual spread of HIV, affecting 1% or more of the sexually active population, has occurred in sub-Saharan countries, a few countries in the Caribbean and Central America, and a few countries in south and south-east Asia. Considering the presence of risk factors for HIV infection, such as high-risk behaviours and other sexually transmitted infections, and the vulnerability for HIV infection in the region, the major public health question is what actions need to be taken to maintain this low HIV prevalence. However, a response cannot be properly formulated without understanding the HIV epidemic status and trends in the region.

**Basic epidemiology and transmission dynamics of HIV**

**Sexual transmission**

The majority of HIV transmission is as a result of human behaviour that places an individual at significant risk of an HIV infection. The primary risk behaviours that place a person at significant risk of acquiring or transmitting an HIV infection include having unprotected sexual intercourse (vaginal or anal) with multiple and concurrent sex partners, and/or sharing drug-injecting equipment. The risk of HIV transmission via sexual intercourse (vaginal or anal) is facilitated by other factors including sexually transmitted infections (STI).

Two primary patterns of sexual transmission of HIV exist. The first (transmission between persons who have multiple and concurrent sex partners) is well recognized, and occurs among heterosexuals and MSM who commonly engage in such high-risk sexual behaviour. This pattern of heterosexual HIV transmission occurs globally, and such epidemic transmission affecting 1% or more of the 15-49 year old population has occurred in sub-Saharan Africa (SSA), several countries in the Caribbean, and a few countries in South and South-east Asia. This pattern was seen where there are: (1) high-risk patterns of sex partner exchange (multiple and concurrent); and (2) a high prevalence of factors that can facilitate HIV transmission.

The second pattern of sexual transmission (from HIV-infected persons – to his or her regular sex partner) has not formerly been fully recognized as being different from the first pattern. In recent years, the mode of heterosexual HIV transmission

---

1 Facilitating factors are not co-factors because they are not required for HIV transmission. Basically, any factor that can cause micro or macro lesion(s) in the genital or rectal epithelium (i.e., concurrent STD, especially ulcerative STD, traumatic sex, etc.) can be a facilitating factor.
in current high or low HIV prevalence countries throughout the world has increasingly been from HIV-infected persons (regardless of how they may have acquired their infection) to their regular sex partners.

During the early 1980s, extensive HIV transmission in MSM was documented in many cities throughout the world. Annual HIV incidence peaked in most of these MSM populations by the mid-1980s. However, in recent years, increasing sexual risk behaviours, especially among young MSM, have threatened to increase the current low HIV incidence in some MSM populations. There are insufficient data on HIV transmission in MSM in most countries in the region. However, some limited data indicate that many MSM in the countries of the region acquired their HIV infection outside the region. MSM networks in most countries are probably small, but detailed information on the patterns and prevalence of risk behaviours and HIV in this group needs to be collected to better assess the potential risk for extensive HIV transmission in this vulnerable population in this region.

**Transmission through injecting drug use**

Extensive and/or explosive HIV epidemics among IDU have occurred in about 100 areas throughout the world. Currently this is the primary mode of HIV transmission in many countries in Asia and in Eastern/Southern Europe. This type of transmission has been found in IDU who share injecting equipment with other IDU. Increasing drug use and increasing injecting drug use have also had an effect on HIV spread. More detailed information on the specific patterns and prevalence of IDU risk behaviours in the countries where HIV epidemics in IDU populations have not occurred needs to be collected to better assess the HIV epidemic risk potential in IDU who regularly share their injecting equipment.

**Transmission via blood transfusion**

HIV transmission via blood transfusion occurs only rarely in low HIV prevalence countries, even in those with limited HIV testing capabilities. Routine HIV screening of paid and volunteer donor blood has been implemented in virtually all countries during the past decade and transmission of HIV via blood transfusion is now not considered a major public health problem in the region.

Many thousands of haemophilia patients in many countries throughout the world received HIV-infected blood products in the early-to-mid 1980s. This mode of transmission has not been a problem since the mid-to-late 1980s, when manufacturing methods were changed to make these products safe. Extensive HIV transmission associated with HIV-contaminated plasma collection equipment was documented in Mexico during the late 1980s and in China up to about the mid-1990s. It has been estimated that the problem in China was widespread and may have infected a very large number of persons from the early 1990s to about the mid-1990s, when it was recognized. Hospital or medically acquired HIV infections have also been documented in Russia, Romania and more recently possibly in Libya. In sub-Saharan
Africa, because of the very high prevalence of HIV and the frequent use of a single needle and syringe for medical injections, this mode may account for up to 2%-3% of all HIV transmission in this region. Accidental needle sticks in a medical setting are always a potential but infrequent problem, but increasing attention to universal precautions in health care settings is still needed to limit potential HIV transmission via this route.

**Mother-to-child transmission**

Without any intervention, overall mother-to-child transmission (MTCT) rates range between 25% to 45% in developing countries\(^2\), and between 16% to 20% in Europe and North America. The prevalence and duration of breast-feeding, prematurity, and the maternal viral load, as well as the different methods used to classify infant infection status and calculate transmission rates, may account for the differences in reported perinatal HIV-1 transmission rates around the world. MTCT can occur during pregnancy — *in utero* or labour and delivery — intrapartum, and through breast-feeding - postpartum. The absolute risk for *in utero* transmission is estimated to be approximately 5% to 6%, and for intrapartum transmission, approximately 13% to 18%\(^3\). In many developing countries where breast-feeding is almost universally practised, postpartum transmission through HIV-1-contaminated breast milk has been widely documented. HIV-1 has been found in breast milk samples of HIV-1-infected women. Based on meta-analysis, the frequency of breast milk transmission for women with established infection was estimated to be 14%\(^4\). Data suggest that the risk of HIV-1 infection is highest in the early months of breast-feeding. A study conducted in Malawi demonstrated that, in infants born to HIV-1-infected mothers who had not received ARVs, the incidence per month was 0.7% during age 1-5 months, 0.6% during age 6-11 months, and 0.3% during age 12–17 months\(^5\).

The opportunities for prevention differ for these three periods. Several study findings show that using antiretroviral drugs (ARV) in pregnant women can result in a marked reduction of infant infections during pregnancy and labour. Replacement feeding to prevent postpartum transmission is not always feasible. However, it has been reported in some studies that the reduction of MTCT after ARV prophylaxis is sustained, though to a lesser extent, when breast-feeding is continued.

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Estimated global and regional HIV prevalence

During the 1990s, public health surveillance systems were developed to monitor HIV transmission patterns and to collect HIV data to estimate HIV prevalence in countries and in all major regions of the world. HIV prevalence estimates made by staff of the Global Programme on AIDS of the World Health Organization (GPA/WHO) from the late 1980s up to about the mid-1990s were conservative. Since then, global estimates have been produced and updated regularly by the UNAIDS/WHO global working group on HIV/AIDS surveillance, estimation and projection. The latest update of the UNAIDS/WHO working group on HIV/AIDS surveillance was in December 2003 and Table 1 shows the new global and WHO/regional estimates.

Global estimates

As of 1 December 2003, around the world 40 million people are living with HIV/AIDS. The sub-Saharan region accounts for 26.6 million infected people (more than two-thirds of the global total), with a decrease of almost 2 million persons living with HIV compared with 2001 estimates. An estimated 7.4 million people are living with HIV/AIDS in the Asia Pacific region. It has been estimated that, globally, 5 million people became newly infected in 2003, more than 1 million of them in the Asia Pacific region.

New data and better understanding has enabled UNAIDS and WHO to arrive at a more accurate estimate of HIV prevalence. New information shows that HIV prevalence in rural areas is lower and that the differences between prevalence rates in rural and urban areas are greater than previously assumed. In addition, the United Nation Population Division has made a downward adjustment to the estimated total populations of some countries, which means a smaller number of PLWHAs. Finally, in some sub-Saharan countries, such as Zimbabwe, Kenya and Zambia, national prevalence has dropped significantly, thereby decreasing the total number of PLWHAs.

WHO/regional estimates – summaries

Table 1 presents estimates of HIV prevalence as well as the major mode(s) of HIV transmission in WHO regions as of December 2003.

The highest prevalence rates are in the WHO Africa Region, where heterosexual encounters are the major mode of HIV transmission. The Asia Pacific region (WHO South-East Asia and Western Pacific Regions) includes a few countries with generalized heterosexual HIV transmission as well as several countries where IDU is the primary mode of transmission. The WHO Americas Region has a low-level mix of all transmission modes, in MSM and IDU. In the WHO European Region, the primary HIV risk behaviours are found in MSM and IDU. By the year 2003, close to 8% of the 15-49 year-old population in sub-Saharan Africa was infected. Heterosexual

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### Table 1: Estimated HIV prevalence in WHO regions - December 2003

<table>
<thead>
<tr>
<th>WHO Region</th>
<th>Adults and children living with HIV/AIDS</th>
<th>Adults and children newly infected</th>
<th>Adult and child deaths due to AIDS</th>
<th>Adults (15-49) living with HIV/AIDS</th>
<th>Children (0-15) living with HIV/AIDS</th>
<th>Estimated adult (15-49) prevalence rate</th>
<th>Major HIV risk behaviour groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFRO</td>
<td>26 600 000 (25 000 000-28 200 000)</td>
<td>3 200 000 (3 000 000-3 400 000)</td>
<td>2 300 000 (2 300 000-2 400 000)</td>
<td>24 500 000</td>
<td>2 100 000</td>
<td>8.0% (7.5-8.5)</td>
<td>Heterosexual</td>
</tr>
<tr>
<td>AMRO</td>
<td>3 000 000 (2 440 000-3 690 000)</td>
<td>260 000 (191 000-314 000)</td>
<td>100 000 (91 000-123 400)</td>
<td>2 900 000</td>
<td>80 000</td>
<td>0.6% (0.5-0.7)</td>
<td>MSM, IDU, SW</td>
</tr>
<tr>
<td>EMRO</td>
<td>600 000 (470 000-730 000)</td>
<td>55 000 (43 000-67 000)</td>
<td>45 000 (35 000-50 000)</td>
<td>650 000</td>
<td>40 000</td>
<td>0.3% (0.2-0.4)</td>
<td>IDU</td>
</tr>
<tr>
<td>EURO</td>
<td>2 100 000 (1 720 000-2 480 000)</td>
<td>270 000 (210 000-320 000)</td>
<td>30 000 (25 600-40 400)</td>
<td>2 100 000</td>
<td>20 000</td>
<td>0.5% (0.4-0.6)</td>
<td>MSM, IDU</td>
</tr>
<tr>
<td>SEARO</td>
<td>6 400 000 (4 600 000-8 200 000)</td>
<td>850 000 (610 000-1 100 000)</td>
<td>460 000 (330 000-590 000)</td>
<td>6 200 000</td>
<td>150 000</td>
<td>0.7% (0.4-0.8)</td>
<td>IDU, SW</td>
</tr>
<tr>
<td>WPRO</td>
<td>1 000 000 (700 000-1 300 000)</td>
<td>210 000 (150 000-270 000)</td>
<td>45 000 (32 000-58 000)</td>
<td>980 000</td>
<td>14 000</td>
<td>0.1%</td>
<td>Heterosexual, IDU</td>
</tr>
<tr>
<td>Global totals</td>
<td>40 000 000 (34 000 000-46 000 000)</td>
<td>5 000 000 (4 200 000-5 800 000)</td>
<td>3 000 000 (2 500 000-3 500 000)</td>
<td>37 000 000</td>
<td>2 500 000</td>
<td>1.1% (0.9-1.3%)</td>
<td>IDU, Heterosexual</td>
</tr>
</tbody>
</table>

These figures were provided by WHO Headquarters in collaboration with UNAIDS, with data distributed by WHO region. The estimates for 2003 are based on ranges provided by UNAIDS and WHO. There is always a high degree of uncertainty associated with such ranges, which are designed to define the boundaries within which the actual numbers lie, based on the best available information.
transmission predominates in sub-Saharan Africa and in the Caribbean region, which has the second highest prevalence rate (2.4%). All of the other regions have HIV prevalence rates of 0.6% or lower. The overall rate for the combined Asia and the Pacific region is 0.4%.

**WHO African Region (AFRO)**

**Sub-Saharan Africa (SSA):**

Nearly 8% of adults aged 15-49 are infected (UNAIDS and WHO, 2003). There are large differences in estimated HIV prevalence within the WHO African Region. The trends in HIV prevalence among antenatal clinics attendees in recent years suggest that the growth of the epidemic levelled off in the late 1990s. The trend is towards a slight increase in the southern sub-region, with prevalence between 20% and 40%, while in the Central and Eastern sub-region a decline is being observed. In some countries, such as Kenya, Ethiopia, Zambia and Zimbabwe, a significant decline is being noted. In Western Africa, most countries are maintaining the epidemic at the same low level. Heterosexual HIV transmission predominates in this region.

**WHO Region for the Americas (AMRO)**

The Americas include the United States of America, Canada, Central America, Latin America and the Caribbean sub-regions.

**North America:**

Around 20 000 new infections are among African-Americans, one in three transmitted through heterosexual contact. A recent US Centers for Disease Control study found that 34% of HIV-infected African-American men had reported sexual contacts with both women and men.

**Caribbean:**

In this sub-region, 12 countries face a generalized epidemic, with at least 1% prevalence among pregnant women. Heterosexual transmission is the main mode of transmission and it is only in Puerto Rico that injecting drug use drives the epidemic. Haiti is the most affected island, with 30 000 AIDS-related deaths a year and 120 000 orphans due to AIDS. Its adult prevalence rate remains stable at 5% to 6%.

**Central America:**

Most countries in Central America are facing a concentrated epidemic, where transmission occurs through men having sex with men and through heterosexual contacts. A few countries in this region, such as Guatemala, Honduras and Panama, have a national prevalence rate of 1%.

**Latin America:**

Studies in Colombia and Peru have revealed a prevalence rate of between 18% and 22% among men having sex with men, a large percentage of whom are also having unsafe sex with women.
WHO Eastern Mediterranean Region (EMRO)

North Africa and the Middle East:
HIV prevalence in this region is still very low. Sudan remains the most affected country, with a national adult prevalence rate of 2%, and contributes around 400 000 people living with HIV/AIDS to the total regional number of 600 000 infected persons. Nevertheless, rising HIV infections among injecting drug users in Libya, where 49% of all new patients visiting one drug facility centre were found to be HIV-positive, Iran and Bahrain are of serious concern.

WHO European Region (EURO)

Eastern Europe and Central Asia:
In this region a total number of 2 100 000 PLWHA are estimated, of whom 1 500 000 are living in Eastern Europe and Central Asia. The most affected countries are still the Russian Federation, Ukraine and the Baltic States. Russia accounts for around 1 million infected people. In Belarus and Moldavia the spread is continuing, while injecting drug use in Kazakhstan (estimated 200 000 injecting drug users) and Kyrgyzstan is dramatically increasing, and is up to 2% of the adult population in the latter.

Western Europe:
In this region, there were a total of 600 000 people living with HIV/AIDS by December 2003, with an adult prevalence of 0.3%. AIDS mortality drops each year, mainly due to implementation of widely available antiretroviral treatment. Nevertheless, there were an estimated 35 000 newly infected people as of December 2003 and the increasing rates of other sexually transmitted, such as syphilis in France, Ireland, the Netherlands and the United Kingdom are cause for concern.

Asia and the Pacific

WHO South-East Asia Region (SEARO)
By December 2003, there were an estimated 6.4 million PLWHA and 850 000 newly infected adults and children, and another 460 000 had died due to AIDS. The regional prevalence rate had increased slightly to 0.7%. The numbers in this WHO region are dominated by India, with an estimated 3.8 million to 4.58 million people living with HIV and AIDS (about two-third of the regional total) by the end of 2002. The Government of India estimate for 2003 is 4.58 million HIV infections in the country. High HIV infection rates are found in Thailand, Myanmar and five States of India.

Heterosexual transmission predominates, but there are significant areas where the HIV epidemic has emerged among injecting drug users in countries such as Indonesia, Nepal and Bangladesh (prevalence of 4% in Central Bangladesh), where until recently there was little or no HIV. In Thailand, where the epidemic is well established, there is significant spread from people with high-risk behaviour to their sexual partners.
WHO Western Pacific Region (WPRO)7

This region has a total of 980,000 adults and 16,000 children living with HIV and AIDS and an adult prevalence rate of 0.1%. China accounts for about 840,000 HIV infections—about two-thirds the regional total. A large proportion (about 90%) of HIV infections in China are attributed to transmission in IDU and to faulty plasma collection from paid plasma donors that occurred during the early to mid-1990s. In parts of China, high rates of HIV prevalence have been found in IDU, varying from 20% in Guangdong to 80% in Xinjiang. The highest HIV infection rates are found in Cambodia and Papua New Guinea. Papua New Guinea has an estimated HIV prevalence of around 1% among pregnant women attending antenatal clinics and 17% HIV prevalence among sex workers in certain areas. Viet Nam is facing serious HIV infection rates of more than 20% among IDU in most provinces, and heterosexual transmission among sex workers has reached an HIV prevalence rate of 8% in Hai Phong and 15% in Hanoi.

Estimated HIV prevalence trends in different regions

Regional HIV prevalence trends can obscure some individual country trends, but are, nevertheless, useful to monitor the general trends of the HIV/AIDS pandemic. To derive the prevalence trends shown in Figure 1, assumptions were made as to when extensive HIV transmission started in each region; then a curve was fitted to the estimates published by UNAIDS/WHO for the years 1995, 2001 and 2002.

Figure 1 shows clearly the increasing annual prevalence of HIV infections that have been estimated in sub-Saharan Africa from 1980 up through 2003. By the year 2003, about 25 million people of 15-49 years of age in sub-Saharan Africa were infected. The

7 These estimates for 2003 are based on ranges provided by UNAIDS and WHO. There is always a high degree of uncertainty associated with such ranges, which are designed to define the boundaries within which the actual numbers lie, based on the best available information. The estimates are continually being revised; although those given here are lower than those indicated in previous years, the broad range covers both current and previous estimates.
The region with the next highest number of HIV infections is South and South-East Asia, where the extensive HIV spread started after the mid-1980s and the total number of infected persons had reached about 6 million in 2002. Overall HIV prevalence in the Asia Pacific region (South and South-East Asia, plus East Asia and the Pacific) was about 7 million in 2002. In Western countries and Latin America, following explosive epidemics in MSM and IDU populations during the early-to-mid 1980s, prevalence peaked after the mid-1980s and has begun to level or decrease during the 1990s. In Western countries, there was a slight increase in HIV prevalence from 1995 to 2002 due to the increasing survival of HIV-infected persons since the advent, in the mid-1990s, of effective anti-HIV treatment. The sharp increase in HIV prevalence in Eastern Europe, Central Asia, East Asia and the Pacific, starting around the mid-1990s, is due primarily to explosive HIV epidemics in IDU populations. The annual estimated prevalence rates of HIV infections also increased during the period from 1980 to 2001.

**HIV/AIDS in the Asia-Pacific Region**

Table 2 lists all Asia Pacific countries in rank order by their estimated HIV prevalence rate, along with some assessment of the major RBG affected. As of 2002, only two Asian countries had an estimated national prevalence rate greater than 1% in their 15-49 year-old population – Cambodia and Thailand.

**HIV trends provided by HIV sentinel surveillance**

HIV sentinel surveillance (HSS) systems in high HIV prevalence countries in Asia were started at various times after extensive HIV transmission began in each country. However, from the available HSS data, the general HIV pattern and the median or mean HIV prevalence in FSW and antenatal clinic attendees (ANC) sentinel groups are similar, as shown in Figure 2 below.

**FIGURE 2:** HIV Sentinel Surveillance (HSS) Findings in Cambodia, Myanmar and Thailand
Table 2. Estimated HIV Prevalence and Major Mode(s) of HIV Transmission in Asia-Pacific Countries – 2002

<table>
<thead>
<tr>
<th>Country</th>
<th>Population 15-49</th>
<th>Number HIV Pos</th>
<th>HIV Prev %</th>
<th>HET¹</th>
<th>MSM¹</th>
<th>IDU¹</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>6 158 000</td>
<td>157 000</td>
<td>2.6</td>
<td>+++</td>
<td>--</td>
<td>--</td>
<td>Extensive heterosexual HIV transmission</td>
</tr>
<tr>
<td>Thailand</td>
<td>36 636 000</td>
<td>650 000</td>
<td>1.77</td>
<td>+++</td>
<td>--</td>
<td>++</td>
<td>from FSW to their male clients.</td>
</tr>
<tr>
<td>India</td>
<td>533 580 000</td>
<td>4 580 000</td>
<td>0.86</td>
<td>++</td>
<td>--</td>
<td>+</td>
<td>Major diversity between states.</td>
</tr>
<tr>
<td>Myanmar</td>
<td>25 855 000</td>
<td>#200 000</td>
<td>0.77</td>
<td>+++</td>
<td>--</td>
<td>++</td>
<td>Extensive HIV spread in FSW and IDU</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>2 491 000</td>
<td>16 000</td>
<td>0.64</td>
<td>++</td>
<td>--</td>
<td>--</td>
<td>Increasing heterosexual transmission.</td>
</tr>
<tr>
<td>Nepal</td>
<td>11 106 000</td>
<td>56 000</td>
<td>0.50</td>
<td>+</td>
<td>--</td>
<td>++</td>
<td>Extensive HIV spread in IDU networks, but</td>
</tr>
<tr>
<td>Myanmar</td>
<td>11 868 000</td>
<td>41 000</td>
<td>0.35</td>
<td>--</td>
<td>--</td>
<td>++</td>
<td>limited spread to regular sex partners of</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>43 343 000</td>
<td>130 000</td>
<td>0.30</td>
<td>+</td>
<td>--</td>
<td>++</td>
<td>HIV-infected IDU</td>
</tr>
<tr>
<td>Singapore</td>
<td>2 234 000</td>
<td>3 400</td>
<td>0.15</td>
<td>--</td>
<td>+</td>
<td>--</td>
<td>Importation and non-epidemic spread</td>
</tr>
<tr>
<td>China</td>
<td>726 031 000</td>
<td>840 000</td>
<td>0.12</td>
<td>--</td>
<td>--</td>
<td>+++</td>
<td>Focal IDU epidemics and plasma collection</td>
</tr>
<tr>
<td>Australia</td>
<td>9 933 000</td>
<td>12 000</td>
<td>0.12</td>
<td>--</td>
<td>++</td>
<td>++</td>
<td>Primarily MSM and IDU</td>
</tr>
<tr>
<td>Pakistan</td>
<td>67 964 000</td>
<td>76 000</td>
<td>0.11</td>
<td>--</td>
<td>--</td>
<td>++</td>
<td>Diverse patterns and spread in IDU.</td>
</tr>
<tr>
<td>Indonesia</td>
<td>118 163 000</td>
<td>111 000</td>
<td>0.09</td>
<td>--</td>
<td>--</td>
<td>++</td>
<td>Recent IDU epidemics</td>
</tr>
<tr>
<td>Fiji</td>
<td>443 000</td>
<td>300</td>
<td>0.07</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>Importation and non-epidemic spread</td>
</tr>
<tr>
<td>Hong Kong, China</td>
<td>4 134 000</td>
<td>2 600</td>
<td>0.06</td>
<td>--</td>
<td>+</td>
<td>--</td>
<td>Initial MSM importation</td>
</tr>
<tr>
<td>New Zealand</td>
<td>1 911 000</td>
<td>1 200</td>
<td>0.06</td>
<td>--</td>
<td>+</td>
<td>+</td>
<td>Primarily MSM</td>
</tr>
<tr>
<td>Lao P.D.R.</td>
<td>2 542 000</td>
<td>1 300</td>
<td>0.05</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>Primarily importation and then limited</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>10 685 000</td>
<td>4 700</td>
<td>0.04</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>spread to regular sex partners</td>
</tr>
<tr>
<td>Philippines</td>
<td>39 600 000</td>
<td>6 000</td>
<td>0.02</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>Low HIV prevalence among all HIV risk-</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>72 340 000</td>
<td>13 000</td>
<td>0.02</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>behaviour cohorts. The vast majority of</td>
</tr>
<tr>
<td>Japan</td>
<td>59 109 000</td>
<td>12 000</td>
<td>0.02</td>
<td>--</td>
<td>++</td>
<td>--</td>
<td>HIV infections are imported with some</td>
</tr>
<tr>
<td>Rep of Korea</td>
<td>27 558 000</td>
<td>4 000</td>
<td>0.01</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>limited transmission from these imported</td>
</tr>
<tr>
<td>DPR Korea</td>
<td>11 876 000</td>
<td>&lt;100</td>
<td>low</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>infected persons to their steady or regular</td>
</tr>
<tr>
<td>Mongolia</td>
<td>1 416 000</td>
<td>&lt;100</td>
<td>low</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>sex partners.</td>
</tr>
<tr>
<td>Bhutan</td>
<td>972 000</td>
<td>&lt;100</td>
<td>low</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Brunei</td>
<td>187 000</td>
<td>&lt;100</td>
<td>low</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Maldives</td>
<td>141 000</td>
<td>&lt;100</td>
<td>low</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Other Pacific</td>
<td></td>
<td>&lt;1100</td>
<td>&lt;0.1</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>countries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1 829 356 779</td>
<td>6 900 400</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


¹(-) Unknown or minimal HIV transmission; (+) limited HIV transmission; (+++) moderate HIV transmission; and (++++) major HIV transmission

* A national workshop in Myanmar estimated, for the end of 2001, that there were a minimum of 177 279 and up to 23 605 persons living with HIV.

In Thailand, the most detailed and comprehensive HSS system was started in 1989 when HIV prevalence had reached about 5% in the direct (brothel-type) FSW population. HIV prevalence in these Thai FSW would likely have reached levels of 40% or higher had the “100% condom use” intervention not been started in Bangkok during the early 1990s. By the mid-1990s, HIV prevalence in Thai direct FSW had peaked at about 34% and had decreased steadily to below 20% by the late 1990s. A measurable HIV prevalence rate was not detected in ANC in Thailand until 1991, several years after epidemic HIV transmission was noted in FSW. Around the mid-1990s, HIV prevalence in Thai ANC populations peaked at slightly over 2% and has decreased to less than 1.5% since 2000. IDU is the only population where HIV has not decreased over the past six to eight years.

In the other two high HIV prevalence countries (Myanmar and Cambodia), HIV prevalence in sentinel FSW groups reached levels of close to 40% or higher, but appears to have peaked in 1998 (Cambodia) and 2000 (Myanmar). HIV prevalence in various ANC sentinel populations in some parts of those countries appears to have levelled off in the late 1990s. Cambodia currently has the highest estimated national HIV prevalence rate (2.6% in 2002) in the Asia Pacific region, and also has the highest ANC prevalence rate (close to 3%), while national HIV prevalence in sentinel ANC samples in Thailand and Myanmar in 2001 were 1.4% and about 0.5%, respectively. The low estimated HIV prevalence for the ANC population in Myanmar is probably due to the inclusion of rural ANC sentinel sites for the first time in 2001.

All of these HSS findings are consistent with an initial epidemic increase of HIV prevalence from relatively small numbers of infected FSW to their more numerous male clients. Subsequently, infected male clients of FSW, and HIV-infected male IDU in Thailand and Myanmar, have been transmitting their infection, at a slow but steady rate, to their regular sex partners. Generally, these regular sex partners have minimal heterosexual risk behaviours and, therefore, continued HIV transmission into the “general” heterosexual population has not occurred at any measurable rate in any of these high HIV prevalence countries.

**HIV trends provided by HIV estimation**

In the Asia Pacific region, estimations of national HIV prevalence have been carried out by a variety of agencies and methods. Many countries, with the support of a donor agency and/or one of the WHO regional offices (SEARO or WPRO), have organized national meetings or workshops to develop national HIV prevalence estimates. These national meetings have usually included a group of national experts, along with some external consultants, to review all available HIV/AIDS data. Figure 3 presents national HIV prevalence trends from 1995 to 2002. The methodology and assumptions used for estimation of national HIV prevalence in Asian Pacific countries has been evolving and changing as the epidemiology of HIV in the region is better understood and as the quality of HIV surveillance data improves. As a result, UNAIDS/
WHO has cautioned that recent estimates of national HIV prevalence should not be directly compared with previous or possibly future estimates.

The unadjusted prevalence curve for Cambodia represents official annual prevalence estimates, whereas the adjusted prevalence curve used the most recent HIV surveillance data to “fit” and back-calculate a prevalence curve on the assumption that, compared with previous years, the most recent data are more accurate and representative. The Myanmar prevalence curve has not been “adjusted” but will require adjustment because the most recent prevalence estimate was derived using urban and rural ANC data, while previous estimates were derived using only urban ANC data. Regardless, in these high HIV prevalence countries, national HIV prevalence rates, adjusted or not, have, in conformity with their HSS data, been showing a decreasing trend since the late 1990s.

Figure 4 presents annual HIV prevalence estimates for all countries in the Asia Pacific region with an estimated HIV prevalence rate of <1% and >0.1%. HIV prevalence in India appears to have peaked in 1997 and has remained steady at the same level since 1999. However, India is a very large country with marked heterogeneity in the patterns and prevalence of HIV risk behaviours in individual States. A detailed review of all HSS data in India suggests that HIV prevalence in those States with the highest estimated HIV prevalence rates may no longer have been increasing over the last few years. HIV prevalence in Papua New Guinea has increased markedly since 1999 and all indications are that prevalence may continue to increase. HIV prevalence estimates in Malaysia have fluctuated widely and, in recent years, appear to have been levelling or decreasing, while estimated HIV prevalence has been steadily increasing in Viet Nam and China. From a review of all national HIV/
AIDS data, it is clear that HIV prevalence estimates for these two countries were overestimated prior to 1995. In Indonesia, extensive HIV transmission in the IDU populations has resulted in an increasing HIV prevalence trend in the last few years. More available data in the Philippines has enabled better estimation of HIV prevalence, giving lower rates in recent years compared with estimates in previous years.

**HIV epidemics in IDU populations in the Asia Pacific region**

In contrast to the relative success of public health measures for limiting epidemic HIV transmission via commercial sex, HIV epidemics in IDU populations continue almost unabated in many countries in the Asia Pacific region. About 100, often-explosive HIV epidemics have occurred in the past couple of decades throughout the world in IDU populations who routinely share needles and syringes. Since the mid-1980s, explosive spreads of HIV in IDU populations in the Asia Pacific region have occurred in India, Myanmar, Thailand, Malaysia, Pakistan, China, Viet Nam, and most recently in Nepal and Indonesia.

Indonesia provides an example of the sudden emergence of HIV among injecting drug users after long years of silence. The country has tested sex workers anonymously for HIV infection since 1988, expanding from two cities to cover 15 provinces. Year after year, this system registered virtually no HIV infection. The rate in IDU subpopulations, however, has risen rapidly over the past few years. In 1999/2000, HIV prevalence among IDU had already reached 15%. A year later, 40% of injectors in treatment in Jakarta were HIV-positive. In Bogor, in West Java province, 25% of injectors tested were HIV-positive, while in drug users tested in prison in Bali the prevalence rate was 53%.

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In Nepal, during the early 1990s, HIV prevalence remained under 1% among IDU. However, during the mid 1990s, no new HIV prevalence surveys were conducted. By 1998, 50% of IDU in a survey in Kathmandu tested HIV-positive. In early 1999, the National Centre for AIDS and STD Control of the Ministry of Health in Nepal conducted an HIV prevalence survey among IDU in 19 cities throughout the country. The results startled the HIV prevention community. The survey showed a national overall HIV prevalence of 40%, with Kathmandu, the capital, registering 50% of its IDU population HIV-positive.

Figure 5 shows HIV prevalence trends in six IDU epidemics in the region. All of these HIV epidemics probably started in the mid-to-late 1980s. All have shown no sign of any significant decrease in over a decade and most continue to show an increasing trend. The marked decrease in HIV prevalence (62% in 2000 to 24% in 2002) reported from Myanmar is not possible. Even if all new HIV infections in the sentinel IDU population in Myanmar were stopped after 2000, HIV prevalence in the IDU population could only have decreased to about 50%. Although there may have been some significant decreases in HIV prevalence in the last couple of years in Myanmar, the reported decreases are more likely in part due to differences in sampling and/or changes in the type of IDU populations included in sentinel surveillance.

Comparing the HIV prevalence levels in the various IDU epidemics in the Asia Pacific region is difficult because the specific type of IDU populations in each of the HSS systems may be different.
It is clear that those injecting drug users (IDUs) who inject and share injecting equipment frequently have the highest risk of acquiring or transmitting HIV infection, but injecting risk behaviours are constantly changing and most HSS systems probably include a varying mixture of types of drug users at different times.

Figure 6 presents unofficial estimates of the number of HIV-infected IDU in those countries with documented HIV epidemics in their IDU populations. These estimates represent an initial attempt to quantify the number of HIV-infected IDU in the region and many of the numbers will change as more data become available. The largest potential source of error in these estimates is the general difficulty in estimating the size of IDU groups who routinely share needles and syringes for injecting drugs. However, the following estimates are reasonable given the paucity and limitations of data concerning the specific needle sharing behaviours of drug users and the exact annual numbers of IDU in needle sharing networks in most countries of the region. Although “harm reduction” measures such as needle/syringe exchange to prevent HIV transmission have been shown to be effective public health interventions, there remains considerable opposition to such programmes because drug use is illegal in most countries and needle exchange programmes are thus also considered illegal.

Estimates of the total number of IDU in the region range from a low of about 2 million to 4 million, and the best “average” estimate of the total number of HIV-infected IDU in the Region is about 750 000, with about two-thirds of the regional total (300 000-500 000) in China. These infected IDU have transmitted, and can be expected to continue to transmit their HIV infection to a large proportion of their regular sex partners, and the number of such heterosexually transmitted infections from currently infected IDU could be up to 500 000 by the end of this decade. Thus, even if all HIV transmission in IDU via use of contaminated injecting equipment could be prevented after 2003, a total of about 1 250 000 HIV-infected IDU and their regular sex partners can be projected by the end of this decade. However, from the estimates of the relative numbers of IDU in the region and the general HIV prevalence trends observed over the past decade, it
could be conservatively projected that, until public health programmes can fully and aggressively implement harm/risk reduction interventions, the total number of HIV-infected IDU will probably double during this decade. Thus, a more realistic projection of the total number of HIV-infected IDU and their infected regular sex partners by the end of this decade is over 2 million. In addition, many of those HIV-infected persons could serve to intensify or facilitate epidemic heterosexual transmission in some commercial sex networks in those countries where epidemic heterosexual HIV transmission has not yet occurred.

Figure 6 also provides estimates of the percentage of the national total number of HIV infections in the IDU population. In countries where scant or no epidemic heterosexual HIV transmission has occurred, HIV infections in the IDU population comprise a large percentage (up to 50%) of all estimated HIV infections in the country (China, Indonesia and Malaysia). In countries where epidemic heterosexual HIV transmission has been the major mode of HIV transmission, HIV-infected IDU comprises a much smaller percentage of the national total, as in India (around 0.7%) and Thailand (about 20%).

**Projected Impact of HIV/AIDS in the Asia-Pacific Region**

**Clinical Burden of HIV Infections**

The clinical burden of HIV infections that can be expected during this decade in Asia-Pacific countries is directly related to their current HIV patterns and prevalence, and thus can be reliably projected using a scenario/modeling method developed by GPA/WHO during the late 1980s. In the countries which currently have an estimated HIV prevalence of less than 0.1%, annual AIDS deaths are projected to be less than 1% of all adult deaths throughout the first half of the coming decade. The clinical impact of AIDS and other HIV-related conditions in the five Asia Pacific countries (Papua New Guinea, India, Nepal, Malaysia and Viet Nam) with estimated HIV prevalence rates of > 0.1% and < 1% of the 15-49 year-old population will increase annual adult deaths by about 5% during the coming decade, with most of these AIDS deaths in young male IDU and male clients of FSW.

For the high HIV prevalence countries (Cambodia, Thailand, Myanmar and several states in India), annual AIDS deaths may be expected to increase the total number of annual deaths in the 15-49 year-old population by up to 30%-40%. For example in Phayao province in northern Thailand, the crude death rate increased dramatically, from 5.3 per 1000 in 1986 to 6.8 in 1993 and 9.5 in 1996. No condition other than HIV/AIDS could explain that increase. By 1994, AIDS had become the leading cause of mortality in the province. It represented 11.3% of all deaths, and 18.2% of all deaths if those cases where AIDS was the suspected cause of death but was not medically

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confirmed were included. The AIDS death rate in 1994 was 1.53 per thousand, hitting men 5.2 times more than women at age 25-34 (55.3% of the total). Some 40% of them were single. Between 1986 and 1996, mortality among men aged 25-34 and among women aged 20-29, increased eight to nine-fold.10

**Pediatric AIDS and maternal AIDS orphans**

The problem of paediatric AIDS and maternal AIDS orphans in the region is, as with most of the other HIV/AIDS issues/problems in this region, diverse and difficult. The estimated numbers of paediatric AIDS cases and maternal AIDS orphans are directly related to the number of HIV-infected females of child-bearing age and their fertility rates. In Asia Pacific countries with a measurable HIV prevalence, the prominent risk behaviour groups are FSW (including their male clients) and/or IDU. As a result, there is usually a marked male preponderance of HIV infections compared with female infections. This is because most IDU are male, and the epidemiology of FSW and their male clients in most countries also results in a preponderance of infected males. A relatively small “core” group of highly exposed FSW can develop very high HIV infection rates and transmit infection to their many male clients. This accounts for the very large male preponderance of HIV infections in the early phase of a heterosexual HIV epidemic in Asia Pacific countries. In the latter phases of an Asian heterosexual HIV epidemic, the male-to-female ratio begins to decrease as infected males begin to infect their regular female sex partners (i.e., their wives or girlfriends). These factors (low HIV prevalence, a much higher male-to-female ratio of HIV infection), plus a much lower age-specific fertility rate in this region compared with sub-Saharan Africa, accounts for the relatively low rate of mother-to-child transmission of HIV in the Asia Pacific region compared with sub-Saharan Africa. With the possible exception of the high HIV prevalence countries/states in the region, the current numbers of paediatric AIDS cases and orphans in Asia Pacific countries are low and are expected to remain low. In the baseline scenario, today roughly 4000 Thai children are being infected with HIV each year. By 2006, roughly 2500 children per year will develop AIDS. As with adult AIDS and deaths, paediatric deaths will track the paediatric AIDS cases quite closely (around 2500 per year). However, with the ongoing short-course AZT nationwide programme, the number of children infected annually can be cut in half by the end of 2006. This would result in over 6000 children being saved from HIV.11

Persons with latent infection with *Mycobacterium tuberculosis* (*Mtb*) and who are also infected with HIV develop clinical tuberculosis (TB) at an increased rate. Modeling of the interaction between HIV and *Mtb* infections provides useful estimates and projections of the additional TB cases that may be expected annually in different epidemiological

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10 UNAIDS Case Study 2000. Available at www.UNAIDS.org
situations. In sub-Saharan Africa, high HIV prevalence (10%-35%) and high Mtb infection rates (more than 50%) are present in young and middle-aged adults. The prevalence of Mtb infection in young and middle-aged adults in the countries is relatively high (ranging from 35% to over 70%). However, HIV prevalence levels range from well less than 0.1% in most countries of the Asia Pacific region and up to 2%-3% only in Cambodia, Thailand, Myanmar, and several states in India.

In sub-Saharan Africa, a more than 2-3 fold increase in the annual numbers of clinical TB cases can be expected during this coming decade. In Cambodia, under the worst-case scenario, the annual number of HIV-related TB cases in the 15-49 year old population could, by the end of this decade, equal the expected annual number of TB cases that would occur in the absence of HIV. Figure 7 presents the TB situation in relation to HIV in Chiang Rai, Thailand. In terms of progression, the annual risk of developing active TB varies from 7% to 10% in individuals infected both with TB and HIV, compared with less than 1% in those who are HIV-negative, and the lifetime risks are estimated at 60% and 10%, respectively.

Most Asia Pacific countries with current low to moderate HIV prevalence rates can expect to have a modest increase in HIV-related TB of from 5% to 10% or less. However, it is expected that HIV-related TB will increase, especially in areas of high HIV prevalence.

**AIDS deaths**

Although HIV/AIDS rates in the Asia Pacific region are relatively low when compared with the current rates in sub-Saharan Africa, the absolute numbers of annual AIDS cases and deaths in the 15-49 year-old age group in the region will be high. As of
2003, there were an estimated 7 million persons of 15-49 years of age who were living with HIV in the region and about 5 million (over 70%) were in India and China. For most of this decade, nearly half a million people will die because of AIDS every year in Asia.

**HIV/AIDS Care including antiretroviral treatment (ART)**

In order to address the growing needs of people living with HIV/AIDS in the Asia Pacific region, it is a matter of urgency that countries in the region develop HIV/AIDS care, including antiretroviral treatment (ART), the price of which is continuing to fall. It is estimated that around 1 million people need ART, while less than 5% of those are currently receiving the treatment. WHO is fully committed to achieving the global “3 by 5” target – getting three million people on ART by 2005. WHO and its partners have declared failure to provide AIDS treatment a global health emergency.

The expansion of ART treatment is expected to dramatically reduce the stigma and discrimination attached to the disease, and thus markedly increase the uptake of voluntary counselling and testing, and to contribute to the prevention of HIV transmission. ART itself may reduce HIV transmission from those who receive it to their partners. However, it should be noted that prevention interventions, such as harm reduction among IDU and condom promotion, which have proved effective in reducing HIV transmission and are relevant to the countries in the region, are still severely underfunded. Therefore, since the national HIV/AIDS programmes in most countries in the region are supported significantly by external donors, and the cost of routine ART is completely out of reach, mobilization of massive donor support is urgently needed.

A cascade of interventions for antiretroviral treatment largely depends on the number of people who know their HIV status through voluntary counselling and testing (VCT) services in the first place, as well as the availability and capacity of appropriate care and treatment services to ultimately screen for eligibility and provide antiretroviral treatment.

The dilemma that confronts most Asia Pacific countries is whether grossly inadequate public health funds should be divided to provide some semblance of support for both types of programme. This is a classic public health triage situation, and most policymakers are hesitant to take the difficult policy decision to maximize government support to primary prevention programmes. This is especially difficult when the choice may in some instances be providing funds for needle-exchange programmes or providing funds for anti-HIV drugs to treat an infected child. In an ideal world, there would be sufficient support for both prevention and treatment/care programmes. However, for most Asia Pacific countries, this tension and competition between HIV prevention and treatment/care programmes will continue and, as a result, there is a potential likelihood that risk-reduction, including harm-reduction programmes that are required for effective prevention of HIV in the Asia Pacific region, will continue to be severely underfunded.
Concern about the potential economic impact of AIDS stems from two prominent aspects of the epidemiology and natural history of HIV infection. The first is that HIV primarily infects the most sexually active age group (15-49 years) and this is also the most economically productive age group. The second is that the severe immune deficiency resulting from HIV infections will kill infected persons in their prime productive period. Although the macroeconomic effect of AIDS is likely to be small in Thailand, the effect on the health sector and the poor will be severe. “Among the households that suffer AIDS deaths, lower income will mean that those households will be less able to cope with the medical expenses and loss of incomes...”12. Therefore, the microeconomic impact of AIDS deaths in this region will continue to be significant and will tend to worsen poverty and increase inequity in the poorest households. According to a study carried out during mid-1990s by Mechai’s group, Thailand would have lost US$ 9 billion due to AIDS by 2000, most of the costs being indirect and due to premature deaths and lost productivity, since most of the people dying of AIDS would be young men and women at their most productive age. The costs relating to medical care would be relatively smaller.

Potential HIV/AIDS scenarios

So far epidemic heterosexual HIV transmission, affecting 1% or more of the 15-49 year-old population has occurred in Thailand, Cambodia, Myanmar, and several States in India, namely Andhra Pradesh, Karnataka, Maharashtra, Manipur, Nagaland and Tamil Nadu, resulting in estimated HIV prevalence of 1%-3% in the 15-49 year-old population of these countries and States.

In Asia Pacific countries where extensive HIV transmission has occurred primarily in IDU and/or MSM, estimated national HIV prevalence has generally been more than 0.1%, but well less than 1%, although heterosexual transmission for IDU is well recognized. These countries include Malaysia, Pakistan, Viet Nam, Singapore, China, and most recently Nepal and Indonesia. In most of these countries, HIV infections (mostly imported) are clearly spreading via slow heterosexual transmission. Considering various risk factors and the vulnerability for HIV infection in these countries, the critical public health question is, if such epidemic spread begins, what actions should be taken to prevent the current HIV prevalence rate from rising to the level of the high prevalence countries mentioned above. In Papua New Guinea, some sexual behavioural research in suggests that sexual networking in the country may deviate quite significantly from other countries and more closely resembles some sexual cultures in Africa. In this case, it is possible that an HIV epidemic may eventually spread in a pattern and to an extent similar to those seen in some sub-Saharan African countries. A wide range of social, economic and cultural factors in Papua New Guinea have led to an environment in which sexual risk behaviours, including low levels of condom use in casual partnerships, are widespread.

The danger of HIV “bridging” into the general heterosexual population from infected bisexual/MSM and/or IDU continues to be a public health concern. In most heterosexual populations, HIV-infected bisexual males and/or IDU will transmit their infection to their regular sex partners. However, in the absence of a high-risk pattern and a high prevalence of heterosexual risk behaviours in these regular sex partners, HIV cannot penetrate much further into the heterosexual population. Heterosexual HIV transmission from HIV-infected IDU to their regular sex partners is currently present in China, north-eastern India, Indonesia, Malaysia, Myanmar and Viet Nam. Nevertheless, high HIV prevalence has been found among FSW, many of whom are IDU or the regular sex partners of HIV-infected IDU. Such relatively high HIV prevalence in FSW increases the risk of igniting some epidemic heterosexual HIV transmission. These situations require rapid and aggressive implementation of both harm reduction among IDUs and targeted condom programmes for the high-risk population.

IDU populations and the large number of poor rural farmers, among others, who have been infected as a result of faulty plasma collection procedures since the early 1990s, together comprise the largest number of HIV-infections in China. From the estimated hundreds of thousands of HIV-infected persons from these two routes of HIV transmission, there has and continues to be slow and steady HIV transmission to regular sex partners. Behavioural surveillance data collected from IDU and FSW groups in China show that the levels of heterosexual and IDU risk behaviours continue to be very high in these groups. A very large proportion of FSW report that they never use condoms and a relatively large proportion of IDU groups continue to share injection equipment. The finding of a high level of heterosexual risk behaviours in some areas of China, especially in the “mobile working population” is also worrisome. Thus, the potential for heterosexual HIV transmission is present.

HIV-risk behaviours are present in the Philippines, but not at very high levels compared with countries such as Thailand and Cambodia. The average number of male clients that FSW have per day or week is much lower than in other countries and the percentage of males who routinely use FSW is several times less than in other countries. The national AIDS programme has participated in the development of HIV behavioural surveillance and the findings from these studies have been used to develop programmes to minimize HIV risk behaviour.

In the Lao People’s Democratic Republic, a country with a low estimated rate of <0.1%, social research studies in three regions recorded tolerant attitudes toward multiple partner sex but little real evidence that it was common. Furthermore, a survey of knowledge, attitudes and behaviours indicated that only 11% of males reported 10 or more total lifetime sexual partners. Commercial sex is beginning to re-emerge in most urban areas, but is almost all indirect and very expensive relative to per capita income. Prostitution (both direct and indirect) is subject to more severe punishment in the Lao People’s Democratic Republic than is observed in neighbouring countries. For these reasons, the intensity and prevalence of commercial sex is relatively low.

The most likely HIV/AIDS scenario for current moderate to low HIV prevalence countries in the Asia Pacific region is that focal and concentrated HIV transmission in IDU and FSW can be expected. A Thailand or Cambodia-type HIV/AIDS scenario is unlikely for most Asia Pacific countries because of the relatively lower intensity of heterosexual risk behaviour, i.e. sex partner exchange rate for female sex workers and proportion of males who routinely use FSWs.

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In the Asia Pacific region, extensive epidemic heterosexual HIV transmission has only occurred in countries where a large percentage of the male population (more than 10%) frequent FSW on a regular basis and where there are large pockets of direct, brothel-type, sex establishments where FSW have up to thousands of male clients annually. Each Asia Pacific country should be able to identify some major potential populations with the highest heterosexual risk behaviour (“hot-spots”) for epidemic heterosexual HIV transmission and to give these populations the highest priority for primary HIV prevention programmes. If epidemic HIV transmission can be prevented from occurring in the highest heterosexual risk populations, such as FSW with many hundreds to thousands of clients per year, then it is unlikely that epidemic HIV transmission will develop in heterosexuals with lower sex partner exchange rates.

All other countries in the region (Brunei, Bhutan, East Timor, Japan, the Lao People’s Democratic Republic, Mongolia, the People’s Democratic Republic of Korea, the Pacific islands countries, the Philippines, the Republic of Korea, and Sri Lanka) had an estimated HIV prevalence rate in 2002 of well less than 0.1%. However, all countries in the region, regardless of their current HIV prevalence level, will need to closely monitor all situations that tend to increase heterosexual risk behaviours, especially commercial sex. These situations include: border areas with extensive population movement, extensive migration and/or travel away from stable social environments, such as from rural to urban areas for employment, seasonal workers, migrant workers, military, sailors/merchant seamen, long distance truck drivers, large development or construction projects, etc. Primary HIV prevention programmes will need to be targeted to these vulnerable populations wherever they may be.

Conclusions

Although the HIV prevalence is low, as of 2003 in most countries in the Asia Pacific region, major public health concerns remain because of prevalent high-risk behaviours and vulnerabilities and the potential for epidemic spread.

HIV continues to spread in all countries of the region except Thailand and Cambodia, where the HIV prevalence in several population groups has begun to decline.

A slow, but steady HIV prevalence increase over the next 5 to 10 years in populous countries such as China, India and Indonesia can result in 10-20 million new HIV infections if no effective HIV prevention programmes are established.

In many countries of the region, HIV transmission first began among populations with high-risk behaviours and, in several countries, this was followed by transmission in the general population. Therefore, the highest public health priority is to target persons with the highest HIV risk behaviours to protect these populations from HIV infection and prevent further transmission of HIV to persons with lower risk behaviours.
While HIV transmission generally involves risk behaviours that are socially unacceptable and often illegal, the sexual transmission from a HIV-infected person to his or her regular sex partner is generally via legally and morally sanctioned sex. The current HIV strategy to limit or prevent heterosexual HIV transmission (such as condom promotion in all commercial sex encounters) is ineffectual in dealing with regular sexual relationships. Prevention of HIV transmission requires modification or elimination of those behaviours that place a person at risk of acquiring or transmitting an HIV infection and provision of voluntary counselling and testing.

Education programmes, including HIV-risk behaviour change programmes and access to the means of behavioural change (e.g. provision of condoms, etc.) for all persons who may engage in risky sexual behaviours (non-regular sex or injecting drug), especially adolescent and youths (less than 20 years of age), remain important public health interventions. In countries where resources are scarce, resources should be made available after targeted programmes for the highest HIV risk behaviour groups are adequately supported.

Effective prevention of HIV infections requires a basic understanding of HIV transmission dynamics. The potential of HIV transmission in a region, subregion or country should be evaluated based on the pattern(s) and extent of (i) commercial and other sex networks, and (ii) the IDU population.

These indicators should include:

- prevalence of untreated and ulcerative STI;
- percentage of the male population who indulge in sex with female sex workers on a regular basis;
- sex partner exchange rates; and the percentage of consistent condom use for commercial and casual sex encounters;
- frequency of injecting drugs, and
- sharing injecting equipment.

Such an assessment, based on STI and behavioural data, can identify the situations with the highest potential for an HIV epidemic. It would then be possible to design and focus primary prevention strategies where they are most needed and most effective. Based on the available data regarding patterns and prevalence of risk behaviours, the most likely HIV/AIDS scenario for current low to moderate estimated HIV prevalence countries is that HIV transmission is likely to occur, especially if effective prevention programmes (harm reduction for IDU and the condom promotion and condom programme for commercial sex) are not rapidly and fully implemented. Recognizing the threat of emerging or fast-growing HIV epidemics in specific populations is essential to an early and effective response. Equally crucial is the acknowledgment that rapid and extensive spread of HIV into most general
heterosexual populations can be stopped or minimized through effective response among populations with high-risk behaviour. Such informed decision-making leads to more rational and efficient use of resources, as well as focusing interventions towards individuals who need them most.

The common thread that runs through all epidemic situations is that the major HIV risk behaviour groups affected (MSM, IDU, FSW and their clients) are socially marginalized and engage in socially unacceptable and often illegal behaviour(s). Injecting drug use and sexual risk behaviours are difficult subjects for government or official agencies to deal with. Over the past few years, considerable interest has been generated in provision of effective treatment for HIV/AIDS and for development of an AIDS vaccine. Besides enhancing access to ART, scaling up of primary prevention efforts, such as behaviour change programmes, must remain an important and urgent priority. Significant research into the distal and proximal determinants of human risk behaviours, such as substance abuse and having multiple and concurrent sex partners, also needs priority support by the international community. Until there is full public and policy-maker acceptance of the need to develop and expand effective risk behaviour change programmes and effective HIV risk behaviour reduction or elimination programmes are implemented, HIV will continue to spread in the Asia Pacific region.
This section of the report provides additional details on the HIV/AIDS situation for each country in the Pacific Region. Countries will be presented in a descending order, starting with countries with the highest estimated HIV prevalence rate to the countries with the lowest estimated HIV prevalence rates (see Table 2).
CAMBODIA

Cambodia is a small country (total population estimated in 2002 was about 12 million, with just over 6 million in the 15-49 year-old age group) lying in the south-western Indo-Chinese Peninsula in south-east Asia. It is bordered by Thailand, the Lao People's Democratic Republic and Viet Nam, and by the Gulf of Thailand. Cambodia has a developing economy, and it is one of the world's poorest countries, with a per capita GNP of less than US $300 – only the Lao People’s Democratic Republic and Nepal have a lower per capita GNP in the Asia Pacific region.

HIV/AIDS situation

HIV infections were first detected in Cambodia through serologic screening of blood donors in the early 1990s. However, the general magnitude of HIV transmission in Cambodia was not fully described until the completion of the first HIV Sentinel Surveillance (HSS) round in 1995. HIV sentinel groups that year included eight different populations in nine provinces located mainly on the Thai border, where HIV infections were suspected to be high. The results provided the first evidence of a highly disseminated HIV epidemic, with prevalence of HIV up to 38% among FSW, 8% among police and the military, and about 2.5% among women attending antenatal clinics (ANC).

Extrapolating from data collected from continued annual HSS rounds, HIV prevalence in Cambodia was estimated at the end of 1998 to have reached a high of about 175 000 infections in the 15-49 year-old population. HSS data collected in 2000-2002 indicate that HIV prevalence has decreased in all sentinel groups and that the national HIV prevalence is continuing to decline, similar to the trend in Thailand. The estimated national HIV prevalence for the year 2002 is 157 500 (2.6%) and remains the highest estimated prevalence rate in the Asia Pacific region.

The main conclusions from a detailed review and analysis of the 2002 HSS data include:

- HIV prevalence is not increasing in any sentinel group.
- HIV prevalence is continuing to decline in FSW, both direct and indirect.
• HIV prevalence appears to be levelling off in ANC nationally and in each of the three major regions.

• HIV prevalence in blood donors continues to be unacceptably high – about 2%.

• The clinical caseload of HIV infections is increasing annually (HIV-related TB, AIDS cases and deaths, and pediatric HIV infections.

• HIV prevalence in ANC in Cambodia probably overestimates HIV prevalence in the general population of females.

• An increasing, if not the major route of heterosexual HIV transmission in Cambodia is now from HIV-infected males to their regular sex partners.

• Cambodia needs to prepare to provide anti-HIV treatment to annual cohorts of about 22 000-25 000 HIV-infected persons who become clinical candidates for HAART therapy.

HIV-risk behaviours

The first HIV behavioural surveillance survey (BSS) in Cambodia was started in 1997. A preliminary behavioural survey, on a smaller scale, was conducted one year before. From 1996 to 1999, the consistent condom use rate increased from 38% to 90% among sex workers, and from 65% to 85% among the police. Some studies have reported that about 20%-50% of the Cambodian police force have visited sex workers in the past year. These findings clearly reflect the increasing programme activities on condom promotion in sex work in the country. The BSS also showed that the partner exchange pattern is one of the highest in the Asia Pacific region. The mean number of clients during the previous night was 3.2 per sex worker.

Other STI

STI prevalence surveys in Cambodia were planned to be undertaken in 1996, 2000 and again in 2003. In 1996, STI prevalence rates were found to be high among sex workers. These rates varied by site and ranged from 4%-19% for syphilis (confirmed by TPHA), 17%-26% for Chlamydial infection (by LCR) and from 20%-34% for gonorrhoea (by culture).

Estimated clinical impact of HIV

Based on an estimated HIV prevalence of about 160 000 in 2002, the clinical caseload of AIDS deaths, as well as HIV-related TB cases, can be estimated and projected with some confidence up to the year 2005.
In the Asia Pacific region, Cambodia, even prior to the introduction of HIV/AIDS, had one of the highest estimated annual mortality rates (from all causes) in the total 15-49 year-old population—about 6-7 per 1000 per year. Thus, even in the absence of AIDS, over 30 000 deaths were expected to occur in this age group in the year 2002. The estimated annual number of AIDS deaths in this age group in Cambodia ranges from over 11 000 in the year 2002 and gradually increases to close to 15 000 in the year 2005, an increase in total deaths in this most productive age group of almost 50%.

The expected numbers of HIV-related TB cases in the 15-49 year-old population in the year 2000 is between 5000-6000 and, by 2005, this number is projected to increase to about 10 000 cases. These numbers represent an increase in the total TB case-load in this age group of close to 15% in the year 2000, and over 20% in 2005.

Overall, the clinical case burden of HIV-related disease(s) and conditions estimated and projected for Cambodia will be the most severe in the Asian Pacific region. This resource poor country will require much additional technical and fiscal support to adequately respond to these severe medical and social problems.
THAILAND

Thailand is situated in the west of the Indo-Chinese Peninsula of south-east Asia. Thailand shares land borders with Myanmar (Burma), the Lao People’s Democratic Republic, Cambodia and Malaysia. In 2002, the population of Thailand was estimated to be about 62 million, with about 36.6 million in the 15-49 year-old age group. Persons speaking Tai languages account for nearly four-fifths of the total population. Almost one-fifth of the population lives in urban areas. More than one-third of the population is younger than 15 years.

Thailand has a predominantly market economy based largely on services, light industry and agriculture. The GNP is increasing much more rapidly than the population. The country continued to have a trade deficit during the 1980s and into the 1990s. Thailand is among the more developed countries in Asia and, during the early 1990s, became ineligible for some bilateral donor assistance.

HIV/AIDS Situation

Thailand was the first country in Asia to document HIV epidemics among IDU and FSW and their clients. After a brief period of denial of a significant HIV epidemic, the country organized a national programme, supervised from the highest level of government, to respond to the HIV epidemics. Thailand has a very comprehensive HSS system that has provided reliable information on HIV trends in selected sentinel populations throughout the country.

The Thai HSS system was started in 14 provinces in 1989 and expanded to all 76 provinces by 1990. The system includes blood donors, ANC, IDU, male STI clinic patients, and FSW, both in brothels (direct) and in massage parlours and other places (indirect).

In addition to HSS data, HIV data on IDU in Thailand have been supplemented by separate IDU serosurveys. In Bangkok, in late 1987, 1% of IDU were HIV-positive. By the end of 1988, that rate had increased to 30%. Since 1988, HIV prevalence in IDU tested has remained between 20%-50% both in and outside Bangkok.

HIV surveillance data in Thailand indicates that HIV prevalence peaked in FSW and their clients around the mid-1990s and has been slowly decreasing since then (see Figure 9). As of the end 2002, about 1.8% of the total 15-49 year-old population in Thailand are estimated to be living with HIV. Only Cambodia, with an estimated prevalence of 2.6%, has a higher HIV prevalence rate in Asia.

The Thai HSS data showed very clearly that epidemic HIV transmission has essentially been limited to the highest HIV-risk behaviour groups (RBG) and from these RBG to some of their regular sex partners. Since the mid-1990s, HIV prevalence in ANC has been steadily decreasing. This indicates that HIV does spread to a limited extent.
from infected male clients of FSW to their wives and other regular sex partners and from infected IDU to their wives and other regular sex partners, but not much further.

The HIV/AIDS situation in Thailand is closely monitored and projected (modelled) for public health and health care planning by a national expert group – the Thai Working Group on HIV/AIDS Projection (2000) and the following summary information was provided in their most recent report.

The state of the Thai HIV/AIDS epidemic as of 2001:

- 984,000 people (951,000 adults and 33,000 children) have been infected with HIV in Thailand since the start of the epidemic.
- 289,000 of these people have subsequently died of AIDS.
- 695,000 people are currently living with HIV and AIDS in the country.
- 29,000 new infections will occur this year of which 4,200 will be in children.
- 55,000 Thais will develop serious AIDS-related illnesses this year requiring medical care, and approximately the same number will die of AIDS complications.

These estimates indicate:

- Approximately 2% of Thai men and 1% of Thai women are living with HIV.
- Infection levels in the adult male population will remain above 1.5% until the end of 2006.
- Each year, up until the end of 2006, over 50,000 Thais will die from AIDS-related causes.
- Over 90% of these AIDS-related deaths will occur in people aged 20-44, the most productive sector of the workforce.
- Unless prevention efforts are sustained at a high level, the epidemic could quickly regain momentum and start to increase rapidly.
HIV/AIDS prevention in Thailand

Although Thailand has had substantial success in HIV prevention efforts, close to 30,000 new infections continue to occur each year, according to Thai authorities. At present almost three-quarters of a million people in the Kingdom are living with HIV or AIDS, creating serious demands for care and social support.

Since it was recognized from the beginning of the HIV epidemics in Thailand that most HIV transmissions were occurring through commercial sex, major efforts were focused on reducing the number of males visiting FSW and promoting condom use in all commercial and casual sexual interactions. These efforts substantially changed the levels of risk behaviour in the country:

- The percentage of adult men visiting FSW annually has fallen from almost 25% of the population to roughly 10%, and
- Condom use when visiting sex workers has become the norm.

The Thai expert group has estimated that these behaviour changes have prevented millions of HIV infections in Thailand during the past decade.

However, as with most other countries in Asia and throughout the world, Thailand has not had much success in reducing HIV prevalence in their IDU population. HIV prevalence among Thai IDU ranged from 30%-40% during most of the 1990s, increased to about 50% in 2000 and was about 40% in 2002.

The noted “success” of Thailand with their 100% condom programme for all commercial and casual sex has not had much effect on the slow but steady transmission of HIV from infected male clients of FSW and from infected male IDU to their regular sex partners (wives and girlfriends). In addition, Thailand’s HIV/AIDS prevention interventions have suffered because of the economic crisis in Asia during the late 1990s. The Thai Ministry of Public Health budget for HIV decreased following the crisis in 1997 and many of the international donors (AUSAID, USAID) that left Thailand during the economic boom years have not returned. Thus, overall there are currently fewer resources for HIV/AIDS prevention and treatment in Thailand than before.

Thailand has tried to provide routine anti-HIV treatment to all HIV-infected persons. With the decreasing national AIDS programme budget and the increasing costs of multidrug treatment regimes, it is unlikely that Thailand will be able to provide optimal HIV treatment to any significant percentage of the more than half a million undetected HIV-infected adults during the coming decade. However, the recent decreases in the price of most anti-HIV drugs will mean that a larger number of HIV-infected Thais will receive anti-HIV treatment during this decade.
India

India is one of the largest countries in southern Asia – geographically it is the seventh largest and second most populous nation in the world. Its estimated total population in 2002 was close to one billion, with over a half a billion in the 15-49 year-old age group. India shares land borders with Pakistan, China, Nepal, Bhutan, Myanmar, and Bangladesh. The shift of population from rural to urban areas is slower in India than in most developing countries, but one-quarter of the total population is now urban.

India has a developing mixed economy in which both the public and private sectors participate. India’s economic growth, though fairly steady since independence in 1947, has until recently been slow, and its GNP per capita remains among the lowest in the world.

HIV/AIDS situation

HIV infections were likely imported into India in the early-to-mid 1980s. The first case of AIDS in India was detected in 1986. Since then, HIV infections have been reported in almost all states and union territories.

With a large population, a small change in the HIV epidemics in India will have a major impact on the epidemic picture in Asia and the Pacific, as well as globally. Most of the Indian states have a population greater than the majority of the countries in Africa. The spread of HIV within India is – at least – as diverse as the societal patterns between its different regions, states and metropolitan areas. As a result, tracking HIV patterns, prevalence and trends, and implementing effective interventions pose a serious challenge to public health programmes. Although HIV prevalence is low in the majority of Indian states, the numbers of HIV infections overall are high. The epidemics vary from states with heterosexually transmitted infections predominating, in Maharashtra and Tamil Nadu, to infections concentrated among IDU and their partners, in Manipur.

The distribution of HIV/AIDS in India is very heterogeneous. HIV epidemics are focused very sharply in a few southern states with most of India having extremely low rates of infection. It is noteworthy that 21 of the 31 states only report 4% of the
total reported national AIDS cases. The major impact of HIV/AIDS is being felt in Maharashtra in the West, Tamil Nadu in the south with adjacent Pondichery, and Manipur in the north-east.

All of these findings highlight the fallacy of considering average national HIV/AIDS figures in India for measuring HIV/AIDS epidemics. India clearly has areas very severely affected by HIV/AIDS, and yet, as of 2002, major portions of the country still have very low HIV prevalence. Unless this differential is taken into account when planning interventions, efforts are likely to be inadequate in some areas and inappropriate in others. The epidemiology of HIV in some of the low HIV prevalence states may be very similar to that in neighbouring Nepal – where large numbers of male migrant workers go to high HIV prevalence areas such as Mumbai for work and then return, HIV-infected, to their home states.

With a high prevalence of TB infection in India, the problem of TB related to HIV infection also poses a major public health challenge to those states with relatively high HIV prevalence.

Between 1994 and 1997, HIV prevalence among STI clinic attendees in Maharashtra State increased from 6% to 36%, and prevalence in IDU in Manipur increased from 25% to 61%. However, there were insufficient numbers of sentinel surveillance sites to give an adequate picture of the overall HIV situation. There was non-participation of some states, inadequate representation of various risk groups, no representation of the rural population, and a scattered schedule of rounds of collection. In order to obtain a better HIV prevalence estimate for India, the National AIDS Control Organization (NACO) instituted a National HIV Sentinel Surveillance (HSS) programme. States were given guidelines on the selection of HSS sites to adequately represent the various population subgroups and a regularly scheduled timetable for surveillance was instituted.

In 2001, HSS surveys were conducted in 320 sites (about 100 more sites than in the 2000 HSS surveys) in all states and union territories. The HSS sites included 135 sites in STI clinics, 170 in antenatal clinics, 13 sites for IDU and 2 sites for MSM. The data collected were analysed to monitor HIV prevalence trends in specific HIV risk behaviour groups over the years and also used to derive a national HIV prevalence estimate.

Based on the HSS data, HIV prevalence levels in the 15-49 year-old population can be broadly classified into three groups of states/union territories in the country.

**Group I**: High HIV prevalence states: includes Maharashtra, Tamil Nadu, Karnataka, Andhra Pradesh, Manipur and Nagaland, where the HIV infection is at least 1 % or more in antenatal women.

**Group II**: Moderate HIV prevalence states: includes Gujrat, Goa and Pondicherry, where HIV infection has reached 5% or more among high-risk groups, but HIV prevalence is below 1 % in antenatal women.
Group III: Low HIV prevalence states: includes remaining states, where the HIV infection prevalence in any of the high-risk groups is still less than 5% and is less than 1% in antenatal women.

Sentinel surveillance data from antenatal clinics in seven metropolitan cities in the country indicate that HIV infection has reached 2% in Mumbai, is more than 1% in Hyderabad, Bangalore, and Chennai, and is less than 1% in Calcutta, Ahmedabad, and Delhi. These data clearly indicate that HIV-infected persons in these areas are transmitting their infections to spouses or other regular sex partners.

Estimation of national HIV prevalence

WHO/UNAIDS have made some efforts in the past to estimate the total burden of HIV infections in the country, using data generated by NACO and other publications from various research Institutes in India. The past estimates of national HIV prevalence developed by these organizations since 1990 are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Source</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>GPA/WHO</td>
<td>0.05 - 0.2 m</td>
</tr>
<tr>
<td>1992</td>
<td>GPA/WHO</td>
<td>1 million</td>
</tr>
<tr>
<td>1993</td>
<td>GPA/WHO</td>
<td>2 million</td>
</tr>
<tr>
<td>1994(end)</td>
<td>NACP</td>
<td>1.75 million</td>
</tr>
<tr>
<td>1996(mid)</td>
<td>UNAIDS/WHO</td>
<td>2.5 million</td>
</tr>
<tr>
<td>1997(mid)</td>
<td>MAP</td>
<td>2.5 million</td>
</tr>
<tr>
<td>1998(mid)</td>
<td>NACO</td>
<td>3.5 million</td>
</tr>
<tr>
<td>2000(mid)</td>
<td>NACO</td>
<td>3.9 million</td>
</tr>
<tr>
<td>2001(mid)</td>
<td>NACO</td>
<td>3.97 million</td>
</tr>
<tr>
<td>2003</td>
<td>NACO</td>
<td>4.58 million</td>
</tr>
</tbody>
</table>
In 1998, NACO convened a group of national and international experts to review the results of the first round of the expanded HSS, with the goal of producing state-specific and national estimates on HIV/AIDS. The new calculations provide greater consistency in making a national estimate of HIV prevalence, and the working estimate derived from this consensus meeting – 3.5 million people living with HIV and AIDS in mid-1998 is well within the range of previous estimates. Similar estimation processes were held in 2001 and 2002 and the national prevalence estimate was increased for 2000 to 3.9 million, for 2001 to 3.97 million and for 2003 to 4.58 million.

**Behavioural surveillance**

Realizing the need of behavioural data, behavioural surveillance has figured as an important activity in AIDS II Project. A protocol on behavioural surveillance has been finalized after intensive consultation with sociologists and behavioural scientists. This protocol for initiating this activity has been provided to states and union territories.

**Estimated clinical impact of HIV**

Based on the HIV prevalence estimate of 4.58 million in the year 2003 in the 15-49 year-old population, and on the estimated age and general shape of the annual HIV incidence curve, the annual numbers of AIDS cases and deaths are expected to increase considerably in the future. It needs to be appreciated that the estimated deaths will be distributed according to the current HIV prevalence present in the different states.

The vast majority of these estimated and projected AIDS cases/deaths will be concentrated in the current high HIV prevalence states of Maharashtra, Tamil Nadu, Karnataka, Andhra Pradesh and Manipur. There will be few AIDS cases and deaths in the current low HIV prevalence states in the central and northern portions of India. Similarly, the distribution of pediatric AIDS cases and maternal AIDS orphans and HIV-related TB cases will also occur mostly in the five southern states with the highest current HIV prevalence rates.
MYANMAR

Myanmar shares borders with Thailand, the Lao People’s Democratic Republic, China, Bangladesh and India. Its estimated total population in 2002 was close to 49 million, with about 25.9 million in the 15-49 year-old age group. Myanmar is one of the least densely populated countries in Asia, and the rugged, forested portion of its terrain is still only lightly settled; it is a land of villages, where less than one-quarter of the population live in urban areas. The annual population growth rate is somewhat high by world standards, but is about average for south-east Asia. Myanmar has a centrally planned, developing economy that is largely nationalized and is based principally upon agriculture and trade. The GNP per capita, however, remains one of the lowest in the world.

HIV/AIDS Situation

HIV was probably introduced to Myanmar in the mid-to-late 1980s. HIV prevalence among IDU in the capital, Yangon, had reached 73% by 1989. Since then, HIV infection rates among IDU tested in Yangon and Mandalay have ranged from over 50% to 85%. HIV prevalence among sex workers tested in Yangon and Mandalay has increased from a median of 4% in 1992 to 26% in 1997 and 32% in 2002. HIV prevalence among ANC tested in Yangon and Mandalay increased from no evidence of infection in 1992 and 1993 to 0.8% in 1995. HIV prevalence among ANC remained about 2% in 1998, 1999, 2000, and 2002. Outside the major urban areas, HIV prevalence in some ANC tested in 2000 reached up to 5%. HIV infection among military recruits tested in Yangon and Mandalay increased from 0.5% in 1992 to 1.4% in 2000 and 2% in 2002.

Rates and general trends of HIV infection in IDU, sex workers and pregnant women have been similar to those found in Thailand but, in recent years, there has been a clearly decreasing prevalence trend in Thailand while the prevalence trends in Myanmar have been more level. The 2002 HSS findings are presented in Table 3.

Table 3: 2002 HIV Sentinel Surveillance Findings in Myanmar and Thailand

<table>
<thead>
<tr>
<th>Sentinel Population</th>
<th>Myanmar</th>
<th>Thailand</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDU</td>
<td>24.1%</td>
<td>41.7%</td>
</tr>
<tr>
<td>Direct FSW</td>
<td>32.3%</td>
<td>12.3% (33.2)*</td>
</tr>
<tr>
<td>Male STI patients</td>
<td>6.5%</td>
<td>4.6%</td>
</tr>
<tr>
<td>Military recruits</td>
<td>2.0%</td>
<td>0.5%</td>
</tr>
<tr>
<td>ANC</td>
<td>2.1%</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

*Highest level reached in 1994
The general HIV patterns and prevalence in Myanmar have some similarity to those observed in Thailand. However, there are some major differences in HIV trends in Thailand compared with Myanmar:

- Both countries have had very high HIV prevalence in their IDU populations during the past decade, with HIV prevalence reaching a high of over 70% in Myanmar in 1993 and in Thailand reaching a peak of over 50% in 2001. In the last couple of years, HIV prevalence in IDU sentinel populations in Myanmar has decreased markedly from 62.7% in 2000 to 40.9% in 2001 and 24.1% in 2002. However, such a marked decline is not possible and, although there may have been some decrease in HIV prevalence in IDU in the last two years, it is more likely that this marked decrease may be related to changes in definitions or sampling of IDU in the HIV sentinel surveillance system. A baseline survey of IDU in Myanmar in 2002 found that only about 50% of IDU routinely share needles and syringes and it is possible that the most recent denominators used to calculate HIV prevalence in IDU included all IDU rather than only those IDU who routinely share injecting equipment.

- HIV prevalence peaked among direct and indirect FSW in Thailand around the mid-1990s and has been decreasing since then. In Myanmar, HIV prevalence in direct FSW has shown no signs of any marked decrease, but appears to have been somewhat level since 2000.

- HIV prevalence in military recruits in Thailand peaked in the mid-1990s at close to 4% and decreased to 0.5% in 2001 and 2002. HIV prevalence in military recruits in Myanmar has remained at about 2% since the late 1990s.

Figure 10: HIV Sentinel Surveillance - Thailand and Myanmar
• HIV prevalence in Thailand among ANC peaked at slightly over 2% in the mid-1990s and has been slowly decreasing to about 1.5% in 2000 and 1.39% in 2002. Up to the end of 2002, there does not appear to be any peaking of HIV prevalence in ANC in Myanmar, but the most recent HSS summary for ANC sentinel sites did not include several new rural ANC sites that indicated that rural ANC HIV prevalence was much lower than that found in urban ANC sites and these findings resulted in a very much lower national HIV prevalence estimate for Myanmar in 2002 because 70% of the ANC population live in rural areas.

• All the available HIV/AIDS data indicate that peaking of HIV prevalence in FSW in Thailand was a direct result of the “100% condom programme”, started by the Thai AIDS programme for FSW and their male clients during the early 1990s. A 100% condom programme was started on a pilot basis in late 2000 in four townships in Myanmar, but it is too early for these pilot programmes to have had any measurable effect on HIV prevalence among FSW. Based on some limited behavioural surveillance started in 1997, it appears that consistent condom use rates among FSW in Myanmar increased from about 30% in 1997 to about 50% by 2000 but, as of 2002, there are no clear indications that there has been sufficient condom use to significantly lower HIV prevalence among FSW or male STI patients.

Estimated Clinical Impact of HIV

Based on the revised HIV prevalence estimate of about 200 000 in 2002, the annual number of AIDS deaths in Myanmar is estimated to be close to 20 000 in 2003 and this annual toll will steadily increase, approaching 30 000 in 2010.
PAPUA NEW GUINEA

Papua New Guinea is an island country in the south-west Pacific Ocean, encompassing the eastern half of the island of New Guinea and a chain of tropical islands. The country is bounded on the west by Indonesia’s half of the island (West Papua) and on the north by the Pacific Ocean, on the east by the Pacific and the Solomon Sea, and on the south by the Coral Sea and Torres Strait, which separates the island from Australia. Its estimated population in 2002 was 5.2 million, with about 2.5 million in the 15-49 year-old age group.

Papua New Guinea’s ethnic composition is extremely complex. There are more than 700 ethnic entities, which can be divided into two large groups: Papuan, comprising more than four-fifths of the total population; and Melanesian, less than one-sixth. The rest are Polynesian, Chinese and European. Ethnic Papuans live in the interior and southern sections, and Melanesian peoples live in the north and east and in the outlying islands. Papua New Guinea possesses a developing mixed economy based to a large extent on the export of mineral and agricultural products. The GNP is growing almost as rapidly as the population. Most of the population exists primarily in subsistence, non-monetaryized but largely self-sufficient economy.

HIV/AIDS situation

The first HIV infections in Papua New Guinea were reported in 1987, with HIV prevalence increasing annually throughout the early 1990s. At the end of 2002, the cumulative total was 6503 cases, 1047 HIV infection cases and 1654 AIDS cases, and there had been 299 reported deaths due to AIDS-related illnesses. Reported cases are equally distributed among men and women, with a slight increase favouring male (51% males and 46% females). The trend in the annually reported number of AIDS cases has continued to rise more sharply each year since the mid-1990s. HIV infection appears to be concentrated but there is concern about a high potential for a generalized epidemic in the capital city of Port Moresby in 2002, with an increase in the prevalence rate among pregnant women from 0.37% in 1998, to 0.9-1% in 2002 and 1.35% in 2003. Much higher levels of infection have been found in FSW (17% in Port Moresby and 3% in Lae in 1998) and among patients attending STI clinics (7% in 1999, increasing from 3% in 1998 to 9% in 2002 in Port Moresby, and from 0.7%-1.2% in 1997-1999 to 1.58%-6.33% in 2003 in four other locations. Prevalence remains low among blood donors (0.065%) and in homosexuals (0.114%).

The estimated HIV prevalence in Papua New Guinea in 2002 was about 16 000 or 0.6% of the total 15-49 year-old population and is continuing to increase slowly due primarily to heterosexual transmission. However, a much higher HIV prevalence is found in 15-29 year-old females (in 2002) compared with males of the same age.
Risk behaviours

A wide range of social, economic and cultural factors in Papua New Guinea have led to an environment in which sexual risk behaviours, including low levels of condom use in casual partnerships, are widespread. There have been a few behavioural surveys carried out recently. Among sex workers, the proportion reporting consistent use of condoms was around 15% in Port Moresby and Lae in 1999. The mean number of clients per sex worker was 3-5 per week. Sexual behaviour surveys among sex workers indicate a predominant practice of vaginal intercourse, but 30% also report anal sex. A similar proportion reports forced sex and group sex.

STI

STI prevalence surveys in Papua New Guinea show a high STI prevalence among both high-risk and low-risk groups. A 15% prevalence of gonorrhoea among Highland populations and 36% among sex workers were found. Chlamydia prevalence was up to 26% in Highland populations and 31% in sex workers. The prevalence of syphilis was 4% in Highland populations and 32% in sex workers. Trichomoniasis was found in 45%-50% of both the low-risk and high-risk populations.

Estimated clinical impact of HIV

Based on an estimated HIV prevalence of about 13 800 in 1999, using Epimodel, it was projected that there will be about 15 000 HIV infections and close to 2000 cumulative AIDS deaths in 2000. The annual number of AIDS deaths was projected to be about 750 in 2000 and close to 2400 in 2006.
NEPAL

The Kingdom of Nepal is a highly heterogeneous country in terms of geography, ethnicity, language and culture. Nepal is landlocked, shares borders with India and China and is made up of 75 districts in five different development regions (Far-Western, Mid-Western, Western, Central and Eastern). The Himalayas cover the northern third of the country from east to west, bordering China. To their south lies a long east-west stretch of lower mountains (the hilly region) whose southern flanks flatten into the Terai, a fertile sub-tropical plain spanning the border with India. These contours have played a major role in helping to determine the geographical and social diversity that characterizes Nepal. As a result of its years of geographic and self-imposed isolation, Nepal is one of the least-developed nations of the world. The population of Nepal in 2001 was estimated to be about 23.15 million, with over 11 million in the 15-49 year-old age group.

In the Human Development Report 2002, Nepal features among the poorest countries in the world both in economic terms as well as sociocultural parameters. Nepal’s social indicators remain well below the average for the South Asia region: more than 40% of the Nepali population live below the national poverty line, nearly half of all children below five years are underweight, and nearly 60% of all adults are illiterate. Additionally, women traditionally have a lower status than men and gender inequity is deeply rooted. Nepal is one of the few countries worldwide in which men live longer than women.

The pressure of population growth on scarce and fragile land means that the benefits of better education or irrigation are often outweighed by more fragmented land and reduced availability of forest products, upon which most of the rural population depends for all or part of its livelihood. In Nepal, the topography, environmental degradation, poverty and economic migration are all linked, and they combine with other factors to increase vulnerability to HIV.

HIV/AIDS situation

In Nepal, as with virtually all other countries in the Asia Pacific region, the first cases of AIDS or HIV infection were detected during the late 1980s and early 1990s either in a foreign visitor or in a citizen who returned from international travel. During the early 1990s, HIV seroprevalence surveys detected HIV infections among STI patients and FSW throughout most regions of Nepal. As a result, there is great public health concern that extensive spread of HIV, similar to that documented in several neighbouring countries (Thailand, Myanmar, Cambodia, and parts of India), might occur. IDU in Nepal were initially believed to share injection equipment in relatively small and isolated networks. However, but since the mid-1990s, an explosive increase in HIV infection (infecting about half of all IDU throughout the country), has occurred.
Nepal also has a unique situation with regard to the number and mobility of FSW and young males who work in India. Large numbers of young Nepalese girls are recruited as FSW to Indian cities, and large numbers of young Nepalese males working in India frequent FSW there and within Nepal. Thus, in addition to the increasing number of HIV infections occurring among persons with high HIV-risk behaviours in Nepal, there are also increasing numbers of Nepalese FSW and young male Nepalese workers who have been infected with HIV in India, and who have or will be returning to Nepal. Estimates range from 1.5 to 2 million Nepali who work outside the country, 1 million alone in different parts of India. In early 2001, a study was conducted in a district in the far-western region, which found that 10% of male migrants returning from Mumbai (India) were HIV-positive.

The estimated HIV prevalence in Nepal by the end of 2002 was about 60 000 or close to 0.5% of the 15-49 year-old population. Asian countries with the highest HIV prevalence (from 2-3% of their 15-49 year-old populations) in the region all have large brothel-based FSW as a dominant factor. Because Nepal’s pattern of FSW is primarily non-brothel-based, it appears likely that HIV prevalence in Nepal may not reach such high levels. However, the current pattern of having a large percentage of Nepalese male migrant workers returning HIV-infected from high HIV prevalence areas in India will continue until the 100% condom intervention is effectively implemented in the high HIV prevalence areas in India.

**Estimated clinical impact of HIV**

Based on an estimated HIV prevalence of about 60 000 as of the end 2002, the annual numbers of AIDS deaths that can be expected in the years 2002-2005 is about 6000. These annual AIDS deaths are estimated to increase total deaths in the 15-49 year-old age by over 5% in 2002 and this annual impact will continue to increase slowly during the remainder of this decade.
Malaysia is composed of two noncontiguous regions – Peninsular, or West Malaysia, and East Malaysia. Peninsular Malaysia is bordered to the north by Thailand and to the south by Singapore. In 2002, the total estimated population was 24,526,200, with 13,058,100 in the 15-49 year-old age group. Ethnic Malays constitute about two-thirds of West Malaysia’s (Peninsular) inhabitants. Chinese who migrated from south-eastern China make up about three-tenths of the population, and Indians, Pakistanis, and Tamils (from Sri Lanka) account for most of the remainder. The population of East Malaysia is even more diverse than that of Peninsular Malaysia. The main groups are Chinese (about one-third of the population) and some 25 ethnic groups, as well as smaller tribal subgroups.

Peninsular Malaysia has about four-fifths of the country’s population. Approximately 58% of the population was urban in 2002, and the trend of migration is towards the cities. Malaysia has a predominantly market economy that has been transformed from one heavily dependent on the production and export of raw materials to one that is much more diversified. The New Economic Policy and its successors were designed to reduce poverty among Malays and other indigenous people. The GNP per capita is, after Singapore and Brunei, the third highest in south-east Asia.

**HIV/AIDS situation**

The first AIDS case in Malaysia was reported in December 1986. Since then, the number of HIV infections reported to the Ministry of Health continue to rise to 51,256 at the end of 2002. Data on HIV/AIDS have been collected through various surveillance activities such as case reporting, routine screening at drug rehabilitation centres and prisons, and special or ad hoc studies.

Routine HIV screening activities throughout the country were started in 1986 among blood donors, IDU, prisoners, delinquent girls in the rehabilitation centres, sex workers arrested by police, STI patients and those suspected to be exposed to HIV. Since 1998, TB patients and ANC attendees at government antenatal clinics have been included in routine HIV screening.

The majority of reported HIV-infections (76.3%) contracted their infection through injecting drug use. A nationwide study of IDU in 1998 showed that 81% shared needles and 21% shared more than once per day. Transmission through sexual intercourse accounted for 13% of HIV infections (12.1% in heterosexuals and 0.9% in MSM).

Malaysia is considered a country with a concentrated epidemic (WHO/UNAIDS classification) with HIV epidemics primarily among its IDU population. HIV prevalence is still very low in the ANC population (0.039% in the year 2002, with about
357,850 women tested, 0.02% in 2001, with 343,030 tested, and 0.03% in 2000, with 286,390 tested), and in the blood donor population (0.035% in 2002, with over 400,000 blood donors tested). The Consensus Meeting in 2001 noted that HIV prevalence rates in pockets of FSW and STI patients in major cities were beginning to exceed 5%. However, overall prevalence throughout the country in these risk behaviour groups are still probably less than 5%.

The Consensus Meeting also estimated a total of 42,000 HIV cases in 2000.

**Estimated clinical impact of HIV**

Based on an estimated HIV prevalence of about 42,000 in 2000, over 4000 AIDS deaths can be expected in 2003, and it is projected that the annual number of AIDS deaths will be close to 6000 in 2010. The vast majority of these deaths will be in 35-49 year-old males.
VIET NAM

Viet Nam, in south-east Asia, had an estimated total population of over 79 million in 2002, with 43.3 million in the 15-49 year-old age group. The country shares land boundaries in the north with China and in the west with the Lao People’s Democratic Republic and Cambodia.

Viet Nam has a centrally planned, developing economy that is largely based on agriculture. In 1986, Viet Nam began to move towards an economy that utilized market forces and incentives and tolerated private enterprise. Viet Nam’s GNP per capita remains one of the lowest in the world.

HIV/AIDS situation

HIV/AIDS infection has been reported in all 61 provinces/cities throughout the country. From sentinel surveillance data collected over the past few years, it is possible to describe at least three somewhat separate HIV epidemics in the country. The most advanced HIV epidemic started among older male IDU in cities of south and central Viet Nam. HIV prevalence among these men varies from 5% to over 50%. A new group of younger men in the southern provinces, who are starting to inject heroin after beginning use by smoking or snorting it, are starting to blend in with this older epidemic. There are also some women in the south who are beginning to inject heroin and who are FSW. A second and more recent HIV epidemic is among young male IDU who live along the main heroin trafficking routes and in cities in the far north of the country and in the Red River Delta. The third HIV epidemic is developing among women who are FSW in the southern provinces, especially in the Mekong Delta area and in provinces bordering Cambodia. Most of these FSW acquired their infection in Cambodia and/or in Viet Nam close to the Cambodian border. Sentinel surveillance data show an overall increasing trend of HIV infection in sentinel groups.

The most recent epidemiological data, as of late 2002, indicate that HIV prevalence is increasing across all sentinel groups, with a rapid increase in IDU (from 9.6% in 1996 to 29.35% in 2002). A sharp increase has also been found among sex workers in Ha Noi (from 3.8% in 1998, to 11.5% in 2001 and 14.5% in 2002) and in HoChi Minh City (from 3.8% in 1998 to 23.4% in 2001). However, how much of this increase is due to sexual transmission or via IDU is not clear since a large proportion of these sex workers are either IDU or the regular sex partners of IDU. In 2000, drug use among street-based sex workers was reported as 20% in Ha Noi and 43% in Ho Chi Minh City (up from <1% in 1996). IDU had the highest prevalence at most sentinel sites (>80% in Ho Chi Minh City, Binh Dinh) in 2001. These accounted for about 60% of the cumulative number of reported HIV infections, as of late 2002.
An expert national committee estimated HIV prevalence in 2000 to be about 122,000 (ranging from 107,000 to 137,000) for a prevalence rate of 0.29% in the 15-49 year-old population. A national meeting on HIV/AIDS epidemiology and relevant responses in Viet Nam was convened in November 2002, and an updated national HIV prevalence estimate was planned to be made in 2003. It was recommended that the representativeness of the national HSS should be reviewed. For example, it was recommended that there should be more community-based HIV surveys for groups such as FSW and IDU. In addition, rural site surveys should be designed for antenatal women since all the current ANC sites are in urban centres. Since the majority of the Viet Nam population is rural, the finding of significantly lower HIV prevalence in rural ANC sites could potentially reduce the current national HIV prevalence estimate.

A comparison of HIV prevalence findings among blood donors in 2001, compared with HSS results in ANC populations, adds to the need for further caution in using HIV prevalence findings from urban-based ANC HSS sites as a surrogate of the total sexually active population in Viet Nam. In 2001, HIV screening of blood donors was expanded to all provinces and districts and can be considered to be a more representative national sample. In 2001, about 170,000 blood donations were screened and 0.08% were found to be HIV-positive. In contrast, in 2001, 0.4% of the ANC population from urban ANC HSS sites were found to be HIV-positive.

**High risk behaviours**

Baseline surveys of a project, conducted in 2002 in five provinces (Lai Chau, Quang tri, Dong thap, An Giang, Kien giang) by the National Institute of Hygiene, showed that:

- The frequency of needle sharing (in the last month) among IDU ranged from 15.3% to 29.2% (>40% in Ho Chi Minh City in behavioural surveillance surveys). Only 15.1% - 32.3% of IDU had consistently used condoms with FSW during the last 12 months.

- Among FSW, consistent use of condoms with non-regular and regular clients during the last 12 months was found to be lowest in Kiengiang (14.1%, 15.2% respectively for street-based FSW, and 18.2%, 15.9% respectively for karaoke-based FSW).

- Among PLWHA, only 23-50% had used a condom at the last sexual intercourse.
Sexually transmitted infections

In a survey in Ha Long, Quang Ninh, a tourism city, about one-fifth of ANC attendees had any STI, including HIV infection. Surveys among antenatal clinic women showed a rate of 1% positivity for *Treponema pallidum* (5 provinces/cities), and from 2%-3% (three cities, 1995) up to close to 5% (Ha Noi, 1998) for Chlamydial infection. Among FSW, most recent STI prevalence surveys, conducted by the Pasteur Institute HCMC in five provinces, showed higher prevalence rates for *Treponema pallidum* (10.7%), *Neisseria gonorrhoeae* (10.7%) and *Chlamydia trachomatis* (11.9%). According to the BSS, STI was reported in more than 30% of female sex workers in three out of the five cities surveyed, and between 7% and 13% in the two others.

*Estimated clinical impact of HIV*

Based on a HIV prevalence of about 122 000 in 2000, and using different assumptions for the annual HIV incidence curves for the IDU epidemic and the heterosexual epidemic, the annual number of AIDS cases was estimated and projected using Epimodel. Close to 4000 AIDS deaths are estimated in 2000 and the annual total of AIDS deaths projected for 2005 is over 20 000.
SINGAPORE

Singapore is an independent city-state country located at the southern tip of the Malay Peninsula. It is separated from Peninsular (West) Malaysia by the Straits of Johor and from the Indonesian islands by the Straits of Singapore. The total population of Singapore, including foreign residents, was 4.2 million in 2002. The local resident population was 3.4 million, with 1.9 million in the 15-49 year-old age group. The median age of the resident population was 34.9 years and the growth rate of the resident population was 1.8% in 2002. Over the past decade, Singapore’s resident population has grown on average by about 2% annually. The ethnic distribution in the resident population has remained stable, with 76.5% Chinese, 13.8% Malay and 8.1% Indians.

Singapore’s population is virtually all urban. The average life expectancy at birth for all Singaporeans was 78.7 years in 2002, which is among the highest in the region. Females have a longer life expectancy at birth of 80.6 years compared with males, whose life expectancy at birth is 76.8 years. Singapore’s infant mortality rate is among the lowest in the world. In 2002, it was 2.5 per 1000 live births.

Singapore has a predominantly market economy based largely on international trade and finance. The GDP per capita is the highest in south-east Asia.

HIV/AIDS situation

The first HIV infection was reported in Singapore in 1985. Since then, the annual numbers of reported HIV/AIDS cases have continued to rise. Up to the early 1990s, MSM (including bisexuals) comprised the majority of reported cases of HIV/AIDS. Since then, heterosexual transmission has become the most common mode of HIV transmission among Singaporeans.

As of June 2003, the cumulative number of Singaporeans reported with HIV was 1941. AIDS cases numbered 1133, with a total of 744 deaths resulting from AIDS. Sexual transmission was the main mode of transmission among Singaporeans. Up to the end of 2002, 96.6% of all HIV-infected Singaporeans contracted their infection through sexual transmission. The majority of cumulative reported cases were found among men (87.5%), and among heterosexuals (75.9%). MSM (including bisexuals) accounted for 20.7% of the cumulative total of reported HIV-infected cases. Much smaller proportions contracted the infection through intravenous drug use (2%) or blood transfusion (0.2%). Almost two-thirds of cases were between the ages of 30 and 49 years at the time of diagnosis.
HIV seroprevalence surveys have been conducted since 1989 among STD patients, antenatal clinic attendees, TB patients and blood donors. Results have shown that Singapore has a low HIV prevalence. In 2002, the HIV prevalence rate was about 0.5% among STI patients. Based on 2002 data from screening of sex workers attending public STI clinics, this high-risk population had low infection rates of 1.3% for chlamydia and 0.3% for gonorrhoea.

**Estimated Clinical Impact of HIV**

The number of new reported HIV/AIDS cases in 2002 was 234, a small decline from 237 in 2001. The number of new AIDS deaths also declined from 112 in 2001 to 105 in 2002. Anti-HIV treatment provided in Singapore will delay and/or prevent the development of AIDS in many of its HIV-infected residents. Singapore’s multi-pronged national AIDS control programme, which encompass public education, education of high-risk groups, management of those infected and monitoring of the disease, continues to play an instrumental role in the control and prevention of HIV/AIDS in the city state.
CHINA

China is the third largest country and has the largest population in the world. The total population in 2002 was estimated to be close to 1.3 billion, with about 726 million in the 15-49 year-old age group. China contains more than one-fifth of the world’s population. It is a multinational country, with a large number of ethnic and linguistic groups. The ethnic Chinese, however, constitute more than 90% of the population.

The GNP per capita in 1999 was US$ 783, which is still quite low, but it is now several times greater than the poorest countries in the Asia Pacific region.

China’s transition since 1978 from a planned economy to an open market has led to an unprecedented period of economic growth. However, these changes have also been accompanied by changes in social norms and HIV risk behaviours. With a population of over 1 billion, even a limited HIV epidemic in China will result in millions of infections.

HIV/AIDS situation

During the 1990s, China developed a national HSS system. In 2002, 158 sentinel sites for five target populations (STI clinic attendants, underground FSW, IDU, long-distance truck drivers and antenatal women) collected samples in 31 provinces, autonomous regions and municipalities. This represents almost a tripling of the sentinel sites that were operational in 1997. In addition, there are about 420 provincial HSS sites. The national and provincial HSS systems were developed separately and there has been scant coordination or sharing of data by these two HSS systems. These HSS systems have been able to detect and monitor epidemic HIV transmission in several south and western provinces in China starting in the early 1990s.

The epidemiology of HIV in China is unique since epidemic HIV transmission has been found primarily in rural areas and populations. At the present time, the majority of HIV transmission in China is from persons who have been infected by sharing drug-injecting equipment or from faulty plasma collection methods. The transmission from HIV-infected persons (regardless of how they acquired their infection) to their regular sex partners is generally via legally and morally sanctioned sex, and effective public health action can only be provided after identification of discordant HIV-infected couples. In areas or populations where HIV is known to be prevalent, there is no pressing need to expand surveillance sites. However, there is an urgent need to begin to provide voluntary testing and counselling (VTC) centres to identify HIV-infected persons and evaluate the HIV status of their regular sex partners.
All the available HIV/AIDS data collected to date indicate that HIV spread among IDU populations is continuing to increase and is spreading to more provinces. Over half of the 25 IDU sites detected HIV infection and HIV prevalence rates ranged from 1% to 80% in the provinces of Yunnan, Xinjiang, Guangxi, and Sichuan. There is increasing public health concern that such high prevalence rates among IDU groups in these provinces will ignite an extensive spread of HIV in FSW and their clients. Although a few HIV infections have now been detected in FSW and STI patients in these provinces, the number of HIV infections that are not associated with IDU remains low.
Thus, there are still no conclusive data to indicate that any extensive spread of HIV is occurring among the highest heterosexual risk groups in China. The National HIV Surveillance System has estimated that around 70% (according to reported cases and estimated numbers) of the cumulative number of HIV infections are related to IDU and to faulty plasma collection procedures. The latter problem has been aggressively addressed and is now carefully followed up, but the IDU problem appears to be continuing almost unabated.

Some behavioural-risk assessment data have been collected from IDU and FSW groups. These data show that the levels of specific HIV risk behaviours continue to be very high among these population groups. A very large proportion of FSW report that they never use condoms (more than 49% in general, more than 31% in Beijing, and 70% in Anhui) and a relatively large proportion of IDU groups continue to share injection equipment (73% in Hunan, 81% in Jiangxi and 100% in Xinjiang). In addition, the finding of high levels of heterosexual risk behaviours in some areas of China, especially among the “mobile working population” has to be addressed aggressively with behaviour-change programmes before HIV prevalence rates are detectable by sentinel surveillance.

One worrisome indication of the presence of such risk behaviours is the increasing number of reported cases of sexually transmitted infection (STI) and high STI prevalence among risk groups. Reported cases of STI increased from 5800 in 1985 to over 836 000 in 1999. Considering the fact that reported cases are thought to be seriously underreported, these data suggest the increasing potential for extensive spread of HIV. A recent study in 2000 showed that 86% of female sex workers in Kunming and 17% of truck drivers in Togling were infected with at least one STI.

There are also other indications of increasing risk for heterosexual HIV transmission in China. With official estimates of more than 3 million sex workers in China, condom use and HIV prevalence among sex worker populations are important indicators of heterosexual risk of infection. Data from sentinel surveillance sites show that only about 10% of sex workers always use condoms with clients, and close to half reported never using condoms.

China faces many challenges in the coming years in preventing rapid growth of HIV infection. Information campaigns have been few and the level of knowledge of prevention measures is low. The illegal nature of injecting drug use and sex work makes populations with these behaviours very difficult to reach. China’s increasingly mobile population poses challenges to effective implementation of public health interventions.
Estimation and projection of HIV in China

Estimation of HIV prevalence in China has been carried out by the Department of Surveillance and Epidemiology of the National Centre for AIDS/STD Prevention and Control (NCAIDS) of the China Centre for Disease Control. An official estimate of about 840 000 people (according to NCAIDS) living with HIV infections was made by the National AIDS Programme in mid-2003, for an overall HIV prevalence of 0.12% of the total 15-49 year-old population (Table 2).

In China, the major modes of HIV infection have been:

1. epidemic HIV transmission in IDU in rural areas of several southern and western provinces, and
2. epidemic HIV transmission from faulty plasma collection methods to poor rural farmers and others in several central provinces starting from the early 1990s up to about the mid-1990s.

Estimates of the total number of IDU in China range from a low of about less than half million to over three million, and the best “average” estimate of the total number of HIV-infected IDU, as of 2003, is about 300 000-500 000. These infected IDU have, and can be expected to continue to transmit their infection to a large proportion of their regular sex partners.

However, from the estimates of the total number of IDU in China, and the general HIV prevalence trends observed in IDU populations over the past decade, it can be conservatively projected that until public health programmes can fully and aggressively implement harm/risk reduction programmes, the total number of HIV-infected IDU in China will probably double during this decade. In addition, these HIV-infected persons can serve to intensify or facilitate some limited epidemic heterosexual transmission in some commercial sex networks where sex workers may have 3 to 4 or more clients per day.

In addition to these HIV infections, the number of persons who were infected via improper procedures for the commercial collection of plasma that occurred from the early 1990s to the mid-1990s, plus the regular sex partners that these infected plasma donors have and may still infect during this decade, need to be included. The number of HIV-infected paid plasma donors (primarily in Hunan, Hubei, Anhui, Henan, Shaanxi, Shanxi, and Hebei) is uncertain because no data have been made available to assess the general scope of this problem. However, this number is believed to be relatively large, and some of them have already died. To this number may be added additional HIV infections transmitted to their regular sex partners. In addition, there is the presence of high risk behaviours in MSM, of which the population size is quite significant, the estimated prevalence rate is as high as 1-5%.
Based on this analysis of the epidemiological pattern and trends of HIV transmission in China, the annual estimates of HIV prevalence made by the Department of Surveillance and Epidemiology of the National Centre for AIDS/STD Prevention and Control require adjustments starting from the late 1980s, when HIV transmission began to be detected in IDU populations in Yunnan and in the early 1990s when HIV transmission probably began via improper commercial collection of plasma. Figure 14 includes these adjustments to the estimated HIV prevalence curve for China from 1988 to 2002. UNAIDS used a model to fit the annual estimates of HIV prevalence provided by the Department of Surveillance and Epidemiology of the National Centre for AIDS/STD Prevention and Control from 1995 to 2002, and then continued to project future HIV prevalence based on the increasing trend of these annual estimates. If annual prevalence estimates that are more consistent with the observed epidemiological trends from 1988 to 2002 are used to project HIV prevalence to the end of this decade, this results in the lower estimated/projected curve in the figure below.

As of 2003, there are still no conclusive data to indicate that epidemic heterosexual HIV transmission is occurring, even in the highest heterosexual risk groups in China. However, some limited behavioural surveillance data have been collected from IDU and some FSW groups in China. These data show that the levels of heterosexual and IDU risk behaviours continue to be very high in these HIV risk behaviour groups.
A very large proportion (close to 30%) of FSW in some of the provinces with large IDU epidemics are also IDU, and many report that they never use condoms and a relatively large proportion of IDU groups continue to share injection equipment. The finding of high levels of heterosexual risk behaviours in some areas of China, especially in the “mobile working population” is also worrisome. Thus, the potential for some pockets of epidemic heterosexual HIV transmission may be present, especially if HIV prevalence in FSW who regularly have three to four male clients per day is permitted to increase to about 5% or greater. If epidemic heterosexual HIV transmission begins to occur to any significant extent in China, then this will require an upward adjustment to the lower projected HIV prevalence curve in the figure, when and if extensive epidemic heterosexual HIV transmission is detected.

**Estimated clinical impact of HIV/AIDS**

Based on the HIV prevalence estimate of about 860,000 HIV infections in 2003 in 15-49 year-old population, and on the general shape of the annual HIV incidence curve as well as other assumptions, the annual numbers of AIDS deaths can be estimated.

Up to June 2003, a total of about 160,000 AIDS deaths in the total 15-49 year-old population is estimated (China Centre for Disease Control), and it is projected that this number will remain for the remainder of this decade. It needs to be fully appreciated that these numbers represent a national total for China and these numbers will be distributed according to the current HIV prevalence that is present in the different provinces. The vast majority of these estimated and projected AIDS cases/deaths will be concentrated in the current high HIV prevalence provinces of Yunnan, Xinjiang, Guangxi, and Sichuan. There will be few AIDS cases and deaths in most other provinces where HIV prevalence is currently low. Similarly, the distribution of paediatric AIDS cases and maternal AIDS orphans and HIV-related TB cases will also occur mostly in the provinces with the highest current HIV prevalence rates.
AUSTRALIA

Australia covers a land area of 7,692,000 square kilometers and lies between the Pacific and Indian oceans. The population increased from about 4 million in 1900 to nearly 19.6 million by 2002, with almost 10 million in the 15-49 year-old age group. Migration has been a key factor in population growth. The population is culturally diverse. Almost one in four Australians were born overseas, more than half of these in a non-English speaking country, while 40% were either born overseas or had a parent born overseas. People of Aboriginal and Torres Strait Island descent (although they have increased numerically in the last few decades) number less than 2.4% of the Australian population (Australian Bureau of Statistics 2001).

Australia’s population enjoys good health relative to other countries, with increasing life expectancy and a low incidence of life-threatening infectious disease. Australia’s indigenous people, however, experience much poorer health across a range of health indicators than the rest of the population.

Australia is a prosperous country with a capitalist mixed economy. Per capita GDP is similar to European Union member states (controlling for purchasing power parity).

HIV/AIDS situation

The epidemiological pattern of HIV in Australia has been and continues to be very similar to that of countries in North America and Western Europe. Extensive HIV transmission occurred within MSM populations in Australia during the early 1980s, with a peak annual incidence of close to 3000 shortly before the mid-1980s. Since that peak, the annual number of HIV diagnoses has continued to decline substantially over time, but the decline appears to have slowed in recent years to around 700 in 2001. The spread of HIV in IDU in Australia has been and remains limited (less than 0.5% in both men and women seen at metropolitan sexual health centres from 1994 to 2001 who identified as IDU), due to effective prevention programmes. Heterosexual transmission of HIV also remains at low levels (HIV incidence in women having heterosexual contact was estimated by back-projection to have increased during the late 1980s to a peak of around 80 new infections in 1990 followed by a decline).

Transmission of HIV in Australia continues to be overwhelmingly through sexual contact between men. Over 85% of HIV transmissions in Australia are estimated to have been via this route. The number of diagnoses of newly acquired HIV infection among homosexually active men has remained stable at around 130 - 180 infections per year since 1993.
Estimated clinical impact of HIV

As of 31 March 2002, the cumulative number of HIV infections that had occurred in Australia was 22,779, with a total of 9,039 AIDS cases.

The annual number of AIDS cases in Australia appears to have peaked in 1994, with an estimated 950 cases, and is estimated to have declined to about 178 cases in 2001. The decline in AIDS diagnoses since 1996 has been much more rapid than originally predicted in the mid-1990s. It is now clear, since around 1996, that the additional decrease in the number of AIDS diagnoses is due to the use of effective combination antiretroviral therapy for the treatment of HIV infection. There have been similar findings in Canada, the United States and in a number of European countries.

It is currently estimated that around 50% of all people living with HIV infection in Australia are receiving antiretroviral treatment. If this proportion were to increase substantially, then AIDS incidence would be expected to decline. However, the long-term effect of antiretroviral treatment is unknown and, if treatments fail for a substantial proportion of people, then AIDS incidence could increase again.
PAKISTAN

Pakistan is Asia’s seventh largest country, occupying the northwestern portion of the Indian subcontinent. It is bounded to the west by Iran, to the north by Afghanistan, to the north-east by China, to the east and south-east by India, and to the south by the Arabian Sea. Almost all the population is Muslim; Hindus and Christians make up small minority groups. The estimated population in 2002 was about 145 million, with close to 68 million in the 15-49 year-old age group. Pakistan has a developing mixed economy based largely on agriculture, light industry and services. The GNP is increasing more rapidly than the population, but the GNP per capita is among the lowest in Asia.

HIV/AIDS situation

Pakistan, as of 2002, had an estimated HIV prevalence level that can be considered moderate. The vast majority of all detected HIV infections in the country have been found in IDU groups. Low rates (generally less than 1%) of HIV infection have been found in FSW tested as part of the HIV surveillance system. There are no data to indicate that, aside from IDU transmission, there is any other significant transmission of HIV occurring in Pakistan at the present time.

UNAIDS/WHO estimated HIV prevalence in Pakistan in 2002 to be about 76,000 or about 0.1% of the 15-49 year-old population.

Estimated clinical impact of HIV

UNAIDS has estimated that there may be over 5000 AIDS deaths in Pakistan in 2003.
INDONESIA

Indonesia is an island republic lying off the coast of mainland south-east Asia and composed of some 13 670 islands. It is the fourth most populous country in the world, with an estimated total population of close to 215 million, 118 million of them in the 15-49 year-old age group in 2002. More than four-fifths of the population is Muslim. The densely settled island of Java alone accounts for more than half of Indonesia's population. Madura, Bali, and parts of Sumatra and Celebes also have high population densities.

Indonesia has a developing, mixed economy that is based largely on agriculture and manufacturing. The GNP is growing more rapidly than the population; the GNP per capita, however, is low. A marked economic recession that started after 1997 has resulted in a devaluation of the country’s currency to about one-quarter of its former value against the US dollar. This has made the price of imported medical and laboratory supplies almost beyond the reach of most medical and public health programmes.

HIV/AIDS situation

In 1993/1994, HIV/AIDS projections were made for Indonesia using a complex computer model. The modellers projected that there might be close to 400 000 HIV infections in Indonesia by 1996, and about 2.5 million by the year 2000. However, until the end of 1998, all HIV/AIDS data collected in Indonesia from all sources indicated that HIV seroprevalence rates were very low, (below 0.1%) even in the highest heterosexual risk groups such as FSW. The exception to this very low HIV prevalence was in Merauke (in West Irian) where relatively high HIV prevalence rates were reported among FSW several years ago.

Starting in 1999 and continuing in 2000, several HSS sites for FSW began to detect increasing numbers of HIV infection and prevalence rates of from 1%-5% were found in several areas. Although IDU populations were not included as a routine HSS group, several ad hoc serosurveys of IDU populations throughout Indonesia, especially in Jakarta, detected sharply increasing HIV prevalence (up to over 35% in Jakarta) in late 2000. This increasing trend of HIV prevalence can be seen in the blood donor data from the Indonesian Red Cross from 1992 to 2000 in Figure 15.
recent years, approximately 750 000 to close to one million blood donors have been screened annually for HIV. A marked increase was seen in 1999/2000 and this probably is a reflection of the large increase among IDU populations noted during this same time period.

During most of the 1990s, most HIV infections in Indonesia could be attributed to infections acquired outside the country and to a pocket of epidemic heterosexual transmission in areas such as Merauke. Since the late 1990s, however, there has been an explosive HIV epidemic in IDU populations in Indonesia, with a large focus in the Jakarta area. As of early 2003, the most common pattern of HIV transmission in Indonesia has been from HIV-infected persons (regardless of how they acquired their infection) to their spouses or regular sex partners, and this will continue to be the predominant pattern of HIV transmission in Indonesia. Because Indonesia’s pattern of commercial sex is primarily non-brothel-based, it appears likely that extensive or sustained epidemic heterosexual HIV transmission will not occur.

Based on the most recent HIV prevalence findings among different HIV-risk behaviour groups, and on estimates of the size of these groups, a national consensus workshop, held in Jakarta in late 2002, used a spreadsheet method to calculate high and low estimates of HIV-infected persons. The workshop provided a working estimate of about 111 000 (0.1%) HIV infections in the 15-49 year-old population in 2002. This estimate was within the range 80 000 to 120 000 HIV infections in Indonesia estimated by a smaller working group in 2000. Indonesia is now classified as a country with a concentrated HIV epidemic, primarily among its IDU population.
Estimated clinical impact of HIV

Based on an estimated HIV prevalence of about 100 000 in the year 2000, with about half of that number occurring in 1999 and 2000, the calculated number of AIDS deaths for the year 2000 is about 3000. This annual number is projected to increase several times by 2005 (close to 18 000). Most of these AIDS deaths will occur in or around Jakarta because that is where the majority of the HIV-infected IDU populations live.
HONG KONG, CHINA

In July 1997, Hong Kong became a special administrative region of China. It comprises the island of Hong Kong and adjacent islets and the Kowloon Peninsula on the southern coast of mainland China, as well as the New Territories. About 95% of the people of Hong Kong are Chinese. Hong Kong has one of the highest population densities in the world, averaging some 6310 persons per km² (excluding marine population and area of reservoirs). Its population in 2002 was estimated to be close to 7 million, with about 4.1 million in the 15-49 year-old age group. Virtually all of Hong Kong’s people live in urban areas. Hong Kong has a market economy based largely on finance and thriving international trade. Its economy has experienced generally steady growth since the mid-20th century. The per capita income is one of the highest in Asia.

HIV/AIDS situation

In Hong Kong, the first HIV infection was reported in 1984 and the first AIDS case in 1985. Since then, the numbers of reported cases have been growing steadily. As of the end of 2002, the cumulative reported HIV infection was 2015, of which 613 had progressed to AIDS. The majority of the initial HIV/AIDS cases identified in Hong Kong were in MSM and male haemophilia patients. There are no data to suggest that any significant self-sustaining heterosexual transmission of HIV is present in Hong Kong. During the 1990s, the majority of HIV infections detected in heterosexuals were either acquired outside Hong Kong or were in non-Chinese Asians. Small pockets of IDU groups have been identified in Hong Kong, but to date no extensive HIV transmission has occurred among these groups. Several surveys in Hong Kong have shown that HIV prevalence among pregnant women is about one in every 4000. Of the total HIV infections reported since 1984 for whom a mode of HIV transmission was determined, 65% was in heterosexuals, 27% in MSM, close to 4% were from HIV-infected blood and blood products, and 3% in IDU.

The current behavioural surveillance system collects data from existing surveys and specifically designed surveys. On average, the rate of needle sharing among drug addicts has generally been less than 20% in the last few years. In 2000 and 2001, about 70%-90% of those attending government Social Hygiene Clinics reported visiting sex workers, and over 50% of men attending the clinics reported using a condom during their last sex with sex workers.
Estimated clinical impact of HIV

Hong Kong has been able to provide highly active antiretroviral therapy (HAART) to HIV-infected residents since the mid-1990s. The number of HIV-infected persons who would have developed AIDS has been reduced in recent years as a result of their access to effective treatment. However, a significant proportion of the estimated several thousand HIV-infected persons in Hong Kong have not yet been identified, and many HIV-infected persons are first detected only after the onset of AIDS-defining conditions. The number of newly reported AIDS cases in Hong Kong has stabilized at about 45 to 70 cases per year since the mid-1990s.
MACAO, CHINA

Macao became a special administrative region of China in December 1999. It is located on the southern coast of China to the west of the Pearl River Delta. It comprises the peninsula of Macao and the two islands of Taipa and Coloane, with a total land area of 23.8 km². As of 31 December 2001, Macao’s local population numbered 437 000 inhabitants. Population density is over 18,000/km², with the northern part of the peninsula of Macao considered one of the most densely populated areas in the world. There is also an impressive flow of people in and out of the territory. Macao’s economy has been experiencing rapid growth since the 1980s. Public health care in Macao is comparable with that of developed countries. The average life span for both sexes is over 75 years.

HIV/AIDS situation

In Macao, the first HIV infection was reported in 1986 and the first AIDS case in 1989. Since 1986, up to the end of December 2002, 262 HIV infections had been reported, 66.8% diagnosed in temporary residents working in the entertainment industry. The HIV transmission in Macao is essentially sexual: the most important route of transmission has been heterosexual (68.7%). A large proportion of HIV cases have been found among women, transmitted through heterosexual contact, representing 66.4% of all new cases (female to male ratio: 2.1 to 1). Excluding temporary residents working in the entertainment industry (EIW group), the cumulative number of HIV cases from 1986 until the end of December 2002 is 87, and the pattern profile of HIV infection in Macao becomes different: the men are responsible for 68.7% of all new HIV cases (male to female ratio: 2.3 to 1); and the principal route of transmission is heterosexual, with a percentage of 31%, injecting drug use transmission accounts for 12.6%, and the homosexual route for 11.5%. Among the 87 HIV cases detected in the Macao resident population, 23 have progressed to AIDS. No estimation of HIV/AIDS has been developed for Macao.

For many years, Macao has had a low HIV prevalence. The Department of Health of Macao has been conducting several surveillance activities since 1986, using different approaches including, among others, unlinked and anonymous serosurveillance for selected groups, such as blood donors, tuberculosis patients, prisoners, IDU, pregnant women and the EIW group. In most population groups being screened, except among the EIW’s, only a limited number of HIV cases have been found. The data obtained lead to the conclusion that the HIV spread among Macao’s general population has been very limited, showing the effectiveness of the measures being taken to fight HIV/AIDS. The prevalence rate estimated for Macao residents is 1.98 per 10 000.
Since the mid-1990s, Macao has been able to provide treatment to HIV-infected residents. However, many HIV-infected persons have been first detected after the onset of AIDS-defining conditions. The number of newly reported AIDS cases in Macao has been about two to four cases per year since the mid-1990s.
NEW ZEALAND

New Zealand is an island nation in the South Pacific, lying about 1000 miles south-east of Australia. New Zealand has two main islands, the North and South, separated by the 20-mile wide Cook Strait, and a number of small islands. The estimated population in 2002 was about 3.8 million, with 1.9 million in the 15-49 year-old age group.

The principal ethnic element of New Zealand’s population (about 78%) is of European origin (mostly British); 15% are Maori and 6% Pacific islanders. The proportion of people of Asian descent is projected to rise to 8% of the population by 2016. Five-sixths of the population lives in urban areas, and most migration within the country takes place between urban areas.

New Zealand has a developed market economy largely based on agriculture, small-scale industry and services. Economic growth has been kept low by dependence on imported fuels and capital and consumer goods. The GNP per capita is within the range of the developed countries of the world.

HIV/AIDS situation

The first AIDS case in New Zealand was diagnosed in 1983. As of 30 June 2003, there had been 1810 people diagnosed with HIV infection, and 788 notified with AIDS, of whom 591 had died. The annual number of new HIV diagnoses has remained relatively steady, with an average of 88 people diagnosed each year. Although some of these will have left the country, as many more people are being diagnosed with HIV each year than are dying with AIDS, the number requiring care is increasing.

As in many developed countries, the effective use of antiretroviral drugs has resulted in fewer persons with HIV infection progressing to AIDS since 1996. The number of people diagnosed with AIDS dropped from a peak of 71 in 1989 and 1990 to 24 in 2000.

Whilst MSM are the largest group affected, in recent years the proportion of people both diagnosed with HIV and notified with AIDS who were heterosexually infected has increased. It is important to appreciate that people infected through heterosexual transmission are predominantly from, or were infected in, countries with high rates of heterosexual transmission. In contrast, most MSM newly diagnosed with HIV were infected in New Zealand. Data from seroprevalence surveys in 1996-1997 showed an HIV prevalence of 3% in MSM, 0.3% in IDU and approximately 0.1% in both male and female heterosexuals.
Sexually transmitted infection in New Zealand

New Zealand has high and increasing rates of sexually transmitted infections (STI). In 2002, the majority of STI were in teenagers and young adults, with over 58% of gonorrhoea, 74% of chlamydia and 65% of genital warts being in people aged less than 25 years. There was also a significant increase in the number of syphilis cases reported during 2002.

Young adults are at higher risk of acquiring STI for a number of reasons, including behavioural factors such as the increased likelihood of multiple sexual partners and unprotected sexual intercourse.

Estimated clinical impact of HIV

The confirmed number of new AIDS cases in 2000 was 27. This number is projected to be similar in 2005.
THE LAO PEOPLE’S DEMOCRATIC REPUBLIC

The Lao People’s Democratic Republic is a landlocked country in the centre of the Indo-Chinese peninsula of south-east Asia. Its total population in 2002 was estimated to be about 5.4 million, with 2.5 million in the 15-49 year-old age group. China, Vietnam, Cambodia, Thailand, and Myanmar surround the country. The Lao People’s Democratic Republic has a slowly developing; largely centrally planned economy based mainly on agriculture and international aid. The GNP per capita in 1999 was one of the lowest in the world. Before its independence in 1975, prostitution did exist even though it was illegal, but it has been prohibited since then. However, since 1986, the country has been moving towards a free market economy and increasingly opening its borders to foreign investments and visitors.

HIV/AIDS situation

The first HIV infection in the Lao People’s Democratic Republic was identified in 1990 in a returning Lao female who was suspected to be a FSW. The first AIDS case was reported in 1992 in a person with a history of frequent travel to Bokeo, a province adjacent to Chiang Rai, a northern Thai province. HIV/AIDS data in the Lao People’s Democratic Republic are limited and are generally based on small serologic surveys/studies of unrepresentative samples. From 1990 to April 2003, a total of about 84,925 persons were screened/tested for HIV infection and 1041 were found to be positive, with 586 AIDS cases reported, including 448 deaths. The majority of the identified HIV infections were in persons with clinical illnesses and who were suspected of having acquired their infection outside the country via heterosexual intercourse.

IDU is believed to be very low or non-existent, but no studies have been conducted to confirm this impression. Data from the national blood centre confirm that HIV prevalence is very low – of over 8000 blood donors tested in 1997 (about 5000 from Vientiane), only one HIV-positive was found. Even although the available data are limited and may be very unrepresentative, collectively they indicate that HIV prevalence is currently still very low.

The results of the first complete HIV sentinel surveillance round in the Lao People’s Democratic Republic, carried out in 2000, were reported in early 2001. More than 800 “service women”, who are considered indirect sex workers, were tested in three sites. In the capital city of Vientiane, about 1% of the almost 300 service women were found to be HIV-positive, and in Savannakhet, the same rate of HIV-positivity was observed among the same number of service women tested. Overall, less than 1% of these indirect sex workers were found to be HIV-positive. No details were provided as to whether the infected females may have acquired their HIV infection in or outside the country.
Behavioural data

In the past few years, the Lao People’s Democratic Republic has witnessed a massive expansion in economic activity, resulting in significant increases in domestic and cross-border population movement. The number of sex workers has also been increasing. Community-based surveys on condom use of PSI in Vientiane in 1999 showed that, among those who had had more than three sexual partners over the previous 12 months, 38% had never used condoms. A behavioural surveillance survey was initiated among specific sub-populations in mid-June 2000. The BSS data showed that 73% of service women had used condoms consistently with clients in the past month. Of the service women who had had commercial sex in the past year, almost all (95.5%) reported having had only one client on the last day worked (mean number: 1.1). Between one-quarter and one-third of truck drivers and police reported they had “had sex with a commercial partner in the last 12 months”. About two-thirds of police and military and three-quarters of truck drivers said they always used condoms with a paid partner. In a school survey among youth in Vientiane, 7.3% of 12-21 year-olds reported having used drugs, 11.6% of them injecting drugs.

Sexually transmitted infections (STI)

The Ministry of Health and European Union STD Project started early 1997 in two pilot areas. The objectives were to develop the National Program for the Prevention and Care of STD on three levels of the health care system: primary health care, provincial hospitals and reference hospitals in the selected pilot sites of Vientiane municipality and Savannakhet province. The project developed a National STD Policy and Strategy, National Guidelines for STD Case Management, and a National STD Training Curriculum for district level health care workers. STI case management based on etiological diagnosis has also been introduced into referral and reference hospitals, and the bacteriology laboratories at the central level, such as the Centre for Laboratory and Epidemiology (CLE) has been strengthened to support the referral/reference hospitals.

National STI surveillance was set up in mid-1999. A study of 754 symptomatic antenatal clinic attendees at Setthathirath hospital, Vientiane municipality between January and December 2001, showed 3.5% had *Neisseria gonorrhoea*, 4% *Chlamydia trachomatis*, 20.8% *Trichomonas vaginalis*, 25.9% Bacterial vaginosis and about 39% *Candida* spp. *N. gonorrhoea* infections were fully sensitive to ceftriaxone and spectinomycin, but highly resistant to ciprofloxacin and fully resistant to penicillin, tetracycline and chloramphenicol. A study on the prevalence of reproductive tract infection (RTI) in three main hospitals in Vientiane and Savannakhet provinces was conducted between May 2001 and February 2002, with a total sample size of 750. The results will be disseminated soon.
A first round of second generation surveillance was conducted early 2001. Of service women (SW) surveyed, 65.5% reported selling sex in the past year, 20.8% reported a current STI symptom and 38.9% had had a symptom in the past year. The prevalence of HIV among all SW was 0.9%, and 1.1% among the SW who reported selling sex. Syphilis prevalence among all SW was 0.2%. The prevalence of chlamydial infection was 32% and of gonococcal infection 13.9%. Either chlamydial or gonococcal infection was detected in 37.6% of SW. Of female factory workers (FFW) surveyed, 3.5% reported current STI, and 5.7% in the past year. No HIV or syphilis was found among this population. The prevalence of chlamydial infection in FFW was 6.6% and gonococcal infection 0.4%. Of long distance truck drivers (LDTD) surveyed, 11% reported a current STI symptom or a symptom in the past year. No HIV was detected in the sub-population, but the prevalence of syphilis was 1.3%, and of chlamydial infection 9.3%.

Clinical impact of HIV/AIDS

As of 2002, HIV prevalence in the Lao People’s Democratic Republic was estimated to be 1300, or 0.05% of the 15-49 year-old population (UNAIDS/WHO working group). Based on this HIV prevalence, the clinical case load of AIDS and other HIV-related diseases and conditions are estimated and projected to be relatively small, ranging from less than 100 annual AIDS deaths in the year 2000 to over 200 in 2005.
SRI LANKA

Sri Lanka is an island country in the Indian Ocean, separated from the south-eastern coast of India. Its estimated population in 2002 was about 19.1 million, with about 10.7 million in the 15-49 year-old age group. Sinhalese are the predominant ethnic group, constituting about three-quarters of the population. Other ethnic groups include Tamils and Muslims.

Sri Lanka has a developing mixed (public and private) economy, largely based on agriculture, services, and light industries. The creation of new jobs has not kept pace with the growth of the population, and unemployment is widespread. The GNP is growing faster than the population; GNP per capita, however, is very low by world standards.

HIV/AIDS situation

The available HIV/AIDS data for Sri Lanka indicate that epidemic spread of HIV has not occurred as of the year 2002. HIV testing among ANC women was conducted in Colombo in 1990, 1993, 1995 and 1996. No evidence of HIV infection was detected. Outside Colombo, HIV testing of ANC women took place in various sites including Anuradhapura, Badulla, Galle, Kandy, Kurunegala, and Ratnapura at various times between 1990 and 1996. As in Colombo, no evidence of HIV infection was found among those tested at that time. Among sex workers tested in Colombo from 1990 to 1998, evidence of HIV infection was found in only one site, in 1993, where 0.2% of the sex workers tested were HIV-positive. Outside Colombo, sex workers were tested for HIV infection in Kandy, Anuradhapura, Galle, Kurunegala, Ratnapura and Badulla between 1993 and 1998. Evidence of HIV infection was found in only one site, Kurunegala, and only in 1995, where 0.5% of sex workers tested were HIV-positive.

The most recent national estimate of HIV prevalence in Sri Lanka, prepared in early 2002, used a spreadsheet method with high and low estimates of the sizes of specific HIV risk behaviour populations and high and low estimates of the HIV prevalence in each of these populations. The use of the high estimates for both the population size and HIV prevalence resulted in a national HIV prevalence of about 4700. This represents a reduction of almost 50% from the prior estimates of about 9000 or more. There are limited studies and data on the patterns and prevalence of HIV risk behaviours in Sri Lanka to suggest that the potential for epidemic or more extensive spread of HIV is low. The KABP surveys of sexual behaviours, carried out by GPA/WHO in the late 1980s and early 1990s, collected data on the median age of first sexual intercourse in selected countries, primarily in sub-Saharan Africa and in some Asia Pacific countries. The median age of first sexual intercourse for males in Sri Lanka was 27 years and for females was over 23 years (see figure 16). This is
approximately the same general age of marriage in Sri Lanka and is markedly different from several African countries where the median age of first sexual intercourse for African boys occurs about 10 years earlier and about 5-7 years earlier for African girls. This finding is a reflection of the strong cultural, social and religious restraints on pre-marital sex in Sri Lanka.

However, more systematic sentinel HIV surveillance needs to be developed, with primary emphasis on high-risk groups. In addition, baseline behavioural surveillance studies/surveys need to be implemented as soon as possible. Support for HIV/AIDS/STD programmes also needs to be expanded and focused on high-risk groups.

**Estimated clinical impact of HIV**

Based on an estimated HIV prevalence of about 4700 in the year 2002, the number of AIDS deaths in 2003 is calculated to be about 500 and it is projected that they will remain at this general level for the rest of this decade.
THE PHILIPPINES

The Philippines is an archipelago of about 7100 islands and islets lying about 500 miles off the south-eastern coast of Asia. The population in 2002 was estimated to be over 77 million, with about 39.6 million in the 15-49 year-old age group. More than four-fifths of the population is Roman Catholic, and a sizable minority is Muslim. Population density in the Philippines is relatively high. Nearly two-fifths are younger than 15 years of age. Heavy migration from rural to urban areas has caused overcrowding, particularly in metropolitan Manila; about two-fifths of the country’s population is urban.

The economy of the Philippines is based largely on agriculture, light industry and services. A market economy predominates, though intervention by the Government was increased in the late 20th century. Prices have tended to rise more rapidly than purchasing power, and wages are among the lowest in east Asia. The GNP per capita, which has a negative real growth rate, is similar to that of other developing countries.

HIV/AIDS situation

An HSS system was developed during the early 1990s that included high behavioural risk groups in several major urban areas. The findings from this surveillance system indicated that HIV prevalence was very low, since only an occasional and sporadic HIV infection was found among registered female sex workers (RFSW) who were included in the surveillance sampling scheme.

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<td>HIV prevalence</td>
<td>0.16%</td>
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Since 1998, the Philippine Red Cross has tested over 100,000 blood donors annually and HIV prevalence has been found to be less than 0.001% (i.e., less than 1 per 100,000). In 2001, no HIV-positive donor was detected in over 122,000 tested. No significant epidemic HIV transmission has yet been detected in the Philippines and, as a result, the official national HIV prevalence estimate has been reduced from an initial 50,000 in the early 1990s to 26,000 a few years ago and, most recently, in 2002, to about 6,000.

All of the collective HIV/AIDS surveillance data in the Philippines support the basic conclusion that epidemic HIV transmission has not occurred, even within the highest HIV risk behaviour groups, such as MSM, IDU and FSW. This low and very slow increase of HIV prevalence in the Philippines is due to the low infection rate of HIV via sexual intercourse and the generally lower prevalence of HIV risk behaviours present in the Philippines compared with those Asia Pacific countries where extensive transmission of HIV has been documented. Early recognition of the potential for epidemic HIV transmission in the Philippines, mobilization of relevant sectors and partners, and implementation of targeted intervention programmes has contributed to keeping HIV transmission low and slow in the country.

**Risk behaviours**

The first large-scale behavioural sentinel surveillance (BSS) was conducted in 1997. There has been an increasing trend towards condom use during the last sex with a non-regular partner among registered sex workers from 75% in 1997 to 76% in 2000 and 83% in 2002. As a result of outreach interventions, the rate among freelance sex workers increased from 65% in 1997 to 72% in 2000 and 80% in 2002. Sex workers have, on average, a low number of clients (2-4 per week in 2002). A recent study indicated that 13% of men had two or more sex partners. There was a statistically significant decline in the proportion of IDU in Cebu who shared injecting equipment from 77% in 1998 to 53% in 2000, but this decline was reversed in 2001 when sharing increased to 81%.

**STI situation**

Serological testing for syphilis was incorporated into the HIV sentinel surveillance (HSS) in 1993. STI prevalence surveys, using different laboratory methods, have been conducted since 1991. A survey carried out in 1998 showed that the prevalence of chlamydiasis was high among sex workers, ranging from 27% to 36%. The syphilis rate in this group was of <1% to 12%, and the gonorrhoea rate varied from 2.6% to 25%. High levels of STI are also found among low-risk groups. For example, chlamydiasis was found in 7.5% to 11.7% of antenatal women in 1998 STI surveys.
A 2002\textsuperscript{1} survey on STI among the general population showed chlamydia at 5.75%, gonorrhoea at 0.75%, and syphilis at 0.17% among females; and 4.4%, 1.1% and 0.2%, respectively, among males. The same survey showed the rates among female youth of 7.7% for chlamydiasis and 0.7% for gonorrhoea, and among male youth, 9% and 1.7%, respectively.

**Estimated clinical impact of HIV**

Based on an estimated HIV prevalence of about 6000 in 2002, the estimated number of AIDS deaths in the year 2003 is about 600 and can be expected to increase slowly to about 700-800 annually by the end of this decade.

**National response**

The Philippine National AIDS Council is currently implementing the 3\textsuperscript{rd} Medium Term Plan for HIV/AIDS prevention and control in the country. The plan targets the long-term containment of HIV prevalence at less than 2\% by seizing the remaining transient opportunity, scaling up, accelerating and expanding the country's responses to prevent epidemic HIV transmission from occurring.

\textsuperscript{1}RTI/STI Prevalence in Selected Site in the Philippines, DOH/FHI, 2002
BANGLADESH

Bangladesh is a relatively small coastal country in south central Asia. To the south Bangladesh has an irregular coastline fronting the Bay of Bengal and shares land borders with Myanmar and India. Its estimated total population in 2002 was about 140 million, with over 72 million in the 15-49 year-old age group.

Bangladesh is one of the most densely populated countries in the world, with the highest densities occurring in and around the capital city of Dhaka. It is also a predominantly rural country, with only about one-quarter of the population living in urban areas. Rural areas are often so thickly settled that it is difficult to distinguish any well-defined pattern of individual villages. Bangladesh has a rather high rate of population growth, and almost one-half of the population is under 15 years of age. Both birth and death rates are far above world averages.

Bangladesh has a developing mixed economy that is heavily based upon agriculture. Almost two-fifths of GDP originates from agriculture, followed by services, transportation and communication. Although GNP is growing somewhat more rapidly than the population, GNP per capita is among the lowest in the world. Severe overcrowding, an inadequate food supply and poor sanitary conditions have combined to create extremely poor health conditions in Bangladesh.

HIV/AIDS situation

As with virtually all countries in Asia, the first cases of AIDS or HIV infection in Bangladesh, detected during the late 1980s and early 1990s, were either in foreign visitors or in citizens who had returned from international travel. All the known HIV-risk behaviours and factors – FSW, MSM, IDU and high rates of STI - are acknowledged to be present in Bangladesh. As a result, there is increasing concern that marked epidemic spread of HIV might occur in a manner similar to that documented in several neighbouring countries (parts of India, Myanmar, and Thailand).

Scant data are available to provide accurate definitions of the distributions or to quantify the prevalence of these risk behaviours and factors in Bangladesh. Although the number of heroin addicts is estimated to be about 100,000, it appears that the majority smoke rather than inject the drug. Almost no data are available to estimate the distribution and number MSM, but it is acknowledged that they exist in Bangladesh.
FSW are present throughout Bangladesh; prostitution areas and brothels are known, but estimates of the number of prostitutes vary widely. In addition, it is known that “floating” prostitutes are present in “large” numbers, but their precise distribution and prevalence are not well known. It is suspected that “large” numbers of young and mostly single female textile and garment workers may also supplement their low wages by occasional prostitution.

In 1998-1999, national sentinel surveillance surveys for HIV and syphilis infections were carried out. In addition, behavioural surveys among selected high-risk groups, brothel-based FSW, STI patients, truckers and IDU, were also conducted. HIV infection in the highest HIV risk behaviour groups continues to be low. About 2%-3% of IDU and less than 1% of FSW were found to be infected with HIV. As of mid-1999, a cumulative total of about 100 HIV-infected persons and a dozen AIDS cases have been identified in Bangladesh. Based on the limited data and on the findings of the national HSS surveys, the estimate of the number of HIV infections in Bangladesh made by WHO/UNAIDS for the year 2002 (about 13 000) appears reasonable.

**Estimated clinical impact of HIV**

Based on the HIV prevalence estimate of about 13 000 in the year 2002, the annual number of adult AIDS cases in Bangladesh is estimated to be about 1300 in 2003 and close to 1500 in 2005.
JAPAN

Japan is an industrialized island country lying off the east coast of Asia. Its estimated population in 2002 was over 127 million, with 59 million in the 15-49 year-old age group.

Japan has a prosperous and well developed economy largely based on manufacturing and services. A market economy predominates, although the Government exercises effective administrative guidance in the private sector. Japan’s GNP per capita is among the highest in the world.

HIV/AIDS situation

HIV prevalence rates in Japan continue to remain well below 1% for most HIV risk behaviour groups, except among female sex workers of foreign nationality (2.7% from 1987-1999). Most reported HIV/AIDS cases in Japan during the mid-to-late 1980s and early 1990s were due to HIV-infected blood products that were imported for the treatment of haemophilia patients. Since then, most newly reported infections have been due to sexual contact.

According to the law, doctors who diagnose an HIV infection must report it to the Government through the nearest rural health unit. For the year 2001, 922 cases were reported. These included 614 cases who did not show symptoms of AIDS. Of these 614 cases, 521 (481 men and 40 women) were Japanese, and 474 cases were estimated to have been infected in Japan. Of these 521 Japanese cases, 33.1% were infected via the heterosexual mode of transmission and 53.6% via the MSM mode of transmission. Only one case of IDU transmission and one case of mother-to-child transmission were found. As for 2002, among 536 reported HIV infections in males, 329 were affected via MSM mode.

Estimated clinical impact of HIV

The epidemiology of HIV infection in Japan is unique in that several thousand infections of male haemophilia patients occurred within a few years during the early-to-mid 1980s. Aside from this initial epidemic, HIV transmission has been minimal and mostly limited to imported infections and some limited transmission from the several thousand HIV infections that have been present in Japan since the mid-1980s. Based on this pattern of HIV infection and an estimated HIV prevalence of about 8000 in 1998, the annual number of AIDS deaths in Japan in the year 2000 can be calculated to be about 600-700. A similar annual number of AIDS deaths can be projected for the year 2005. The numbers may be much lower than estimated/projected, depending on the extent that effective anti-HIV treatment is provided in Japan.
THE REPUBLIC OF KOREA

The Republic of Korea is located in the southern Korean peninsula in East Asia. Its estimated population in 2002 was about 47 million, with about 27.6 million in the 15-49 year-old age group. The Republic of Korea has a predominantly market economy based largely on services and light and heavy industries. Economic growth has been heavily dependent on exports of manufactures. The GNP is growing much faster than the population. The GNP per capita is similar to that of the other rapidly developing East Asian countries and was ranked in the top 10 countries in Asia in 2000.

HIV/AIDS situation

The first case of HIV infection was reported in the Republic of Korea in 1985 and the first AIDS case in 1987. An estimated 4000 HIV-infected individuals were living in the country in 2002 (prevalence of less than 0.1% among people aged 15 to 49 years). The great majority (93%) of HIV infections are estimated to be sexually transmitted, with 13% occurring among women. National seroprevalence surveys have identified only sporadic cases of HIV infection.

Estimated clinical impact of HIV

Based on an estimated HIV prevalence of about 3800 in the year 2000, the annual number of AIDS deaths is calculated to be 200-300 in the year 2000 and is projected to increase to 300-400 in 2005. The annual numbers of HIV-related TB cases, paediatric AIDS cases and AIDS-related orphans will be less than the estimated annual numbers of adult AIDS deaths.
THE DEMOCRATIC PEOPLE’S REPUBLIC OF KOREA

The Democratic People’s Republic of Korea occupies the northern half of the Korean peninsula in east Asia. In 2002, its population was estimated to be about 22.4 million, with about 11.9 million in the 15-49 year-old age group. The Republic of Korea has a command (centrally planned) economy based largely on heavy industry and agriculture. The GNP per capita remains low by world standards.

HIV/AIDS situation

Scant HIV/AIDS data are available from the Republic of Korea, but it is estimated that, as of the year 2002, that there were less than 100 HIV infections in the country.
MONGOLIA

Mongolia is a landlocked country located in north central Asia between Russia to the north and China to the south. It is Asia’s seventh largest country in area, but one of the smallest in population. Its estimated population in 2002 was about 2.4 million, with about 1.4 million in the 15-49 year-old age group.

Almost four-fifths of the population are Khalkha Mongols. The remainder consists of other Mongols and Kazakhs. About three-fifths of the population is now living in urban areas. Until 1990, Mongolia had a socialist economy based on the Soviet model. Since then, it has undergone democratic reforms and now has an open market economy.

HIV/AIDS situation

Mongolia has remained nearly free from HIV over the past two decades, as evidenced by the fact that only four HIV/AIDS cases had been reported as of May 2003. The first HIV case was in a male homosexual in 1992 who acquired his HIV infection abroad and died in 1999. The second case was detected through screening of sex workers in December 1997. The third and fourth cases were two women diagnosed at the National Centre for Communicable Diseases in June 2001 and January 2003. It is estimated that, as of 2002, there were fewer than 100 HIV infected persons in Mongolia.

Mongolia is very vulnerable to an HIV/AIDS epidemic. Widespread poverty (36% according to the 1998 Living Standards Measurement Survey) is associated with more ill health, homeless children and adults, school dropouts and increasing numbers of sex workers. Alcohol abuse is widespread, causing increased sexual risk behaviour and increased vulnerability to HIV infection. STI are common and increasing among both the general adult population and vulnerable groups. STI are the first leading group of communicable diseases reported in the country (41% of all reported infectious disease cases in 2002). A cross-sectional survey, conducted in 2002 among 2000 women attending antenatal clinics, revealed 30.3% had at least one STI.

HIV surveillance activities and testing started in 1987, with an average of 50,000-70,000 tests being conducted annually. In September 2002, the first HIV sentinel surveillance was conducted with seven sentinel sites among six population groups (FSW, male STI clients, pregnant women attending ANC, TB patients, blood donors and mobile populations). Among the 3538 person tested, no HIV-positive case was detected. However, the risk of an HIV epidemic exists. The prevalence of syphilis in pregnant women and mobile populations was 3%, and up to 40% of those sampled in the behavioural survey had multiple sex partners.
The Kingdom of Bhutan is a sovereign kingdom in the Himalayas, bounded by India and Tibet, China. The population was estimated in 2002 to be about 2.1 million, with close to 972,000 in the 15-49 year-old age group. Bhutan’s rugged mountains and dense forests rendered it inaccessible to the outside world until well into the 20th century. The building of a road network connecting Bhutan with India in the 1960s finally brought the country’s historic isolation to an end. Since that time, Bhutan has embarked on a programme to build roads and hospitals and to create a system of secular education. Its governmental institutions have also been modernized. The Bhutanese economy is mainly agrarian; most of the population is engaged in agriculture and livestock raising.

HIV/AIDS situation

As of 2002, scant evidence of HIV infection has been found in Bhutan. Three thousand individuals from various groups were tested in 1990, and nearly 7000 in 1991, and none were found to be HIV-positive. HIV testing among ANC attendees was conducted in 13 districts in 1993 and again none were found positive. Testing of army recruits in 1993 found no evidence of HIV infection. In a 1994 report, three HIV-positive tests were found in a total of close to 7000 tested. There were no details as to the population(s) tested, nor was it clear whether the three positive test results were confirmed positives or not. Current HIV/AIDS estimates suggest that Bhutan has less than 100 HIV infections.
SOUTH PACIFIC ISLANDS AND TERRITORIES

HIV/AIDS data from 20 Pacific island countries and territories were collected and analysed by the WHO Regional Office for the Western Pacific. The countries and territories included American Samoa, Cook Islands, Fiji, French Polynesia, Guam, Kiribati, the Marshall Islands, the Federated States of Micronesia, Nauru, New Caledonia, Niue, the Northern Mariana Islands, Palau, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, and Wallis and Futuna. The estimated population of these countries in 2002 was about 2.8 million, with approximately 1.3 million in the 15-49 year-old age group.

HIV/AIDS situation

The epidemiology of HIV in low prevalence populations in the Asia Pacific region consists of imported HIV infections and then limited heterosexual transmission to the regular sex partners of HIV-infected persons. This is the general pattern found in most of the South Pacific islands and territories.

Only sporadic HIV/AIDS cases have been reported from throughout the South Pacific, which suggests that HIV seroprevalence remains low in this region. As of August 2003, over 800 HIV infections (including more than 300 AIDS cases) had been reported to the WHO Regional Office for the Western Pacific. Four states (Fiji, French Polynesia, Guam and New Caledonia), representing 50% of the total population, have reported 85% of the reported HIV infections and over 80% of AIDS cases. Three countries/territories (American Samoa, Niue and Tokelau) have not as yet reported any HIV infections. HIV is primarily a sexually transmitted infection in Pacific island countries. The rates of reported HIV infections via mother-to-child transmission, injecting drug use and MSM are low. There has been a steady increase in reported HIV and AIDS in the Pacific over the past decade, with recent sharp increases in several countries, including Kiribati, Tuvalu and Fiji. Underreporting of HIV in the Pacific is evident and is due to several possible factors, including: limited available testing and surveillance facilities; poor accessibility of at-risk populations to HIV testing sites; poor perception of risk among the general population; most people getting tested only when they are ill with AIDS-related infections; weakness in AIDS diagnosis; differing quality of reporting systems between countries (private doctors do not always report cases, in some countries testing is encouraged while elsewhere it is not, many Pacific islanders travel freely and some people are tested overseas, etc.).
Few HIV seroprevalence studies have been conducted in the South Pacific. Limited data have been collected in some countries among populations of blood donors, pregnant women, STI clinic patients and immigrant groups. Most of these studies have identified few, if any HIV infections. However, the sample sizes were small and these findings should be interpreted with caution. HIV prevalence was estimated, in 2002, to be <0.1% of the 15-49 year-old population of these countries (e.g. Fiji 0.1% UNAIDS/WHO 2001).

Surveys conducted in some countries and territories show that curable STI are common. Studies of women attending antenatal care in Samoa and Vanuatu showed that one in three had an STI. The highest rates of infection (up to 50%) were found in women below 25 years of age. More than 70% of STI cases recorded in STI clinics in Fiji in 1999 were in young people aged 15-25 years. Teenage pregnancy is also on the rise and commercial sex work and child prostitution is an increasing concern. There are also strong indicators of sexual health risk among youth (e.g. 43-79% of in-school youth had >1 partner in the past in Micronesia). The youthful age structure of Pacific island populations means that many people are dependent on this particularly vulnerable age group. The movement of people in, out and around the region assists the introduction and spread of HIV. The national economies of Tuvalu and Kiribati depend heavily on the seafaring industry and this is the main source of HIV infection in these countries. The slow growing, even stagnating economies of the region and the limited opportunities for employment provide the conditions for economic hardship in which HIV and AIDS may flourish.

**Regional response**

HIV/AIDS programmes in the South Pacific will need to continue to focus on prevention and control of treatable STI, such as syphilis and gonorrhoea, and to develop some HIV surveillance among persons with the highest prevalence of sexual risk behaviours. A Plan of Action entitled “Strengthening STI Services in the Pacific Island Countries and Territories” was prepared in 1998. The regional proposal submitted to the Global Fund to Fight HIV/AIDS, TB and Malaria by eleven Pacific island countries (Cook Islands, Fiji, Kiribati, Micronesia, Niue, Palau, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu) has been approved.
Natural history of HIV infection

AIDS (acquired immunodeficiency syndrome) is a severe disease syndrome that represents the late clinical stage of infection with HIV (human immunodeficiency virus). The syndrome was first recognized in 1981, but probably existed at a low endemic level in Central Africa before epidemic HIV spread began to occur in several areas of the world during the 1970s.

Progression from asymptomatic HIV infection to clinical illness and WHO Clinical staging for HIV/AIDS

After the initial infection with HIV, a mononucleosis-like syndrome develops in 40%-70% of patients at 3-6 weeks. During this acute phase of infection, symptoms may include fever, headache, sore throat, erythematous rash, diarrhoea and generalized lymphadenopathy. There may be a significant depression of the cellular immune system and infected persons at this early stage are considered extremely infectious. Subsequently, the immune system rebounds to generally normal levels and the infected person becomes asymptomatic for periods ranging from many months to many years.

HIV infection attacks the cellular immune system. Continued damage to the immune system eventually makes HIV-infected individuals susceptible to various opportunistic infections and cancers. The first infections described in patients with AIDS were due to ubiquitous organisms that do not usually cause disease in healthy persons; the cancers that developed in AIDS patients were of types that had been diagnosed only rarely in the past. Subsequently, it became clear that persons with HIV infection could contract almost any common or uncommon infectious disease, or some malignancies, because of their immune deficiency. The diagnosis of AIDS is complex and often difficult because of the many conditions that are considered necessary to meet different surveillance definitions of the syndrome.

The time period for progression from HIV infection to symptomatic disease is highly variable: symptoms may occur within a year, although rarely, or may take more than 10 years to appear. Over a variable time period from many months to many years, infected persons begin to develop clinical disease related to progressively increasing immune deficiency. Early symptoms may include swollen lymph nodes, night sweats,
fever, diarrhoea, profound weight loss, fatigue and uncommon infections. Continued destruction of the immune system leads to AIDS, which is characterized by life-threatening opportunistic infections and cancers. Based on detailed cohort studies, primarily among white homosexual men in the USA, it is believed that the median period for the development of severe immune deficiency that results in AIDS ranges from 8-10 years.

The median interval from HIV infection to the development of severe immune deficiency is estimated to be about 7-8 years. However, there is a consensus that the survival period from the development of severe immune deficiency to death is much shorter in most developing countries compared with developed countries, where the advent of HAART therapy has significantly increased survival of patients with moderate immune deficiency related to their HIV infection. A recent review of cohort studies in Uganda, Thailand and Haiti indicates that the median interval from HIV infection to death is 9 years. This median period will now be uniformly used to calculate annual HIV incidence and annual deaths due to immune deficiency related to HIV infection.

Of all host factors that have been studied, only age at acquisition of HIV infection appears to have a major effect on progression to the development of AIDS. A detailed analysis of annual progression to AIDS by age at HIV acquisition for the HIV-infected haemophilia cohort in the USA shows that younger members of this cohort progress to AIDS more slowly than older men. The average time to AIDS when infection was acquired after age 35 was about 7-8 years, while that for males who were initially infected when they were younger than 35 years of age was about 12 years. Several female cohort studies in European countries, reported during the early 1990s, indicate that age-specific progression rates in women are similar to those reported for men.

In 1993, WHO established, for resource-limited settings, a list of conditions that serves for an AIDS surveillance case definition and does not require CD4 T cell count.

**WHO clinical staging system for HIV/AIDS**

*Clinical Stage 1*

- Asymptomatic
- Persistent generalized lymphadenopathy (PGL)
- Performance scale 1: asymptomatic, normal activity

*Clinical Stage 2*

- Weight loss, <10% of body weight
- Minor mucocutaneous manifestations
Herpes Zoster within the last 5 years
Recurrent upper respiratory tract infections (e.g. bacterial sinusitis)
And/or performance scale 2: symptomatic, normal activity.

**Clinical stage 3**
- Weight loss, >10% of body weight
- Unexplained chronic diarrhoea, >1 month
- Unexplained prolonged fever (intermittent or constant), > 1 month
- Oral candidiasis (thrush)
- Oral hairy leukoplakia
- Pulmonary tuberculosis within the past year.
- Severe bacterial infections (e.g. pneumonia, pyomyositis)

And/or Performance scale 3: bed-ridden, >50% of the day during the last month

**Clinical stage 4**
- HIV wasting syndrome, as defined by CDC¹
- Pneumocystis carinii pneumonia
- Toxoplasmosis of the brain
- Cryptosporidiosis with diarrhoea, >1 month
- Cryptococcosis, extra pulmonary
- Cytomegalovirus (CMV) disease of an organ other than liver, spleen or lymph nodes
- Herpes Simplex Virus (HSV) infection, mucocutaneous >1 month, or visceral any duration
- Progressive multifocal leukoencephalopathy (PML)
- Any disseminated endemic mycosis (e.g. histoplasmosis, coccidioidomycosis)
- Candidiasis of the oesophagus, trachea, bronchi or lungs
- Atypical mycobacteriosis, disseminated Non-typhoid
- Salmonella septicaemia
- Extrapulmonary tuberculosis
- Lymphoma
- Kaposi’s sarcoma (KS)
- HIV encephalopathy, as defined by CDC²

And/or Performance scale 4: bed-ridden, >50% of the day during the last month
Survival time after diagnosis of AIDS and advent of antiretroviral treatment

The survival time after onset of severe AIDS-characteristic illnesses is also variable, but, prior to the development of effective antiretroviral treatment, average survival time was about 2-4 years in most developed countries and about six months or less in developing countries. The shorter survival periods in developing regions was most likely due to diagnosis at a later stage of disease and limited access to good supportive medical care. In the absence of anti-HIV drug treatment, the case/fatality rate attributable to HIV is among the highest of any human infectious agent.

The proportion of HIV-infected persons who, in the absence of anti-HIV treatment, will ultimately develop AIDS has been estimated to be over 90%. Less than 5% of HIV-infected persons who have been followed with detailed clinical and laboratory studies for 10 years or longer have been classified as possible non-progressors. In the absence of effective anti-HIV treatment, the AIDS case-fatality rate is very high: most (80-90%) patients in developed countries die within 2-4 years after the diagnosis of AIDS is made. However, in the United States of America and most developed countries, routine use of prophylactic drugs for the prevention of P. carinii pneumonia and other opportunistic infections was able to delay the development of AIDS and death significantly, even prior to the routine availability of effective anti-HIV treatment in the mid-1990s. In Asia, routine access to effective anti-HIV treatment is variable. Access ranges from one extreme, such as in Hong Kong where triple anti-HIV drug therapy is provided to all Hong Kong residents, to the other extreme in the poorer Asian countries, such as Cambodia and Myanmar, where anti-HIV drug treatment is virtually unavailable.
Annex 2: Prevention of mother-to-child transmission

By the end of 2002, according to estimates of the Joint United Nations Programme on HIV/AIDS (UNAIDS), 3.2 million children under 15 years of age were living with HIV/AIDS worldwide. In 2002 alone, 800 000 new infections had occurred, largely due to mother-to-child transmission (MTCT) of HIV-1. The problem is most acute in sub-Saharan Africa, where almost 90% of all HIV-infected children live. In Asia, less than 5% of infected cases are among children under 15 years of age.

Under-5 child mortality rates in sub-Saharan Africa have more than doubled, contributing to the progressive reduction in life expectancy in that region, largely attributable to HIV infection. Without any intervention overall MTCT rates range between 25% to 45% in developing countries and between 16% to 20% in Europe and North America. Prevalence and duration of breast-feeding, prematurity, and maternal viral load, as well as different methods used to classify infant infection status and calculate transmission rates, may account for the differences in reported perinatal HIV-1 transmission rates around the world.

The estimated number of children under 15 years of age in selected countries with generalized and/or concentrated HIV epidemics by the end 2001 are shown in the table below.

<table>
<thead>
<tr>
<th>Country</th>
<th>Children (0-14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>12 000</td>
</tr>
<tr>
<td>China</td>
<td>3000</td>
</tr>
<tr>
<td>India</td>
<td>170 000</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1300</td>
</tr>
<tr>
<td>Myanmar</td>
<td>na</td>
</tr>
<tr>
<td>Nepal</td>
<td>1500</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>500</td>
</tr>
<tr>
<td>Vietnam</td>
<td>2500</td>
</tr>
<tr>
<td>Thailand</td>
<td>21 000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>228,610</strong></td>
</tr>
</tbody>
</table>

Numerous clinical trials on preventing MTCT of human immunodeficiency virus type 1 (HIV-1) using antiretroviral drugs (ARV) have shown that perinatal transmission can be reduced effectively. With effective interventions in place, the vertical transmission of HIV could be reduced by around 50% in the short term.

Up until mid-1999, the only drug shown to reduce perinatal HIV transmission was zidovudine (ZDV), when administered in the following regimen. First it had to be given orally to the mother after 14 weeks gestation and continued throughout pregnancy, and then given intravenously to the mother during the intrapartum period. ZDV also had to be administered orally to the newborn infant for the first six weeks of life. This complex chemoprophylactic regimen was shown to reduce perinatal HIV transmission by over 60%. A shorter course of ZDV treatment has subsequently been shown to reduce the risk of perinatal transmission by about 40%. A study reported from Uganda in July 1999 found that giving a single dose of nevirapine to HIV-infected females during labour, followed by a single dose to their newborn babies within 3 days of birth, gave better results than both the long and short ZDV regimens. Safer delivery practices (i.e., avoiding episiotomies and premature rupture of membranes) have also been shown to be partially effective in reducing perinatal HIV transmission. Finally, a programme of replacement feeding of the infant (formula or wet-nursing from HIV-negative women) can increase prevention of HIV transmission via breast-feeding.

Although a short-term regimen of ZDV can significantly reduce the rates of mother-to-infant HIV transmission, by 18 months of age the benefits to the infant of ZDV treatment are offset by infection via breast-feeding, according to the most recently available PETRA study data released in early July 2000. Conducted under the auspices of UNAIDS, the PETRA trial followed the outcome of 1754 HIV-infected women and their infants after they were randomized to one of four arms. These included ZDV and 3TC administered at 36 weeks gestation and continued throughout the first week after delivery (arm A); ZDV and 3TC intrapartum and throughout the first week after delivery (arm B); ZDV and 3TC intrapartum only (arm C); or placebo. While both neonatal HIV transmission rates and mortality were significantly reduced after six weeks of life in arm A and arm B compared with placebo, no significant difference in any of the study arms was seen after 18 months. During the follow-up period, most of the participants were breast-feeding, which the researchers believe accounts for the high number of HIV infections. Thus, it is becoming increasingly clear that a combination of all of the best practices described above (safer delivery procedures, including planned Caesarian section, anti-HIV drug treatment, and replacement feeding) are needed to significantly reduce mother-to-child transmission of HIV – by up to 90%.

As a result of all of these findings, it is universally recommended that all pregnant women should be counselled about HIV early in pregnancy and encouraged to be tested for HIV infection as a routine part of standard antenatal care. HIV-positive females should be given anti-HIV therapy to reduce in utero and perinatal HIV transmission.
transmission. ZDV is still relatively expensive, but nevirapine is less than US$ 4.00 a dose, so the prospects of preventing mother-to-infant transmission of HIV may be less expensive in the new millennium.

A number of developing countries in Latin America and the Caribbean, Africa, Central and Eastern Europe, Commonwealth of Independent States, the Baltics, and Asia have implemented programmes for prevention of MTCT. Thailand was the first country in Asia implementing a national programme to prevent MTCT, followed by India. Pilot projects are ongoing in Myanmar and Cambodia and a number of other Asian countries are also starting. Overall HIV incidence rates in Thailand, and subsequently the number reported paediatric AIDS cases, have decreased dramatically due to the consequent implementation of interventions to prevent HIV transmission.

Understanding HIV/AIDS numbers

This section defines and describes the HIV/AIDS numbers commonly used by HIV/AIDS programmes in order to clarify potential misunderstanding, especially for those health care workers and others who may not be familiar with the specific meaning of these numbers.

The first cases of HIV infection or AIDS were imported into the Asia Pacific region in the early to mid-1980s. At the beginning of public health surveillance for HIV/AIDS in Asia Pacific countries, no distinction was made between prevalent and cumulative numbers of HIV infection and/or AIDS. However, with time and the progression of HIV infection to AIDS and death, the constant widening difference between the prevalent number of HIV infection and the cumulative number became very obvious. As of the beginning of the new millennium, cumulative numbers of HIV infection and/or AIDS cases are not commonly used, except to put HIV/AIDS epidemics in this region into a historical perspective. Public health programmes now almost exclusively use prevalent (those persons living with HIV at a specific point in time) and incident (new HIV infections over a specified time period – usually a calendar year) numbers.

A clear distinction also needs to be made for each of the following types of HIV/AIDS numbers – reported, official, estimated and actual. As described above (in the section on public health surveillance), the completeness and reliability of reported numbers of HIV infection and or AIDS cases varies markedly from country to country and within any country there may be marked temporal variation in the accuracy of reported HIV/AIDS. Official numbers of HIV/AIDS may be reported cases or, in
some instances, may be officially estimated cases. Estimated numbers may be
derived by a government-appointed expert group or can be the estimated number
of an individual or an agency. Some care needs to be taken in evaluating estimated
numbers since, depending on the data, assumptions and method(s) used to derive
the estimate, the resultant figure can represent a reliable working estimate of the
actual HIV/AIDS numbers or may represent gross overestimation or underestimation
of these numbers. The actual or real numbers represent the “Holy Grail” for public
health epidemiologists. The best approximation of the actual numbers can be derived
via an objective estimation process, using the best data available and reasonable
assumptions and methods for the estimation process.

In general, HIV prevalence is usually derived or extrapolated from available HIV
seroprevalence data and most of the other HIV/AIDS numbers, including projections
or forecasts of HIV/AIDS numbers, are derived from scenario/modelling.

Public health surveillance of HIV/AIDS

Public health surveillance can be defined as the collection, analysis and dissemination
of data relevant to the prevention or control of a public health problem. The general
methods used for public health surveillance of HIV infections and AIDS cases are,
in general, no different from those used for other diseases and infections. However,
the methods used must be adapted to the unique epidemiology, wide variation in
prevalence levels, and the very long incubation period of HIV infection prior to the
development of AIDS. In addition, the severity of AIDS and the extreme social and
personal implications of identifying HIV-infected persons make surveillance of HIV/
AIDS much more difficult and make issues such as anonymity and confidentiality of
paramount importance. Confidentiality of personal data is a universally accepted
concept, but anonymity in the public health management of any infectious or
communicable disease is a new and difficult concept to accept, especially in most
countries in Asia.

Case reporting

Recognition, diagnosis and reporting of HIV/AIDS is generally very incomplete, so
HIV infections and AIDS cases reported to health authorities throughout the world
constitute a variable and, usually, only a small fraction of the estimated total (i.e.
“the tip of the iceberg”), especially in developing countries. Within Asia Pacific
countries/city states, the estimated completeness of AIDS case reporting varies
from highs of 50% or more in places such as Hong Kong, to less than 5% in other
Asia Pacific countries. Reporting of HIV infections is usually much more incomplete
and inaccurate than AIDS case reporting, even in those countries where HIV reporting
is required. Therefore, reported AIDS cases and HIV infections should serve only
as a starting point for estimation of actual HIV infections and AIDS cases that have
occurred.
HIV sentinel surveillance

Epidemiological data on HIV infections, collected since the mid-1980s, make it clear that multiple and, to a great extent, separate epidemics of HIV infection can occur in any country or region, depending on the distribution and prevalence of specific HIV-risk behaviours, including MSM, IDU who routinely share injecting equipment, and heterosexuals who have unprotected sex with multiple sex partners. HIV surveillance systems need to be designed to monitor each of these relatively separate HIV epidemics.

HIV infections are not randomly distributed in any large population. The public health surveillance strategy developed by WHO relies on the routine and consistent collection of data from sentinel groups who may be considered representative of their group’s risk of acquiring HIV infection. The basic purpose of sentinel surveillance is to track changes (i.e., trends) in HIV prevalence in the sentinel groups selected. If various sentinel groups can be monitored consistently over time at selected sites, the data collected should provide reliable data on HIV trends in these groups. These data should be sufficient for the design and direction of HIV/AIDS prevention and control programmes. The sentinel populations selected should, to the extent possible, include all major HIV-risk behaviours or factors known to be prevalent in any given population and/or area.

In principle sentinel surveillance is not designed to collect data for the development of national HIV seroprevalence estimates. However, sentinel surveillance data have been used for this purpose simply because there were no other HIV seroprevalence data sets available that might have been any better for this purpose. In addition, alternative methods, such as community-based surveys are costly and difficult to carry out on a routine basis and may also not be reliable.

Problems and limitations of HIV sentinel groups in Asia Pacific countries

Population groups considered to be at high risk of HIV infection because of their behaviour and selected as sentinel groups for the sentinel surveillance that include MSM, IDU and heterosexual subgroups—sex workers and STI patients. Lower-risk heterosexual subgroups used in sentinel surveillance systems have included blood donors, military recruits and antenatal clinic attendees (ANC). In addition, tuberculosis patients have been included in some surveillance systems. Uniform definitions for each sentinel group and rules for consistency in using them are essential for the collection of reliable HIV sentinel surveillance data.

Female sex workers:

Studies in Thailand indicate that there are many different types of FSW in the country—from the direct brothel worker to the occasional freelancer who may be picked up at bars or other locations. In general, the average HIV risk for each type of FSW varies directly with the average number of different sex partners each type may
have on a daily or weekly basis. Estimates of each type of FSW in any given area are usually not made and different sentinel sites may target different types of FSW.

**IDU:**

Similarly, not all drug users inject drugs, and not all injecting drug users routinely share their injecting equipment. The heterogeneity of HIV risk within these sentinel groups must be recognized. Detailed guidelines should be provided to sentinel sites so that all sites are collecting data from similar types of IDU subgroups. In addition, the relative size of each specific IDU subgroup must be estimated when HIV prevalence is estimated for the total IDU population.

**Blood donors:**

Blood donors in most developed countries with a totally voluntary blood-donor system are considered a low HIV risk group. However, in many Asia Pacific countries, depending on the utilization of paid donors, this population group may include persons with some increased risk of HIV infection. In addition, HIV prevalence among blood donors should decrease markedly when appropriate methods are implemented prior to blood collection to screen out donors with possible high HIV risk behaviours.

**Military recruits:**

Young males who are drafted or volunteer for military service may in some countries be considered relatively representative of other males who do not enter military service. However, once in the military, these young men may increase their general patronage of FSW and thereby increase their overall risk of acquiring an HIV infection.

**Antenatal clinic attendees:**

Pregnant females are an easily identified group from whom blood specimens can be collected routinely to monitor HIV prevalence. In sub-Saharan African countries, where the predominant mode of HIV transmission is heterosexual and where the countries face a generalized epidemic, HIV prevalence rates in antenatal females have been used as a surrogate for HIV prevalence in the most sexually active (15-49 years of age) male and female population. Demographic health surveys which include HIV serological surveys of males and females in sub-Saharan African countries confirm that HIV prevalence found in antenatal females is a reasonable surrogate for HIV prevalence in the sexually active population. HIV prevalence was found to be much higher in young antenatal girls than in other young girls and boys, while it was found to be much lower for pregnant women aged 25-39 compared with non-pregnant females in the same age group. However, the average HIV prevalence in antenatal females was close to the average HIV prevalence in males and females from the same general area.

As indicated in the UNAIDS/WHO guidelines, antenatal females in Asia Pacific countries can be used as reasonable surrogates for HIV prevalence in both males and females unless the prevalence in ANC exceed 1%.
**Tuberculosis patients:**

Tuberculosis patients have been included as sentinel groups in a few surveillance systems, but data from these patients are difficult to interpret without a full understanding of the dynamic temporal interrelationship between *Mycobacterium tuberculosis* (*Mtb*) infection and HIV infection. Models of the interaction between HIV and *Mtb* infections provide useful estimates and projections of the additional tuberculosis cases that may be expected annually in populations with different prevalence levels for these infections. In sub-Saharan Africa, where adult HIV prevalence levels are as high as 10%-20% and the *Mtb* prevalence may exceed 50%, the annual number of adult tuberculosis cases can be expected to increase by up to 10-fold during the new millennium. Although the prevalence of *Mtb* infection among young and middle-aged adults in most Asia Pacific countries is relatively high (from 25% to over 40%), adult HIV prevalence levels are much lower and range from less than 0.1% to over 2%. In Thailand, where adult HIV prevalence was estimated in 1995 to be over 2% and where the adult prevalence of *Mtb* infection is about 35%, annual tuberculosis cases were projected to double by 2000. In Hong Kong, where adult HIV prevalence in 1995 was estimated to be less than 0.1% and prevalence of *Mtb* in adults was about 30%, the annual increase in tuberculosis cases by 2000 was projected to be no more than about 2-3%.

**Sampling issues**

The sampling method for HIV sentinel groups can best be described as a practical “grab” sample, conducted in sentinel institutions which can access sentinel groups as part of their routine work. The improved sampling method is recommended to provide a more representative sample of sentinel groups. However, the replicability of any systematic sampling method needs to be considered to assure the reliable evaluation of HIV trends over time.

Local sentinel sites may sometimes be changed from one surveillance round to another, and occasionally even during the course of one sentinel surveillance collection period. This raises the question of how to interpret differences in HIV prevalence from one sentinel surveillance round to another. Are the differences due to real changes in HIV incidence over time in a given geographic location, or are differences related to variations in HIV prevalence in the sentinel group sampled?

One of the major assumptions made in the interpretation of surveillance results is that, if sample collections are consistently uniform (i.e., same local sites, same sampling frame/method, etc.), then differences in HIV prevalence from one surveillance round to another might be attributed to HIV incidence in the sentinel group. However, when HIV prevalence is relatively low (i.e., well below 1%), very wide fluctuations – as much as several-fold – may be found in any specific sentinel group.
It must be stressed that sentinel surveillance samples do not comprise a selected cohort (i.e., the same persons) who are sampled over time, but rather a series of cross-sectional samples of a target population. Additional potential biases in sentinel surveillance data include possible different proportions of urban versus rural samples collected from one round to another, and marked differences in the average age of those selected from one round to another.

In populations where there are large numbers of FSW, IDU and male STI patients, it may not be difficult to obtain sufficient numbers of these risk groups in a short time period. However, in smaller populations, it may be very difficult, if not impossible, to collect the requested number, even if the time for collection is extended and multiple sites are used.

**Behavioural surveillance**

During the early 1990s, at the behest of international donors, increasing attention was given by WHO to the development of evaluation indices for HIV/AIDS programmes. However, methods for routine behavioural surveillance that should be implemented by HIV/AIDS programmes were not developed by any major international agency. The general concept of behavioural surveillance was not formulated until 1993 and behavioural surveillance targeting selected risk groups had not, as of the late 1990s, been systematically and routinely implemented in most national HIV/AIDS programmes. Relatively large-scale population surveys of HIV-risk behaviours (KABP surveys) have been developed and supported by WHO, but they have not supported the development of periodic cross-sectional behavioural surveys of HIV-risk behaviour groups.

It is now acknowledged that a significant amount of formative research may have to be undertaken before an efficient behavioural surveillance system can even be set up. This research, which aims to identify major HIV-risk behaviour subpopulations or groups to develop appropriate behavioural questionnaires, and to construct sampling frames through which surveys might be administered, is being developed by WHO and Family Health International (FHI). In 2001, UNAIDS and WHO updated a *Guide to monitoring and evaluation national AIDS programmes*. This joint guide includes revised indicators and updated data collection instruments. The choice of behavioural indicators may vary slightly according to the group surveyed, but they will generally include:

1. the percentage of respondents who report at least one non-regular sex partner in the last 12 months; and

2. the percentage of respondents who say they used a condom the last time they had sex with a non-marital, non-cohabiting partner, of those who have had sex with a partner in the last 12 months.
In addition, the following indicators may be considered in specific populations:

- **Youth**: Age at first sex;
- **Drug injectors**: Reported sharing of unclean injecting equipment;
- **Sex workers**: Reported number of clients in last week;
- **Sex workers**: Reported condom use with last client.

Whether all national AIDS programmes in Asia need such detailed behavioural research studies or all of the behavioural indicators listed above is open to question. A more accurate surrogate measurement of the earlier mentioned indicators (1) and (2) may be the prevalence of genital herpes (HSV2) antibodies in young (15-24 years of age) antenatal females. Described below are what may be the basic and essential behavioural data needed by all AIDS prevention/control programmes in Asia.

The essential HIV-risk behaviour surveillance data needed by AIDS prevention and control programmes in all Asian-Pacific countries include:

- the mixing of different groups and prevalence of the highest-risk sexual behaviours; and
- the patterns and prevalence of sharing injecting equipment among injecting drug users.

There is a critical need to develop routine surveillance of these HIV-risk behaviours. If public health programmes are to be effective in reducing, or at least modifying these behaviours, they must first obtain reliable baseline data on sexual and injecting drug behaviours in population groups who are known to practise these behaviours. The essential questions that need to be asked for all high HIV-risk groups include:

- On average, how many different sexual partners did persons in this group have during the past month and/or week?
- For each of these sexual encounters, was a condom used?

Tabulation and analysis of the answers to these questions yields basic information that can provide programmes with:

- specific and reasonable targets that can be achieved over a specified period of time; and
- specific means of evaluating the effectiveness of programme interventions with regard to stated targets.
For example, if the targeted population were truck drivers, and the baseline behavioural surveillance survey indicated that this group had an average of 3.5 different sex partners per month, with condom usage about 20%, then the programme could initially set programme targets:

- to reduce the average number of sex contacts in this group to two per month or less; and
- to increase condom use to 50% over the next six months or a year.

Such programme objectives should be pursued regardless of whether HIV seroprevalence in the community is very low, moderate or high. A second behavioural survey six months or a year later can be used to measure whether or not programme targets have been achieved, or if any changes have occurred.

Routine sexual behavioural surveillance surveys (not research studies or large KABP surveys) should be carried out on a regular basis for all identified high HIV-risk behaviour groups. For those persons who engage in injecting drug use, the essential behavioural questions that need to be asked, in addition to the two basic sexual behavioural questions, are:

- With how many persons and how often, do you share drug injecting equipment during the past month and/or week?
- Do you use separate and/or clean injecting equipment when you share injection equipment?

The answers to these behavioural questions will provide public health programmes with data to develop targets for changing these behaviours and to evaluate the effectiveness of education and other interventions in achieving these targets. Public health epidemiologists, in collaboration with behavioural scientists and experts, will need to develop and evaluate instruments (questionnaires, etc.) and methods for the routine collection of behavioural surveillance data for specific populations.

**STI surveillance (as shown in the figure)**

Sexually transmitted infections (STI) are among the most common causes of illness in the world and have far-reaching health, social and economic consequences. WHO estimated that there were 370 million new cases of curable STI in 1999, 169 million (46% of global burden) in the Asia and Pacific region. STI are not evenly dispersed, with the greatest burden falling on the developing countries and, within countries, on underprivileged people and women in particular. STI are a major public health problem, not only because of the morbidity of acute illness, but also because they have serious sequelae and facilitate the transmission of human immunodeficiency virus (HIV).
Epidemiological information on STI is necessary to assess the magnitude of the disease burden, identify vulnerable population groups, mobilize resources for intervention activities and monitor the impact of these activities. In addition, some essential components of STI surveillance systems, such as studies on relative prevalence of etiologic agents for STI syndromes, and their antimicrobial susceptibility patterns, are specifically aimed at improving patient care. The effective management of STI syndromes reduces the pain and suffering of patients and prevents life-threatening complications.

Objectives and core component of STI surveillance

The two main sources of information on STI are national case reporting systems and epidemiological or prevalence assessment surveys. However, even in countries with good reporting systems, many cases are not reported, either because they are asymptomatic or have non-specific symptoms, or because infected individuals do not seek care because of the social stigma attached to STI. Consequently, the numbers of STI cases reported underestimate the total number of cases substantially.

Epidemiological surveys can provide more accurate information on the prevalence of STI. However, very few countries regularly conduct epidemiological surveys and these are often limited to specific population groups, limiting the usefulness of this information for national estimates of the total burden of infection at community level. As a result, data on the prevalence and incidence of STI and their complications are limited and substantially underestimate the burden of these diseases.

The lack of accurate and timely information on the burden of STI hampers efforts to prevent and control them. Without data for advocacy, obtaining political commitment and getting resources allocated to improve diagnostics, treatment and preventive
services are extremely difficult. Planning appropriate service delivery and monitoring the impact of interventions are also difficult in the absence of good epidemiological data. The end result is a lack of attention to and interest in the problem of STI.

It is well documented that the transmission efficiencies of some STI agents are greater than that of HIV. If the data are well collected, the declining incidence of curable STI could be used as an early biologic indicator for the effectiveness of HIV/STI intervention activities. (e.g. condom use and STI trends in Thailand, and concerted national response and stable/decline in both STI and HIV prevalence in Cambodia) Likewise, the increasing trend or resurgence of curable STI in vulnerable population groups indicates prevailing high-risk sexual behaviour for the spread of both HIV and STI. (e.g. resurgence of STI among MSM in some industrialized countries or Australia and the increase in reported cases of new STI in China) Studies in Western Europe have shown that the availability of highly active antiretroviral therapy (HAART) may increase the resurgence of unsafe sexual practices among MSM. The resurgence of curable STI, such as gonorrhoea and syphilis, among MSM has served as early warning indicator for the potential resurgence of HIV. Therefore, WHO has recommended implementing STI surveillance systems as a risk surveillance for HIV in member countries and has included as a core component of second generation HIV surveillance systems. (Ref. SGS Guidelines)

In summary, WHO is promoting the development of country-level second generation surveillance systems that include the collection of quality STI surveillance data. The core activities include (1) enhancing the availability and quality of STI epidemiological data and estimates indicating the size and course of both STI/HIV epidemics, (2) developing tools and facilitating the use of tools that assist in the collection of accurate and complete data on STI, and (3) ensuring the appropriate and timely use of collected information for programme planning, monitoring and evaluation.
Methods for estimation/projection of HIV infection and AIDS cases/deaths

The following section describes the limitations of the general methods used for estimating all the important and needed HIV/AIDS numbers including: prevalence, incidence and cumulative incidence of HIV infections, AIDS cases and AIDS deaths; and HIV-related diseases or conditions such as paediatric AIDS and maternal AIDS orphans and HIV-related tuberculosis cases. There has been an increasing need for estimates and projections in recent years for advocacy purposes; monitoring and evaluating trends of incidence, impacts, relevant interventions; and planning for future needs and resource allocation.

History of development of methods for estimating HIV prevalence:

1. Prior to the advent of effective drug therapy to delay or prevent the relentless progression from HIV infection to the development of AIDS, most developed countries considered reported AIDS cases to be sufficiently reliable for estimating HIV prevalence by using a back-calculation method. The back-calculation method used annual progression rates from HIV infection to AIDS and reported annual AIDS cases (usually after adjustments for incomplete and delayed reports) to calculate how many annual HIV infections would have been needed to generate the estimated annual AIDS cases.

2. A “ratio” method that used an estimated ratio of prevalent HIV infections to prevalent AIDS cases was used in the late 1980s and early 1990s to estimate HIV prevalence. Like the back-calculation method, the ratio method required reliable estimates of AIDS cases, which were generally not available. In addition, most users of the ratio method did not realize that in all HIV epidemics the ratio of prevalent HIV infection to prevalent AIDS cases changes rapidly over time. This HIV/AIDS ratio falls from many thousands to one during the first few years of an HIV epidemic, to less than ten to one
after the first decade. This decline occurs whether HIV incidence is increasing or decreasing because, in the absence of effective treatment, virtually all HIV-infected individuals progress to AIDS. Thus, at the start of any HIV epidemic, there are virtually no AIDS cases in the first few years, The HIV to AIDS case ratio is, therefore, almost all HIV and no or few AIDS cases. As the HIV epidemic continues, however, almost all HIV infections will progress to AIDS and the HIV to AIDS case ratio will gradually decrease. In a hypothetical situation, where all HIV transmission is stopped, the HIV to AIDS case ratio will decrease to almost 1:1 because virtually all HIV infections eventually progress to AIDS.

A simple and useful method to estimate current HIV prevalence in a “mature” HIV epidemic (one that has been in progress for about 10 years or longer) is to multiply the estimated annual AIDS cases by 20. If the median period for HIV infection to the development of AIDS is assumed to be 10 years, then about 10 years after the start of an HIV epidemic, about 5% of prevalent HIV infections will develop AIDS on an annual basis. For example, if the estimated annual number of AIDS cases is 5000, then the estimated HIV prevalence would be about 100 000 (5000 multiplied by 20). Conversely, if HIV prevalence is estimated to be 100 000, then, by taking 5% of the HIV prevalence, one can rapidly calculate the expected annual number of AIDS cases to be about 5000. This is a “quick check and balance” method to see if the national estimate of HIV prevalence is compatible with the estimated annual number of AIDS cases or the reverse – if the estimated annual number of AIDS cases “fits” with the estimated national HIV prevalence.

In the absence of reliable AIDS case estimates or data, epidemiologists have estimated HIV prevalence by using the results of serological surveys and extrapolating these data to the total 15-49 year-old population. This has been and continues to be the primary method used in developing countries to estimate HIV prevalence. Major problems with this method are the limited number of HIV seroprevalence studies that may be representative of specific populations or subgroups, and the wide variability in estimates of the size(s) of important HIV-risk behaviour groups or cohorts, such as FSW, IDU and patients seen in STI clinics. Nevertheless, epidemiologists have derived reasonable working estimates of the prevalence, general distribution and trends of HIV infection for many countries by an objective and detailed analysis of all HIV serosurvey data and demographic data on general population distribution.

**Estimation of HIV prevalence by using HIV serological data**

Many epidemiologists have developed their own methods, assumptions and biases for using the available HIV serological data to derive a seroprevalence estimate. Although HSS systems are not designed to provide data for making HIV prevalence
estimates, they are widely used for this purpose, simply because there are usually no better serological data available. HIV/AIDS programmes routinely use HSS data to estimate HIV prevalence in the major sentinel groups. HIV prevalence in the 15-49 year-old population has been calculated according to the following general formulae:

(1) The number of HIV infections in each of the major high-risk groups = estimated HIV seroprevalence rate (from HSS data) multiplied by the estimated number of the high-risk group (estimated for a specific population or a province); and

(2) The number of HIV infections in the 15-49 year-old population = estimated HIV seroprevalence rate in antenatal women in the province (from HSS data) multiplied by the estimated number of 15-49 year-olds in the province (from census estimates).

**Major sources of potential error when using this general method:**

(1) Errors in estimating HIV prevalence are obvious. The data quality and representativeness of the usual grab samples collected for most HSS systems can be seriously questioned. However, there have not been any systematic attempts to quantify the probable range of error(s) related to such data quality issues. There has also been little effort to use the full range of data available, e.g. HIV prevalence from existing surveys, HIV prevalence in groups outside HSS, other data sources, etc.

(2) Errors in estimating the size(s) of specific RBG can be quite large (up to several times higher or lower).

(3) The probable heterogeneity of HIV risk within any specific RBG is well known, but frequently findings from sentinel HIV sites that tend to capture persons from those RBG with the highest or very high-risk behaviours are then extrapolated to the total RBG. This obviously will tend to lead to higher HIV prevalence estimates.

(4) A major assumption used in this method is that HIV prevalence found in ANC can, with adjustment for the estimated male to female ratio, be used as a surrogate for HIV prevalence in the total 15-49 year-old population. This assumption, used in sub-Saharan Africa, is supported by limited community-based HIV serosurveys which suggest that HIV seroprevalence among antenatal females is a reasonable surrogate value for HIV seroprevalence in the total 15-49 year-old population. However, this assumption has not been validated for other populations.

(5) Measurement and/or estimation of the male to female (M:F) ratio of HIV infections has been carried out using a variety of methods and assumptions. In most epidemiological settings outside Africa (where there is a slight excess of infected females, compared with males) there has been a consistent and
fairly large preponderance of infected males compared with females. However, many Asian countries do not factor in a M:F ratio in their process of estimating their national HIV seroprevalence and this could result in a gross underestimation if ANC data are used without any adjustment to estimate HIV prevalence in both males and females. All HIV prevalence estimation processes should try to ensure that the overall HIV prevalence estimate is consistent with the estimated M:F ratio.

(6) In heterosexual HIV epidemics in Africa, a marked urban-to-rural HIV differential, of up to 10-fold or more, was noted in the early phase of HIV spread. This differential narrowed markedly with time and after 10 years or more had been reduced to about 1-2-fold. One current assumption is that changes in the urban-to-rural HIV prevalence differentials in other developing country populations follow the same general course as that which has been observed in Africa. It is quite possible (and indeed probable) that, in other regions, heterosexual transmission of HIV may remain more localized in the highest RBG in urban centres and may penetrate or diffuse much more slowly (if at all) into most rural populations. However, in the absence of any substantive HIV prevalence data collected from truly rural populations, the assumption that there is no urban-to-rural prevalence differential for HIV seroprevalence in Asian populations, can result in very large and unsupported HIV prevalence estimates.

History of methods for projecting HIV

There is an ancient Arabic saying – those who predict the future, lie, even if they think they are telling the truth. This saying succinctly sums up the great uncertainty in projecting the future, especially for a complex problem such as HIV transmission. Nevertheless, attempts to predict future trends and prevalence of HIV have been carried out with a very wide range of errors, using the following methods.

Delphi survey method

The Delphi survey method was developed in an attempt to improve the reliability of the judgments needed in relatively uncertain situations, as well as to provide a means of quantifying such judgments. Essentially, the Delphi method obtains educated guesses from selected experts in a reiterative fashion, and then uses the average and range of the Delphi responses as projections. Major advantages of the Delphi method are speed and low cost. However, it is difficult to select truly knowledgeable experts (i.e., experienced quantitative epidemiologists who are familiar with the epidemiology of HIV and general demographics of a specific country or population) to develop reliable estimates or projections of the number of HIV infections. Furthermore, estimates and projections made by the Delphi method may have extremely wide ranges. This method should be used only for populations where no data are available.
**Mathematical and computer/simulation models**

Mathematical and computer/simulation models have been used to develop short- and long-range projections of HIV prevalence. However, such models should be used primarily for hypothesis testing – not for making estimates and projections of the annual incidence/prevalence of HIV infection for a specific country or population(s). That was the conclusion of a United Kingdom expert committee that reviewed the situation in the United Kingdom in 1994. The committee concluded that the general uncertainty of many of the needed input parameters, such as the size of the risk groups, as well as reliable data on their current sex partner exchange rates, made estimation and projection of HIV/AIDS incidence and prevalence in the UK extremely uncertain. As a result, they stated clearly that model outputs should not be used for specific programme or policy development. In some countries, with these simulation models, some unrealistic HIV prevalence estimates and projections of HIV have been inappropriately used for programme and policy development.

**Method for short-term (less than 5 years) projection of AIDS cases/deaths.**

A simple scenario/modelling approach for estimation and projection of AIDS cases was developed during the late 1980s by the Surveillance, Forecasting, and Impact Assessment (SFI) unit of the former WHO Global Programme on AIDS (GPA). This scenario/modelling approach or method can be used to provide working estimates and short-term projections of AIDS cases and deaths for policy development and public health planning. A scenario is an outline for any series of events, real or imagined. HIV/AIDS scenarios can be made up or constructed with or without models to “fit” the observed HIV/AIDS data and trends. The following is an outline of the general methods used in this scenario/modelling approach to develop working estimates and projections of HIV infections and AIDS cases and deaths.

1. Assemble and analyse available HIV seroprevalence data to estimate the most recent pattern(s), prevalence and trends of HIV infection for a specific population.

2. Based on these data and other epidemiological observations, different HIV patterns and prevalence levels (i.e., scenarios) can be constructed with some confidence to the year 2005 for specific countries/populations.

3. An AIDS model can be used to derive annual and cumulative estimates and projection of AIDS cases/deaths and other HIV-related conditions, based on the general HIV scenario(s) constructed.

**EPIMODEL**

EPIMODEL is a simple microcomputer programme developed by WHO in the late 1980s to estimate past and current prevalence, and to make short-term projections of AIDS cases and deaths in areas where AIDS case reporting was largely incomplete and unreliable. Most problems encountered by users of EPIMODEL are associated with the quality of input parameters supplied by users.
The basic module of EPIMODEL uses estimates of HIV prevalence and distributes this prevalence by annual HIV-infected cohorts back to the estimated start of the HIV epidemic along a selected epidemic curve. EPIMODEL then applies annual progression rates from HIV infection to the development of AIDS to each of the annual HIV cohorts to calculate annual numbers of adult AIDS cases and deaths. EPIMODEL provides default values for several input parameters that may be considered appropriate for modelling HIV/AIDS in a sub-Saharan African population, but all input parameters for EPIMODEL can be easily changed to better “fit” the specific population that is being modelled.

It must be recognized that, in any large population, the spread of HIV infection and the subsequent appearance of AIDS cases is usually the consequence of several epidemics, i.e., in different “risk groups” or different geographical areas. Each epidemic – whether it be among persons with multiple sex partners, injecting drug users, in urban or in rural areas – has its own starting point and intensity of spread (force of infection). Each HIV epidemic should be modelled separately if sufficient epidemiological data are available.

EPIMODEL was not designed to provide projection of HIV infection. The basic module of EPIMODEL was designed to estimate and project adult AIDS cases and deaths. This module can, with the additional input of a population denominator, calculate annual incidence and prevalence rates for HIV infection. Other modules of EPIMODEL include a Child module and Tuberculosis module.

Aside from the potential errors described above, additional sources of potential error in using EPIMODEL include the following:

1. One problem of EPIMODEL is in making only a single point of prevalence, with a starting year then generating a curve. Also, the greatest error could occur in estimating HIV point prevalence. Usually only subsets of data are used, representativeness of populations tested is not considered. If a very high HIV seroprevalence estimate is used, the number of resultant estimated AIDS cases will also be very high.

2. The “stage” of the HIV epidemic will have a significant impact on the estimates of annual HIV incidence and on estimates of annual deaths due to severe immune deficiency related to HIV infection. For a specific point prevalence estimate of HIV prevalence, the estimated annual incidence of HIV infection will be greater in the early or increasing phase of an HIV epidemic than it will be in the later or declining phase of an HIV epidemic. The stage and duration of the modelled HIV epidemic will also have a major impact on the estimated cumulative incidence of HIV infections and AIDS deaths.

3. Another possible source of error in producing estimates and projections of AIDS cases and deaths with EPIMODEL is the selection of the median interval period from HIV infection to death due to severe immunodeficiency.
related to HIV infection. The median interval from HIV infection to the development of severe immune deficiency appears to be similar in all populations (i.e., in developed and developing countries) and is estimated to be about 7-8 years. However, there is a consensus that the survival period from the development of severe immune deficiency to death is much shorter in most developing countries than in developed countries, where the advent of HAART therapy has significantly increased survival of patients with moderate immune deficiency related to their HIV infection. A recent review of several cohort studies (Uganda, Thailand, and Haiti) indicate that the median interval from HIV infection to death is 9 years, and this median period will now be uniformly used to calculate annual HIV incidence and annual deaths due to immune deficiency related to HIV infection. There is a deliberate movement by UNAIDS/WHO to avoid estimation of AIDS cases because of the vagaries of AIDS definitions.

The default median progression period from infection to AIDS in EPIMODEL is 10 years and the default median interval from AIDS to death for developing countries is less than 1 year. This has resulted in a median interval from HIV infection to death of 11 years. The change from this 11-year median survival period to the 9-year median progression period from infection to death results in much higher (up to 30% higher) cumulative numbers of HIV infections. In addition, use of a 9-year median survival period results in a higher (up to 60% higher) annual number of AIDS deaths. This increase in annual deaths is needed to compensate for the increase in cumulative HIV infections.

Recently developed standardized methods for HIV/AIDS estimation and projection

Standardized tools have recently been developed and promoted by UNAIDS/WHO in collaboration with CDC, Future Group, East-West Center and FHI. A series of regional trainings workshops have been conducted to transmit these methods at country levels. These methods include:

1. **THE WORKBOOK METHOD** * preferably using spreadsheets for a low level or concentrated epidemic, and consisting of two parts:

   - **Point prevalence workbook**: to make a national HIV estimate using a range of estimates (High-low) of infections. The national estimates of HIV cases will be the sum of the HIV estimates in different geographically distinct epidemics, which are decided based on a mix of political, practical and epidemiological considerations. In each region, HIV estimates will be the sum of HIV estimates of the following subpopulations: those at higher risk e.g. IDU, FSW, MSM, clients of FSW, and those at lower risk (sexual partners of those at higher risks e.g. spouses of IDU or clients of sex workers, or pregnant women in urban and rural areas). HIV estimates of each
subpopulation (high-low) are obtained from the HIV seroprevalence rate (provided by sentinel surveillance, HIV screening, other routine HIV testing or specific surveys, etc.) multiplied by its estimated size (calculated from behavioural data or specific surveys).

**Projection workbook:** to make a short-term projection of HIV prevalence using point HIV prevalence in a given year and a curve fitting process (considering some previous prevalence rates, population growth, curve fitting parameters as well as some assumptions e.g saturation prevalence and saturation year). SPECTRUM (a computer model described below) could be applied with projection workbook results for projecting numbers of new infections and impacts (orphans, etc.)

(2) **SPECIAL COMPUTER MODELS** **:**

**EPP (estimation and projection package):** Preferred for a generalized or concentrated epidemic where more data are available. This programme fits a simple epidemiological model to find the best fitting curve that describes the evolution of adult HIV prevalence over time. This is based on yearly HIV prevalence rates available (in at least five years for all population groups) and curve fitting parameters to estimate the time trend of adult prevalence of HIV-1 at the national level, and also make a short-term projection of HIV infections (five years). The time trend of HIV prevalence is estimated by fitting a simple epidemiological model to surveillance data. In generalized heterosexual epidemics the model is fit to urban and rural HIV prevalence data of women attending antenatal clinics separately. These estimates are then combined to produce a national estimate. It is possible to use estimates of other populations, such as sex workers, MSM and IDU. Four parameters which can be changed and their effects on the prevalence curve are:

**To:** The start year of the HIV/AIDS epidemic

**r** : The force of infection (large value will cause prevalence to increase rapidly)

**fo** : The initial fraction of the adult population that is exposed to the risk of infection. This parameter determines the peak of the epidemic curve.

**Phi:** The high-risk adjustment parameter which determines the degree to which susceptible people who die from AIDS are replaced by people who were not at risk. The value of phi determines the amount of decline in prevalence after it reaches a peak (a large value will produce a small prevalence decline).

**SPECTRUM** is a program that reads the prevalence projection produced by EPP and calculates the numbers of people infected, new infections, AIDS cases and AIDS deaths. These calculations are based on population estimates provided by the United Nations Population Division and model patterns prepared by the UNAIDS/
WHO Reference Group that describe the progression from infection to death, the distribution of infection by age and sex, transmission from mother to child, and the effect of HIV infection on fertility.

These latest methods can increase the quality of estimates or projected numbers produced compared with those developed in the past. However, as this is an ongoing process of improvement, there are several issues concerning data gaps and quality of existing input data (e.g. not representative or not consistent methods of data collection, small sample size of population tested, etc.). Assumptions would be made and data from other similar countries would be applied, however the limited value of estimates would be noticed.

