
Chapter 2

HIV/AIDS: Threats and impacts

In the 1990s the AIDS pandemic is in its second decade and is continuing unabatedly; no country has been able to stop its growth. Moreover, it is spreading to hitherto untouched regions. AIDS is the disease that seems destined to characterise the end of the twentieth century and much of the twenty-first.

A few cases of unusual opportunistic illness reported in homosexual men on the west coast of the United States in 1981 (CDC, 1981) only hinted at the magnitude of a viral infection that would afflict an estimated 10-12 million people throughout the world by 1992 (WHO, 1992). According to the Centers for Disease Control (CDC), reported cases of AIDS rose from 295 in 1981 to almost 42,000 in 1991, an increase of more than 14,000%, and reported AIDS deaths increased from 126 to more than 30,000, an increase of more than 23,000% (CDC, 1993). By the year 2000, the World Health Organisation (WHO) estimates that 30-40 million people world-wide will be infected with HIV (WHO, 1991). According to a 1992 projection of the International AIDS Center of the Harvard School of Public Health, up to 110 million people may be infected world-wide by the year 2000, 90% of whom will be in Third World countries (Mann et al., 1992).

Early in the second AIDS decade, there is ample evidence that the pandemic has spread to six continents and to many islands as well. Furthermore, it has become painfully evident that it is intensifying in all affected areas. According to a massive report on the pandemic (Mann J, 1992), it is "dynamic, unstable, and volatile". In effect, it consists of many different epidemics with different time scales. As it matures, it becomes more complex, and it is now composed of thousands of smaller complicated epidemics. Moreover, the researchers see signs that the pandemic may be "out of control", that its

course through many societies has yet to be influenced in any substantial way. and that its major impact is yet to come.

The statistics are impressive: 40 million (or perhaps 100 million, 2% of the world's population) infected with HIV by the end of the decade; seropositivity rates of 10% - 20% - even 30% among certain population groups (by age, place of residence, nationality, or gender); increasing AIDS-related mortality rates; perhaps 2/3 of those infected living in sub-Saharan Africa, with one million (perhaps many more) already infected in India and hundreds of thousands more in Southeast Asia. The problem is that as long as these issues are discussed largely in terms of statistics, they remain issues in the abstract. This is especially true (and dangerous) when the numbers remain relatively small in the developed world (particularly when compared to some earlier predictions), thus lulling it into a false sense of security and leading to the debate over the "myth of AIDS".

In 1994, a record number of people - some 4 million - contracted the HIV (WHO, 1995). Some 400,000 babies were born with HIV in 1994, and 1.4 million women contracted the virus, representing 39% of all newly infected adults (Mann & Tarantola, op. cit). During the same 12 months, an estimated 1.6 million carriers of HIV developed full-blown cases of AIDS , also more than in any previous year. And a record number died of AIDS - 1.5 million (Mann & Tarantola, op. cit).

Since the beginning of the HIV/AIDS pandemic, in late seventies, 20-26 million people have been infected with the deadly virus (Table 2.1). Some 5-9 million of these individuals have already developed AIDS (Table 2.2), and nearly 90 percent of these AIDS patients have died (WHO, 1995).

Table 2.1 Global Estimates of Cumulative HIV cases, 1980-1994.

Year	HIV infections (million)
1980	0.2
1981	0.6
1982	1.1

1983	1.8
1984	2.7
1985	3.9
1986	5.3
1987	6.9
1988	8.7
1989	10.7
1990	13.0
1991	15.5
1992	18.5
1993	21.9
1994	25.9

Table 2.2 Global Estimates of Cumulative AIDS cases, 1980-1994.

Year	AIDS cases (million)
1980	0
1981	<0.1
1982	<0.1
1983	0.1
1984	0.2
1985	0.4
1986	0.7
1987	1.1
1988	1.6
1989	2.3
1990	3.2
1991	4.2
1992	5.5
1993	6.9
1994	8.5

Source: Global AIDS Policy Coalition, *Harvard School of Public Health, Cambridge, Mass., private communication, 20-1-1995.*

Unfortunately experts are projecting that the spread of HIV will continue at record rates for the next few years. Since the virus is especially active right now in Asia, home to some of the world's most densely populated countries, the number of people carrying the virus could quite easily double by the end of this decade (WHO, 1992).

Much of the money currently spent on HIV/AIDS goes towards the development of vaccines and drugs. Such research is crucial, as HIV duplicates and mutates so frequently that it has so far proved resistant even to the most sophisticated biochemical interventions (Down to Earth, 1994). Moreover, most of the people who have HIV/AIDS live in impoverished regions of sub-Saharan Africa and Southeast Asia, where they have no access to any drugs whatsoever (Mann & Tarantola, op. cit). Only 10% of the global budget on HIV/AIDS is spent by industrial countries in the comparatively poor developing countries, though as of 1994, 92% of all HIV infections had occurred in the developing world (Sandstrom S,1994).

In 1994, 48% of the new HIV infections occurred in sub-Saharan Africa, the epicentre of the pandemic. But Southeast Asia had 1.7 million new infections, and there will probably be more new annual infections in Asia within a few years (Mann & Tarantola, op. cit). Just between 1992 and 1994, the number of HIV infections in India tripled (Brown P, 1994).

In sub-Saharan Africa, where HIV spread is primarily through heterosexual sex, there were more new infections among men (Mann & Tarantola, op. cit). Prevention programs that encourage men to be sexually responsible and that empower women, perhaps through wider distribution of female condoms, merit special attention, since many women in male-dominated societies currently have no way to protect themselves.

The impact of HIV infection and AIDS on the development both of communities and of nations *is* beginning to appear. The impact in many regions of the world is already widespread, profound, and complex - and promises to be even more so in the future. The subsequent scenarios being written for the future of heavily affected regions of the world - and for some only now beginning to be affected - are quite devastating. And they come at a time when many societies, because of recession, debt, war, and natural disaster, are simply unable to cope with the "routine" demands of development let alone assess the impact of AIDS and respond effectively to it. (Miller and Rockwell, 1988; Nabarro and McConnell, 1989; Armstrong and Bos, 1992; Reid, 1992).

Contemporary global estimates

It is estimated that by 1 December 1996 more than 8.4 million AIDS cases had occurred since the start of the global AIDS epidemic. Owing to under-recognition, however, only 1.5 million cumulative cases of AIDS in adults and children have been officially reported to WHO by countries. Because of the long delay between infection with the human immunodeficiency virus (HIV) and the ultimate development of AIDS, a more useful indication of current trends in the global epidemic is the number of new infections with HIV. According to UNAIDS estimates, there have been over 3.1 million new HIV infections during 1996. This works out at about 8,500 a day - 7,500 in adults and 1,000 in children.

During 1996, HIV/AIDS-associated illnesses caused the death of an estimated 1.5 million people, including 350,000 children. Since the start of the global epidemic, close to 30 million people are thought to have been infected with HIV - 26.8 million adults and 2.6 million children. Of these, an estimated 5 million adults and 1.4 million children have died.

Today, 22.6 million people are estimated to be living with HIV infection of AIDS. Of these, 21.8 million are adults and 830,000 are children. Approximately 42% of the 21.8 million adults living with HIV/AIDS are women, and the proportion is growing. The majority of newly infected adults are under 25 years old.

Estimates as of December 1996 ¹

New HIV infections in 1996	Adults	2.7 million ²
	Children	400,000
	Total	3.1 million
People living with	Adults	21.8 million

HIV/AIDS	Male	12.6 million
	Female	9.2 million
	Children	830,000 ³
	Total	22.6 million
HIV/AIDS-associated deaths in 1996	Adults	1.5 million
	Male	650,000
	Female	470,000
	Children	350,000
	Total	1.5 million
Cumulative HIV infections	Adults	26.8 million
	Male	15.5 million
	Female	11.3 million
	Children	2.6 million
	Total	29.4 million
Cumulative AIDS cases	Adults	6.7 million
	male	3.9 million
	Female	2.8 million
	Children	1.7 million
	Total	8.4 million
Cumulative HIV/AIDS deaths	Adults	5.0 million
	male	2.9 million
	Female	2.1 million
	Children	1.4 million
	Total	6.4 million

¹ Because of rounding, figures may not tally.

² Nearly half of HIV infections occurred in women.

³ Many children with AIDS die from other causes; the estimated number of children living with HIV/AIDS (830,000) is therefore less than the difference between cumulative infections (2.6 million) and cumulative deaths (1.4 million) in children.

Source : UNAIDS Joint United Nations programme on HIV/AIDS

AIDS, "The Disease"

Usually when an individual is attacked by an infectious microbe (bacterial, viral, fungal, protozoan), his/her immune system will release immunocytes to fight the infection. HIV, the retrovirus causing AIDS, is a special kind of microbe. HIV inactivates the immune system and destroys its ability to produce certain immunocytes, namely, CD4 T cells. This makes the body helpless against a variety of infections, known as opportunistic infections, that healthy persons can usually throw off. A syndrome of such infections constitutes AIDS. The syndrome includes a rare form of pneumonia (*Pneumocystis carinii*, or PCP), skin cancer (Kaposi's sarcoma, or KS), herpes simplex or cold sores (with oesophagus and trachea, blood poisoning, and infections of brain and nervous system (CDC, 1993). All persons who have AIDS do not suffer from all of the diseases, however; and resistance may be strengthened with proper exercise, rest, and good nutrition. In time, however, most infected persons typically suffer from several infections, the cumulative effects of which cause death.

HIV may vary widely from individual to individual and over time within the same individual (Ewald P, 1994); it mutates very rapidly. Consequently, even if an effective drug is developed for one HIV strain, it might not be effective for another. Certain drugs may suppress HIV or fortify the immune system, and hence slow down the progress of opportunistic infections, but at present medicines cannot make people who have HIV, noninfectious or prevent their deaths.

Evolution of HIV/AIDS Pandemic

The HIV/AIDS pandemic has undergone four main phases of evolution:

- emergence

- dissemination
- escalation
- stabilisation

Before AIDS was recognised, HIV infection *emerged* from where it was pandemic at low levels, and disseminated to more populated urban areas (Nizilambi, N., et al., 1988). The infections spread silently among sexually active populations, including female sex workers and their clients, in developing countries, and among homosexual men in industrialised countries. During the *dissemination* phase, the virus spread quickly to various regions of the world as a result of population movements and travels thereby sowing the seeds for an explosive epidemic. Apart from the effects of rural to urban migration and international travel, another factor inherent in population migration and urbanisation was the enormous social disruption that occurred, especially in sub-Saharan Africa (Decosas, J. Kane, F., et al., 1995). Cultural values were changed, commercial sex became more common, medical services declined or were not available, and STDs increased in frequency. The social disorganisation and cultural change coupled with increasing poverty directly enhanced vulnerability to HIV infection.

These and other factors influenced the phase of *escalation*, which occurred during the 1980s. Transmission of HIV was amplified among high-risk population and the virus spread to other populations at risk, including injecting drug users, heterosexual partners of infected individuals, blood transfusion recipients, and eventually, to some segments of the general population in both urban and rural settings in developing countries (Nunn, A.J., Wagner, H-U., et al., 1995). This phase is currently illustrated in the densely populated region of Southeast Asia where the virus was introduced only recently and where four million cumulative HIV infections have occurred within the past five years.

A fourth phase of the HIV pandemic has become evident as HIV prevalence and reported AIDS cases seem to *stabilise* in Australia, North America, and western Europe. Although such changes could represent a positive development from a prevention perspective, they may also signal a transition from epidemic to endemic HIV infection.

Stabilisation in prevalence may indicate that the number of deaths from AIDS equals new HIV infections, and may also mask disproportionate increases in certain modes of transmission - e.g., an increase in heterosexually transmitted HIV or a disproportionate increase in new HIV infections among young people as recently observed in the USA and Europe (GPA - WHO, 1995).

The global pandemic of HIV infections comprises many different epidemics, each with its own dynamics, and influenced by many factors - e.g., time of introduction, population density, and cultural and social issues (Lancet, 1996). Even within some regions the HIV epidemic consists of a multitude of smaller ongoing epidemics, which although related, pursue their own course with different velocities. Spread of the epidemic has varied considerably between developed and developing countries, depending on the culture as well as other social and behavioural patterns. Incidence rates have been the highest in developing countries where heterosexual transmission is most common (GPA - WHO, 1995).

In addition to continued spread in already affected areas, HIV is spreading rapidly to countries little affected during the 1980s. Nigeria, once regarded as an area with very little HIV activity, now estimates that it has at least one million infected individuals (GPA - WHO, 1995). In India, Myanmar, and Thailand, the volatility of the pandemic is most striking (Kaldor, J.M., Sittitrai, W., et al., 1994). Because of the density of the population, there may be more HIV infected individuals in Asia by the year 2000 than in any other region of the world, including sub-Saharan Africa. With continued escalation of HIV transmission in Asia and sub-Saharan Africa, the estimate is that nearly 90% of all HIV infected people will reside in these developing countries by the year 2000.

Definition of AIDS

WHO has developed a clinical definition for AIDS that can be used in areas where diagnostic resources are limited. According to the definition, AIDS in an adult is defined by the presence of at least two of the following major signs in association with at

least one minor sign (Box 2.1), in the absence of a known cause of immunosuppression, such as cancer or severe malnutrition. In addition, the presence of generalised Kaposi's sarcoma or cryptococcal meningitis is sufficient for the diagnosis of AIDS, even without the required number of major or minor signs. The most common symptoms of HIV infection in children are weight loss, failure to thrive, fever and chronic diarrhoea. Oral thrush, which often recurs after treatment, can be the first indication of HIV infection. As HIV infection progresses, opportunistic diseases also begin to appear. Finally, many, if not most, of these children have some type of neurological involvement, such as developmental delay or encephalopathy. A significant proportion, probably more than 20%, of infants infected by mother-to-foetus/infant transmission die during the first year of life.

Box 2.1 Clinical case definition of AIDS in adults.

Major Signs	Minor Signs
<ol style="list-style-type: none"> 1. Weight loss of 10% or more of body weight 2. Chronic diarrhoea for more than 1 month 3. Intermittent or constant fever for more than 1 month 	<ol style="list-style-type: none"> 1. Persistent cough for more than 1 month 2. Generalised pruritic dermatitis 3. Recurrent herpes zoster 4. Oropharyngeal candidiasis 5. Chronic progressive and disseminated herpes 6. Generalised lymphadenopathy

HIV Transmission

The modes of transmission of HIV have not expanded significantly beyond those described or predicted early in the epidemic. Although a small number of persons have been infected by unusual routes, the majority of cases of HIV infection and AIDS throughout the world can be attributed to sexual contact, parenteral transmission (drug injection, percutaneous occupational exposure, or receipt of infected blood, blood

products, organs or tissues), or perinatal transmission from an infected mother. Within any given country, marked differences have been observed in the overall and proportional rates and routes of infection, probably due to the time of introduction of HIV into a particular community, differing patterns of drug misuse and other risk behaviours, as well as social structure.

The Impacts of AIDS

On Population Growth:

The increased mortality among adults and children has raised concerns that AIDS may become so devastating as to reverse positive population growth rates and wipe out entire populations. In December 1989, WHO, in conjunction with the United Nations Population Division, used six mathematical models to examine the demographic consequences of the AIDS pandemic. In a population with a 3% growth rate, modelling showed that a negative growth rate would result only when HIV prevalence in the entire population exceeded 40% - a level that has not, thus far, been seen in any general population.

During the 1990s, the impact of AIDS will be greatest in large urban areas of sub-Saharan Africa, especially in Eastern and Central Africa, where today, in some cities, as many as a quarter to one third of all adults aged 15-49 are infected with HIV. In such cities, AIDS deaths in young children and in those aged 15-49 may reduce expected population growth by over 30%, and the adult mortality rate may be more than triple. In addition, the potential exists for the devastating spread of the pandemic throughout Asia - a continent in which over half of the world's population live.

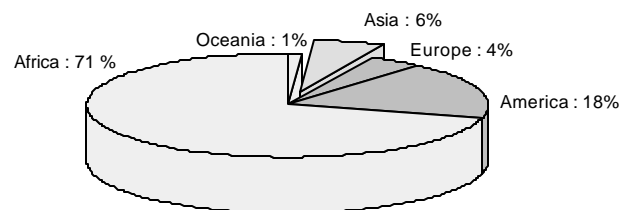
On Socio-economic Development

As AIDS is predominantly a sexually transmitted disease it strikes adolescents, young adults and people in early middle age. These are the people on whom society relies

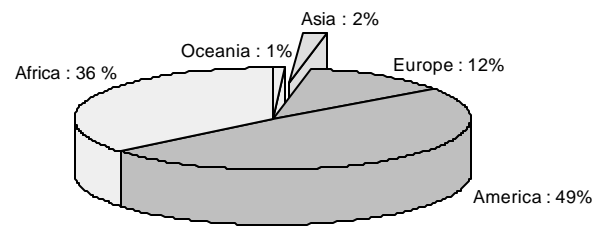
for production and reproduction. As they die of AIDS, their elderly relatives are left without support and their children become orphaned. Thus for every person with AIDS, many more people are affected by the impact of HIV/AIDS. In countries which are in the process of industrialising AIDS threatens development itself.

The Global Status

The HIV/AIDS pandemic was initially centred in urban locations but in most countries is now thought to be present in rural areas as well. The number of AIDS cases reported to the Global Programme on AIDS (GPA) in adults and children rose to 1,393,649 by 30 June 1996 from 985,119 two years earlier. But GPA believes that the true number of cases may be six times this, in the region of 7.7 million. The estimate takes into account under-diagnosis, under-reporting, and delays in reporting. Figure 2.1 shows the distribution of AIDS cases by geographical region.



2.1.a. : ESTIMATED CASES



2.1.b. : REPORTED CASES

Figure 2.1: Distribution of AIDS cases by geographic region

Source : UNAIDS Joint United Nations Programme on HIV/AIDS

Only about half of the reported AIDS cases were from the developing countries, but GPA estimates that these countries account for well over three-quarters of actual cases. The number of AIDS cases is only a fraction of the number of people estimated to have been infected with HIV, and who are therefore likely to go on to develop AIDS. According to GPA estimates, about 18.5 million adults and more than 1.5 million children have been infected with HIV since the beginning of the pandemic in the late 1970s/early 1980s.

Women & AIDS

In many parts of the developing world, including Asia, HIV/AIDS is still viewed as a homosexual male and foreign affliction. But according to the World Health Organisation, women constitute half of all new infections. In 1980, women were almost absent from the HIV/AIDS pandemic. But of the 18 million HIV positive adults in 1994, at least eight million women (a little over 44%) are of childbearing age. Of this number, 5.5 million HIV infected women live in Africa. As of 1994, 1.3 million of the estimated 3 million adult HIV cases in South and South-east Asia were women.

Women, especially adolescents and young girls, are today the group most swiftly being hit by the HIV crisis. Some 500,000 women died from AIDS in 1994 and one million new infections affect women each year. World Health Organisation projects that by the year 2000, 13 million women will be infected with HIV, equalling the number of men expected to be infected.

Women are more vulnerable to physical, emotional and social pressures that come with the disease, for which the prospect of a cure or vaccine is unlikely over the next decade. Women are biologically more susceptible to contracting HIV/AIDS, so that male-female transmission is up to four times efficient as the reverse. Women have higher rates of sexually transmitted diseases, which aids HIV/AIDS transmission.

Socio-cultural and economic factors ranging from poverty, lower status compared to men and lack of control over sexual relations and behaviour ease HIV/AIDS transmission and make them less able to protect themselves against infection. This sort of situations exist particularly in the developing nations. In some places, women are unable to say no to husbands whom they know to have HIV. Often they are expected to provide care for husbands or relatives who fall ill, but may not get same care for themselves.

Future Projections on HIV/AIDS Prevalence

Based on studies of HIV prevalence in specific population groups and areas, the estimated size of each groups, prevalence in neighbouring areas and trends over time, WHO have estimated current cumulative HIV infection in adults.

On the basis of available data on the current global status of the pandemic and recent trends in its spread, WHO has generated a plausible range of projected new HIV infections during the 1990s. In making projects of the future magnitude of the pandemic, WHO used the lower limits of its estimated regional ranges of HIV prevalence; so the results of the forecasting should be considered conservative. During this decade, around

10-15 million new HIV infections may be expected in adults, mostly in developing countries. During the same period, as many as 5-10 million children will be HIV-infected at birth or through breast-feeding, the majority of them in sub-Saharan Africa. By the year 2000, the cumulative number of HIV-related deaths in adults is predicted to rise to more than 8 million from its current total of 2 million.

Table 2.3 Estimated Adults Population and HIV prevalence in mid-1993 and by 2000.

"Macro" region	Mid-1993		2000	
	Estimated HIV prevalence	Estimated population aged 15-49 years (1990)	Projected HIV prevalence	Projected population aged 15-49 years
Australia Europe & North America	> 1.2 million	646 million	1 million	675 million
Latin America & Caribbean	> 1.3 million	227 million	> 2 million	282 million
Africa	> 6.5 million	289 million	> 9 million	397 million
<i>Asia</i>	<i>2 million</i>	<i>1527 million</i>	<i>8 million</i>	<i>1843 million</i>
Global Total	> 11 million	2689 million	> 20 million	3197 million

Source : UNAIDS Joint United Nations Programme on HIV/AIDS

For the year 2000, the current WHO projection is that there will be a cumulative total of 30-40 million HIV infections in men, women and children, of which more than 90% will be in developing countries.

Projections of the number of AIDS cases in infants and children are based on perinatal transmission rate of about 30%. This means that up to 70% of infants born to HIV-infected mothers will not be infected. However, because their infected mothers are likely to die of AIDS within 5 to 10 years of their birth, these infants will constitute a growing population of orphans. The number of orphans will increase further in the early

years of the next century as a result of the death of those parents infected with HIV in the 1990s. The projected cumulative total of adult AIDS cases is close to 10 million.

Status of HIV/AIDS in Advanced Countries

Reported AIDS cases for countries in eastern and western Europe, North America, and Oceania (Australia, Japan, and New Zealand) are given in Table 2.4 . Western Europe is estimated to have 500,000 persons infected with HIV. Eastern Europe is estimated to have 20,000 HIV-infected persons, and Oceania is estimated to have 30,000. An estimated 1 million persons in North America are infected (WHO-GPA, 1992). The extent of the epidemic in eastern Europe is not well defined since no large-scale studies have been done and the accuracy of testing is questionable (Rich,V., 1992). Romania and some countries of the former Soviet Union have experienced extensive localised outbreaks attributed to inappropriate medical practices (Gromyko,A., 1991; Pokrovsky,VV., 1992). As a result of these outbreaks, Romania alone accounted for 54% of paediatric AIDS cases reported in Europe through the end of 1991 (Zolotusca,L. et al., 1992).

The situation of United States reflects the evolution of HIV/AIDS in developing countries, despite some differences in the prevalence of risk behaviours among the countries. The first 100,000 cases of AIDS in US took about 8 years to be diagnosed and reported (CDC, 1989); the second 100,000 cases took about 2 years (CDC, 1992). The epidemic has expanded from large urban areas to smaller metropolitan areas (population <500,000), which are reporting increasing numbers of cases (Karon, JM. and Berkelman, RL., 1991). The large metropolitan areas of north-eastern United States are experiencing some levelling in the rates of increase in AIDS cases; in contrast, the South is experiencing rapid rates of increase, particularly in small metropolitan and rural areas (CDC, 1992). This trend is further confirmed by recent HIV sero-surveillance surveys, which have shown the prevalence in some small towns and rural areas to be nearly as high as in the larger cities (CDC, 1991).

For determining the relative size of the AIDS epidemic in different countries, comparing case rates per 100,000 persons in the population is more valid than comparing numbers of cases, since countries with similar numbers of AIDS cases can have vastly different case rates. Case rates for industrialised countries are shown in Table 2.4.

Table 2.4 Number of AIDS cases and 1990 case rates for developed countries as reported to the WHO and CDC.

	Country	No. of cases	1990 Rates
North America	United States	242,146	18.4
	Canada	6,116	3.4
Europe	France	20,250	6.6
	Italy	13,668	5.2
	Spain	14,533	6.6
	Germany	8,463	2.1
	United Kingdom	6,140	1.9
	Switzerland	2,537	6.6
	Netherlands	2,189	2.7
	Romania	1,961	4.1
	Belgium	1,167	1.8
	Denmark	1,014	3.8
	Portugal	959	2.0
	Austria	795	2.0
	Sweden	712	1.4
	Greece	636	1.3
	Yugoslavia	288	0.3
	Norway	277	1.3
	Ireland	276	1.5
	Poland	108	0.1
	Finland	107	0.3
	Hungary	102	0.2
USSR	100	0.0	
Luxembourg	54	2.5	
Czechoslovakia	28	0.0	
Malta	24	0.3	
Iceland	22	1.2	
Bulgaria	16	0.0	
Monaco	7	7.4	
San Marino	1	0.0	
Albania	0.0	0.0	
Oceania	Australia	3,238	3.7

	Japan	473	0.2
	New Zealand	323	2.2

Source : UNAIDS Joint United Nations Programme on HIV/AIDS

As the number of persons infected with HIV cannot be directly measured, indirect methods such as mathematical modelling are used to estimate the prevalence, distribution, and incidence of infection. Reasonable prediction of the future course of the epidemic in populations or geographic areas can help to identify where prevention and treatment services are more urgently needed.

An estimated 1 million people in the United States are infected with HIV. In 1990, published estimates projected that 390,000-480,000 AIDS cases would be diagnosed in adults through 1993 (CDC, 1990). An estimated 329,000-382,000 cases were expected by the end of 1992; through September 1992, 242,146 cases actually were reported (CDC, 1992). The total cumulative number of cases in the European Community was predicted to be in the range of 64,000-74,000 by the end of 1991. Through June 1992, over 69,000 cases had been reported (Downs AM, et al., 1990).

Projections of AIDS cases in the United States and the European Community anticipate some slowing of the pace of the epidemic, in some transmission categories, but increases in others. Some levelling in the growth of the epidemic is expected among men who have sex with men. Among injection drug users, some slowing in these two major transmission categories is in sharp contrast to the expected expansion of cases attributed to heterosexual transmission (CDC, 1992; Downs AM, et al., 1990). Recent projections from CDC predict growth in cases attributed to heterosexual through 1995 in the United States and predict a plateau in men who have sex with men and injection drug users. Heterosexual transmission is expected to increase steadily in most industrialised countries, but at much slower rates than seen earlier in men who have sex with other men and in injection drug users (Chin J, 1990).

Prevalence of disease in a population refers to the number of people with the disease in that population who are living at the time of measure or estimate. An apparent

steady-state in AIDS prevalence belies the fact that HIV infections continue to occur, and people with AIDS continue to die. For prevalence to remain steady, the number of people developing disease must equal the number of people either dying or being cured of the disease.

Routes of HIV transmission

In United States, Canada, and most of Europe and Oceania, men infected by having sex with other infected men comprise the majority of cases (Green TA, et al., 1992). Less than 10% of all AIDS cases in developed countries, except Bulgaria and Belgium, are attributed to heterosexual transmission, in contrast to the overall world statistics of 75% (CDC, 1991; Braun MM, et al., 1990; Gromyko A, 1991). But the HIV transmission through heterosexual contact is growing in advanced countries, in Western Europe alone, heterosexual transmission increased nine fold between 1985 and 1990 (WHO-GPA, 1991). Women are increasingly represented among AIDS cases attributed to heterosexual contact. In United States, women have outnumbered men in this transmission category since the beginning of the epidemic (Guinan ME, and Hardy A, 1987). Most often women infected heterosexually have had sex with an injection drug user (CDC, 1992).

Receptive anal intercourse is well established as a risk factor for HIV transmission between men who have sex with men (Winkelstein W Jr, Lyman DM, Padian N, et al., 1987). Most heterosexual transmission occurs through vaginal intercourse, although anal intercourse may further increase the risk for women (Padian N, Marquis L, et al., 1987; Seidlin M, Vogler M., Dubin N, and Lee E, 1992).

Injection drug misuse had accounted for about 25% of AIDS cases in developed countries, but only about 7% of cases in the rest of the world by the end of 1991 (WHO-GPA, 1992). Among 32 European countries, drug users constitute an increasing percentage of cases of AIDS cases, although the rates of growth may be slowing (Downs AM, Ancelle-Park RA, and Brunet JB, 1990). The high percentage of cases attributed to

injecting drug misuse is most notable in Italy and Spain (Brenner H, Hernando-Briongos P, Goos C, 1991). Yugoslavia, France, Poland, Ireland, Austria, and Switzerland also have high percentages of drug misuse associated AIDS cases. Little more than 1% of AIDS cases in Canada are attributed to injection drug misuse, compared with about 23% of AIDS cases in the United States. Australia reports relatively low HIV seroprevalence among injection drug users, with a range of 0.7 - 5.2% testing positive across a variety of settings (Kidd S, Denham I, Gold J, et al. 1991). and a correspondingly low percentage of their AIDS cases attributed to injection drug misuse. New Zealand also has a low proportion of its AIDS cases among injection drug users (Carlson RV, Skegg DC, Paul C, Spears GF, 1991).

As the number of HIV-infected women in the world grows, the number of perinatally transmitted cases of HIV infection also increases. Transmission rates from HIV-infected women to their infants has reported to range from about 14% to about 40%, with highest rates observed in studies done in developing countries. HIV has been transmitted by breast-feeding. One report has estimated a 29% risk of HIV transmission by breast-feeding when the mother was infected postnatally; among mothers known to be infected at delivery, breast-feeding is estimated to add a 14% risk to that already encountered via perinatal transmission (Dunn DT, Newell NM, Ades AE, Peckham CS, 1992). WHO recommends that the benefits of breast-feeding in reducing an infant's risk of dying of paediatric infectious diseases or malnutrition should be weighed against the risk of HIV infection through breast-feeding (WHO-GPA, 1992).

Transmission of HIV infection via contaminated blood or blood products is responsible for about 5% of AIDS cases in the world, but 3% or less of cases in most developed countries (WHO-GPA, 1992). The proportion of blood and blood product-associated AIDS cases is declining in most developed countries because of widespread donor testing and exclusion criteria implemented in 1985 (Jones DS, et al., 1992). In addition to HIV screening, many clotting factors also undergo mechanical or chemical treatment that inactivates viruses . In United States, no infections have been detected among patients who received only treated factor concentrates that were made from

screened plasma. Between April 1987 and December 1990, no seroconversions were detected in patients treated only with products currently available (Fricke W, et al., 1992). HIV infection has been transmitted through donated organs and tissues (Samuel D, Castaning D, Adam R, et al., 1988), although the majority of cases occurred before 1985 when antibody tests became available and screening of organ donors became routine (CDC, 1988).

The risk of HIV infection in the health-care setting cannot be ignored. Most documented instances of HIV transmission have resulted from health care worker exposure to laboratory or patient specimens through percutaneous injury. Studies indicate that the risk of infection after percutaneous exposure to HIV-infected blood is approximately 0.4% and risk after mucocutaneous exposure is much less. Health care workers also are at risk for other blood-borne pathogens, and routine testing for HIV infection alone could fail to identify over 80% of patients who pose a risk of transmitting infections such as hepatitis B and hepatitis C viruses to health care workers (Kelen GD, Green GB, et al., 1992). The Occupational Safety and Health Administration of the US Department of Labor has enacted far-reaching regulations based on universal precautions that require employers to assure that their workers are trained in and observe safety precautions to prevent the transmission of blood-borne pathogens and receive hepatitis B vaccine.

After 11 years of studies of HIV infection and AIDS, it is clear that HIV can not spread through casual contact. Studies of household contacts of HIV-infected persons have revealed no instances of transmission among persons who were not sex or needle-sharing partners of the index case (Lifson AR, 1988). Some household contacts in these studies shared toilet articles; nearly all of them shared cooking, eating, and drinking utensils, towels, and other household items, and many provided nursing care to the HIV-infected family member. Furthermore, there is no evidence that HIV can be transmitted by food, inanimate objects, skin contact (such as handshaking), animals, or water (Gershon RR, Vlahov D, Nelson KE, 1990).

HIV has been isolated from saliva, and although there is a theoretical risk that HIV could be transmitted by either deep kissing (Pizza M, Chirianni A, et al., 1989) or by a bite or other direct contact of infected saliva with non-intact skin or a mucous membrane (Lifson AR, 1988), there is no proof that any such transmission has occurred.

HIV transmission by insects has been the subject of much speculation. Insects are known to spread certain infectious diseases by one of two mechanisms: biological, in which the infectious organism undergoes part of its life cycle in the insect; or mechanical, in which the organism is deposited on the surface and is spread by the biting mouth parts of the insects (Lifson AR, 1988; Webb PA, Happ CM, et al., 1989). Findings argue against biological transmission of HIV/AIDS. If mechanical transmission were important, one would expect to see HIV infection well distributed among household contacts who lack established HIV risk factors, and among persons in all age groups (particularly the young and the elderly) in HIV-endemic areas. Neither situation has been observed, even after careful study in Belle Glade, Florida, and in developing countries where both HIV and malaria are endemic (Lifson AR, 1988; Castro KG, Lieb S, et al., 1988).

Status of HIV/AIDS in developing countries

During the first years after the original description of AIDS, the disease appeared largely confined to middle class homosexual men, intravenous drug users, and recipients of blood products in the Western world. It is clear that the epidemic is now evolving into a mainly heterosexually transmitted disease of the developing world, and of poor and marginalised populations in the industrialised world as is the case for many other infectious diseases.

The officially reported AIDS cases represent only the tip of the iceberg as far as the developing world is concerned, where many cases are not diagnosed and reporting to public health authorities is far less than complete. On the basis of HIV prevalence data and ad hoc surveys, it is estimated that as of early 1993, a total of about 2.5 million AIDS cases in adults and children have occurred in the world with over 80% originating from

the Third World (WHO, 1993) of which, over 70% cases occurred in Africa. These cumulative incidence figures reveal little about the actual spread of the disease, except that they continue to increase at a staggering rate. Thus, in 1992 alone, nearly 2 million people became infected. The majority of these new infections have occurred in sub-Saharan Africa, India, and Southeast Asia.

There are much controversy and uncertainty about the future spread of HIV and about the ultimate global dimensions of the epidemic (Mann JM, Tarantola DjM, Netter W, 1992). Whereas short-term (less than 3 years) projections can be made with a responsible degree of accuracy, long-term forecasting is, at best, poorly reliable and should always be interpreted with great caution. It is unfortunate that projections over 10 or more years are sometimes presented to the public without warning about their very limited accuracy.

A plausible estimate is that by the year 2000 there will be a minimal cumulative total of 40 million cases of HIV infection, and of 10 million adults AIDS cases, approximately 90% of which will have occurred in the developing world (WHO, 1993). The spread of HIV infection in various parts of developing world is delineated as below.

Africa

Sub-Saharan Africa is undoubtedly the worst affected area in the world. However, whereas over one third of adults are infected in cities such as Kigali (Rwanda) and Kampala (Uganda), it should be stressed that the HIV-1 prevalence rate is still well below in many rural areas or in a country like Madagascar (Nkowane BM, 1991).

In general, HIV-1 infection rates are highest in eastern and southern Africa, with an exception for Côte d'Ivoire in West Africa, and this usually also corresponds to the areas with the heaviest burden of AIDS patients. However, the epidemic has not reached

its equilibrium as yet and is still expanding in most populations, meaning that the situation may rapidly change.

Populations with more intense unprotected sexual exposure consistently have the highest HIV-1 infection rates. This is most obvious from surveys in female prostitutes and STD patients. Even in areas where HIV-1 infection is still relatively uncommon in the general population, prevalence rates well over 10% can be found in such groups. It is now not unusual in Africa to find HIV-1 infection rates exceeding 80% in prostitutes and 50% in STD patients, particularly those with genital ulcers. This reflects not only common sexual exposure, but also the role of STDs as risk factors for HIV transmission. On the other hand, data on pregnant women in countries such as Malawi, Rwanda, Uganda, and Zambia show that the HIV epidemic is no longer confined to individuals engaging in high-risk sexual behaviour (Allen S, Serufila A, et al., 1991; Van de Perre P, Simonon A, et al., 1991).

Most cases of HIV-1 infection and AIDS occur in the sexually most active years, but the average women become infected at an earlier age than men (Anderson RM, May RM, et al., 1991; Ryder RW, Ndilu M, et al., 1990). In central and eastern Africa, more women than men are infected and have AIDS, with male to female ratios of about 1:2. In contrast, in Côte d'Ivoire, West Africa, men outnumber women with AIDS by a factor of two (Berkley S, Naamara W, et al., 1990).

Incidence of HIV-2

HIV-2 occurs predominately in West Africa, and to some extent in Angola and Mozambique (DeCock KM, Brun-Veziner F, 1989; Kanki PI, 1987). Guinea-Bissau is the major focus of HIV-2, with HIV-2 prevalence rates as high as 9.5% among adults in the general population, and an annual incidence of 0.9% in the same population (Aaby P, Gottschan A, 1990). In most other countries of the region, HIV-2 seroprevalence rates of 2.5% or less have been reported in general population or among pregnant women

(DeCock KM, Porter A, 1989). As for HIV-1, infection rates are much higher in people at higher sexual risk, such as prostitutes and patients with an STD, and also in patients with tuberculosis. Consistent and distinct features of HIV-2 epidemiology are that the age of acquisition of HIV-2 appears to be higher than for HIV-1 in the same population, that the prevalence of HIV-1 increases much more rapidly than that of HIV-2 and that HIV-2 infection in infants and young children is unusual. All of this supports the hypothesis that the risk of transmission of HIV-2 is much lower than of HIV-1. An additional feature of areas with HIV-2 infection is the frequent occurrence of cases with double reactive serology (i.e., for both HIV-1 and HIV-2 antibodies). At least one third to one half of these cases are due to mixed infection with both viruses (George R, Ou C-Y, Parekh B, et al., 1992; Peeters M, Fransen K, et al., 1992).

Latin America and the Caribbean

Epidemic spread of HIV-1 began at about the same time as in North America, and as of early 1993 approximately 250,000 cases of AIDS had occurred in this region with a cumulative total of 1.5 million adult HIV infections (WHO, 1993).

This region is an example of the simultaneous occurrence of different patterns of spread. Whereas homosexual and bisexual modes of transmission have been the major modes of spread at the beginning of the epidemic, transmission via heterosexual contact and among injecting drug users has become the driving force of the epidemic since the mid 1980s in most countries (Quinn TC, Narrain JP, Zacarias FRK, 1990; Basset D, Narain J, 1988). Thus, in Brazil, the proportion of AIDS cases attributed male homosexual transmission declined from approximately 70% in 1980-1986 to less than 35% in 1992, and if trends are confirmed, injecting drug users and heterosexuals will become the major transmission groups in the near future.

Several Caribbean countries have incidence rates of AIDS that are among the highest in the world, with the Bahamas reporting over 100 cases per 100,000 population through 1992 (WHO, 1993). AIDS in Caribbean is a true mosaic of different

epidemiological patterns determined by the local interaction of various risk determinants of HIV transmission. Haiti was one of the first countries in the early 1980s where sustained epidemic among heterosexual population was documented, though in 1983 bisexual men were the major source of transmission in the country (Pape JW, Johnson Jr WD, 1988). In the early 1990s around 10% of pregnant women, 20% of STD patients, and over 40% of prostitutes were infected with HIV-1 (Bouloa R, Halsey N, et al., 1991). Heterosexual transmission is also predominant in neighbouring Dominican Republic (Garris I, Moya E, et al., 1991).

Male homosexual transmission remains important in countries such as Barbados, Trinidad, Tobago, and Guyana (Bartholomew C, Clard J, et al., 1987). Injecting drug misuse is a major risk factor for transmission in Bermuda and Puerto Rico, whereas sex for crack/cocaine use has contributed substantially to the HIV epidemic in Trinidad and the Bahamas (Lewis P, Hospedales J, et al., 1989).

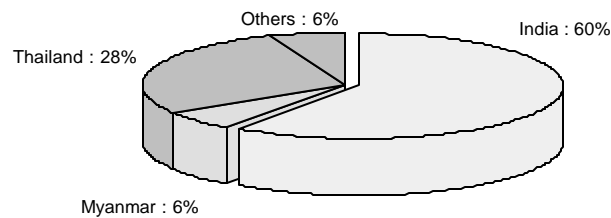
Asia

South and Southeast Asia are currently experiencing a rapidly expanding epidemic, which is spreading as fast as it did in Africa in the last decade, and if this situation continues, Asia will soon surpass Africa in the last decade. As of November 1995, about 25,000 AIDS cases have been reported, 80% of these have occurred in the last two years. Most of these are in the 15-45 age group.

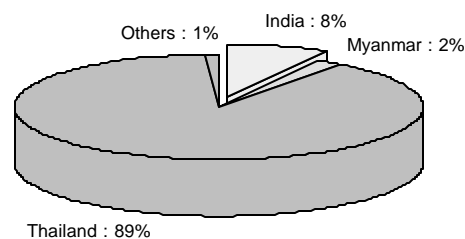
Although the epidemic was originally associated with those engaging in high risk behaviours, such as injecting drug users and sex workers, HIV infection rates have now begun to increase in the general population. Heterosexual intercourse is the major route of transmission, and women and children are becoming increasingly affected by HIV. More than 900 children have already been diagnosed with HIV. Thailand and India have reported the largest number of AIDS cases, (22,135 and 2097 cases respectively as of November 1995) accounting for more than 95% of cases reported from the region to date. WHO has estimated that there are approximately 2.5 million HIV infected people in

South East Asia of which 1.5 million are in India, and 700,000 are in Thailand. Thailand has estimated that the epidemic will cost it almost \$11 million in terms of lost lives and morbidity by the year 2000.

It is only during the mid 1980s that the spread of HIV-1 became detectable in Asia, initially predominantly among injecting drug users in south-east Asia and southern Hunan province of China (Zhang JP, 1991). However, heterosexual transmission has been rapidly increasing and is now the predominant mode of HIV spread in Asia.



2.2.a. : ESTIMATED CASES



2.2.b. : REPORTED CASES

Figure 2.2 : Distribution of HIV/AIDS in South-South East Asia
Source : UNAIDS Joint United Nations Programme on HIV/AIDS

The current epidemiological data provide evidence that at least major parts of Asia are experiencing the beginnings of an HIV/AIDS epidemic reminiscent of that in Africa. Larger urban concentrations, a growing problem of injecting drug misuse, and an inadequate public health response, all are indicators that the epidemic will become much worse. A high-risk and vulnerable environment is not confined to India and Thailand, and rapid spread of HIV can be anticipated elsewhere in the region.

If it is clear that the epidemic in Asia is still in an early and labile stage, it is much less certain how extensive the spread of HIV will be. This is a crucial issue for the future of the pandemic, as two thirds of the population of the world live in Asia. The extent of the epidemic will largely depend on the effectiveness and promptness of the response of governments and communities. The full impact of HIV infection in Asia will become visible by the end of the century when the currently infected people will develop AIDS.

HIV/AIDS in India

AIDS diagnosis: Criteria approved for India

A. Positive test for HIV infection by two tests based on preferably two different antigens.

B. Any one of the following:

1.

a. Weight loss \Rightarrow 10% of body weight or cachexia (not known to be due to condition unrelated to HIV infection) &

b. Chronic Diarrhoea \Rightarrow 1 month (intermittent or constant)

2. Disseminated or miliary or extra-pulmonary tuberculosis

3. Kaposi's Sarcoma

4. Neurological impairment preventing daily activities, not known to be due to a condition unrelated to HIV (e.g. trauma)

5. Candidiasis of the oesophagus (Diagnosable with dysphagia, odynophagia and oral candidiasis)

Source: State AIDS Cell, Kerala.

National Overview

Since the first AIDS case was registered in Bombay in 1986 till 30th November 1995, 2097 cases of AIDS, have been reported to the Ministry of Health and Family Welfare from 32 States and Union Territories. This means that in the past year over 1000 cases have been reported, compared with 290 last year (Figure 2.3). Much of this increase is attributable to better case finding and reporting which have resulted from various NACO (National AIDS Control Organisation) activities, but it is still highly probable that the epidemic continues to increase.

As reported AIDS cases in India showed a mind rattling 42-fold increase from 1992 to 1995 - one of the world's highest increase rates - doctors are confronted by hard-to-diagnose and hard-to-treat 'opportunistic infections'. According to WHO's 1992 report, Tuberculosis (TB) is dormant in almost half the adult population in India. Every year, one million TB cases are added as half a million die. With AIDS prowling in stealthily, by AD 2000, annually 200,000 more TB cases will be added (Down to Earth, 1996).

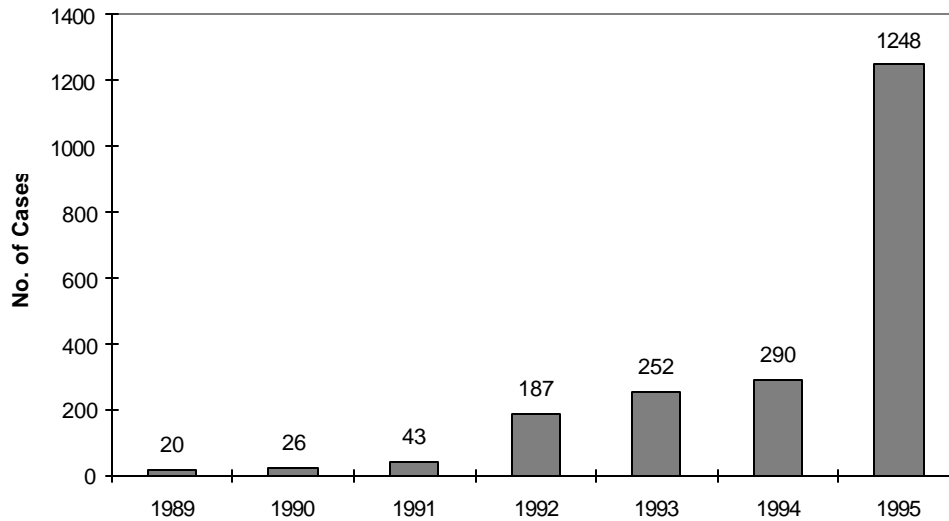


Figure 2.3

Year-wise distribution of reported AIDS cases in India

Source : NACO, India

As in previous years, the ratio of male to female cases is approximately 3:1, with the majority of cases in the 15-44 age group. The main sources of infection in these cases have been identified as far as possible and are shown in Figure 2.4 .



Distribution of 2097 Reported Cases

I : Hetrosexuality ; II : Homosexuality ; III : Blood Transfusion ;
IV : Spouse Infected ; V : Drug Abuse ; VI : Others.

Figure 2.4

Distribution of likely sources of HIV infection in India

Source : NACO, India

Seroprevalence findings from the states show that in November 1995, out of 2,743,913 people screened, 21,131 were HIV-positive, giving a seropositivity rate of 7.7 per 1000. However many of the samples screened for HIV were taken from groups known to be at high risk, such as injecting drug users, or STD clinic attendees.

An estimate of the general population seropositivity rate was made in 1993, by including sero-positivity from other population groups. These were antenatal clinic attendees, as these women can be regarded as a low risk group. Voluntary, non-remunerated blood donors, of whom over 90% are men, are considered as representative of the general population. The seroprevalence rates in these groups were weighted according to the demographic distribution of these sections of the general male population. A general population estimate for HIV infection was then derived, of

approximately 1.7 per thousand, or 1.5 million infected individuals. The estimate did not take into account all population groups.

The eleventh international conference on AIDS jointly organised by **AIDSCAP** (The AIDS Control and Prevention) project of **Family Health International** and the **Francois-Xavier Bagnond Center for Health and Human Rights** of the **Harvard School of Public Health** and **UNAIDS** (The Joint United Nations Programme on HIV/AIDS) at **Vancouver** on July 7 -12, 1996, declared that, India is experiencing rapid and extensive spread of HIV. There are an estimated 2 to 5 million people infected with HIV in India today, and 50,000 to 100,000 cases of AIDS may have already occurred in the country. The epidemic is fueled by both married and unmarried men visiting sex workers. The most rapid and well-documented spread of HIV has occurred in Mumbai and the State of Tamil Nadu. In Mumbai HIV prevalence has reached the level of 50 percent in sex workers, 36% in STD patients and 2.5% in women attending antenatal clinics. Certain regions, such as eastern India (Calcutta area) and northern India (New Delhi region), still show a lower prevalence of HIV (1 to 2 percent) among sex workers. Contrary to traditional belief, sexually transmitted diseases and sex with multiple partners are common in the country, both in urban and rural areas. An estimated 3 to 4 percent of some rural populations have a sexually transmitted disease. Injecting drug use is a problem in Manipur, which is in the North East region, where 60% of drug users are HIV-infected and 1% of women attending antenatal clinics are infected with HIV. HIV is rapidly spreading to rural areas through migrant workers and truck drivers. Surveys show that 5% to 10% of some truck drivers in the country are infected with HIV. An estimated 1 to 2 million cases of tuberculosis occur in India every year. In Mumbai 10% of the patients presenting with tuberculosis are HIV positive. Tuberculosis is the presenting symptom of AIDS in over 60% of AIDS cases.

The State view

The distribution of reported AIDS cases varies from state to state, and this is shown in table 2.6. Eight states and union territories have not reported any AIDS cases to

date. Although there have been improvements in the detection and reporting of AIDS cases, these figures may still underestimate the true cumulative prevalence of the disease.

The state to state variation in the cumulative incidence of AIDS cases is reflected in the prevalence of HIV infection. According to the available information, the major concentration of infection remains in Bombay, Pune and other parts of Maharashtra State which may contain 5% to 10% of the country's infected individuals. The other known "hot spots" are Madras and Vellore where local research groups have conducted studies among commercial sex workers. In December 1993, a new highly infected area was found in Goa. In the North-eastern states, a significant increase of infection in injecting drug abuses, noticed initially in 1990 in Manipur, has now been found to extend to Nagaland and Mizoram as well. The HIV prevalence in injecting drug abuses in Manipur is floating between 60% and 70%, and it reached 50% in Nagaland and 6-10% in Mizoram.

The prevalence rates of HIV infection have continued to rise in practically all states and in all population groups during last year. This increase in rates is observed irrespective of when the infection reached the state.

Table 2.5 Probable source of HIV/AIDS infection in India.

Heterosexual promiscuous	2094
Blood transfusion	206
Blood product infusion	22
Homosexual contact	22
Spouse of HIV positive/AIDS patient	32
Intravenous drug addicts	117
Others	81
Total	2574

Source : NACO, India

Table 2.6 AIDS cases in India (Reported to NACO as on 30th April 1996).

State/Union Territory	AIDS cases
Andhra Pradesh	9
Assam	10
Arunachal Pradesh	0
Andaman & Nicobar Islands	0
Bihar	2
Daman & Diu	1
Dadra Nagar & Haveli	0
Delhi	100
Goa	12
Gujarat	25
Haryana	1
Himachal Pradesh	9
Jammu & Kashmir	2
Karnataka	51
Kerala	96
Lakshadweep	0
Madhya Pradesh	65
Maharashtra	1286
Manipur	104
Mizoram	0
Meghalaya	0
Nagaland	4
Orissa	2
Pondicherry	100
Punjab/Chandigarh	100
Rajasthan	3
Sikkim	0
Tamil Nadu	492
Tripura	0
Uttar Pradesh	56
West Bengal	44
Total	2574

Source : NACO, India

Table 2.7 HIV sero-positives in India (Reported to NACO as on 30th April 1996).

State/Union Territory	HIV Cases
Andhra Pradesh	217
Assam	150
Arunachal Pradesh	0
Andaman & Nicobar Islands	85
Bihar	3
Daman & Diu	8
Dadra Nagar & Haveli	1
Delhi	1020
Goa	790
Gujarat	517
Haryana	175
Himachal Pradesh	71
Jammu & Kashmir	23
Karnataka	2235
Kerala	180
Lakshadweep	5
Madhya Pradesh	284
Maharashtra	6494
Manipur	4188
Mizoram	65
Meghalaya	57
Nagaland	261
Orissa	191
Pondicherry	1757
Punjab/Chandigarh	188
Rajasthan	71
Sikkim	1
Tamil Nadu	2837
Tripura	13
Uttar Pradesh	665
West Bengal	252
Male	1935
Female	639
Total	22804

Source : NACO, India

Table 2.8 Break-up of the detected sero-positives.

Category	Sero-positive	Percentage
Heterosexually Promiscuous	8893	39.0
Homosexuals	116	0.5
Blood Donors	2982	13.1
Dialysis Patients	156	0.7
Antenatal Mothers	120	0.5
Recipient of Blood	420	1.8
Suspected ARC/AIDS	1129	4.9
I/V Drug Abusers	2212	9.7
Others	6776	29.8

Source : NACO, India

According to the national surveillance data, the major concentration of HIV infection cases is in the states of Maharashtra, Manipur and Karnataka. Out of 22804 reported HIV cases as of 30th April 1995, these four states had respectively 6494, 4188, 2837 and 2235 accounting for 69% of the total cases in India (NACO, Dec. 1995). The state-wise major concentration of reported AIDS cases up to that date was little different. The three states with high proportion of AIDS cases were Maharashtra (1286), Tamil Nadu (492), and Manipur (68). The cities so far reported to have high concentration of HIV cases are Mumbai, Pune, Chennai, Vellore, Imphal, and Vascodagama (NACO, 1994).

HIV seroprevalence is high in the Southern and Western parts of India. In Mumbai, HIV prevalence went from 2 to 3 percent in STD clinic attendees before 1990 to 36 percent in 1994. HIV prevalence in sex workers rose from 1 to 51 percent between 1987 and 1993, and antenatal clinic women tested positive at a 2.5% rate in 1994. There

is great geographical variation in the HIV prevalence rate in India. HIV seroprevalence in the central, eastern and northern parts of the country are generally lower than in the rest of India. Studies among sex workers in Calcutta have shown a clear and consistently low prevalence of 1.2 percent. In Vellore, rates among women attending antenatal clinics have been steady at 0.1 percent, although rates in STD clinic have grown from 4% to 15% between 1993 and 1995. Injecting drug use has been a problem in Manipur state, with prevalence of HIV by drug abuse reaching 60% by 1992. This geographic variability and the size of the country have made estimation of the actual number of the infection difficult. At the end of 1994, WHO estimated 1.75 million HIV infections, while evidence suggests an estimate of between 2 to 5 million in mid-1996.

In Mumbai, India's AIDS capital, a study undertaken by the state Department of Health reveals that in 1996, 2.7 percent of random blood samples from pregnant women were found to be infected, four times since 1992. In Bangalore, an AIDS research and control project, Samraksha, has 420 HIV positive people on its register; 58% of them are married and come from middle-class backgrounds.

Data from more upmarket institutions are just as worrying. In Chennai, the results of a survey by the Asia-Pacific Network of People with HIV (APN+) squarely focuses on educated casualties. Randomly picking 79 infected men and 46 infected women from private HIV clinics across the city, APN+ found that 64.8% were graduates, 24.8% postgraduates and 7.2% Ph.Ds.

The trail of destruction is now visible even in smaller metros. In Pune, the National AIDS Research Institute (NARI) reports that 14% of the women who come to its clinics are housewives, a group that is growing at a distressing rate of 3.3% every year. And in Ahmedabad, the Gujarat AIDS Awareness and Prevention Unit reports a 30% increase in the number of middle-class patients attending its clinics (India today, 1997). These statistics are strongest proof that the epidemic has progressed to low-risk individuals.

The high prevalence of STDs in the country and increased population mobility are the key factors in the spread of HIV in India. In Tamil Nadu, the State AIDS Cell has estimated that 20% of adult men suffer from an STD at any given time. People with STDs, especially if genital sores are involved, are at much higher risk of spreading - or being infected by - HIV through sex. India's highly developed network of roads and railways has facilitated a massive movement of people from rural to urban areas in search of employment. According to the Indian Government's Ministry of Labour, there are currently about 180 million migrant workers in India, most of whom are men who are either single or living apart from their wives and families. At any given time they comprise 30-40% of the population of large cities, where they also account for much of the clientele of the red 'light areas'.

The double standard of sexual morality which is practised by a large number of people in India is another important factor in spread of HIV. Women are expected to retain their virginity until married, while men often face peer pressure to visit a sex worker to gain sexual experience before marriage. Even after marriage, it is not unusual for men to have sexual partners other than their wives. Women, who are biologically more vulnerable to HIV infection than men, pay the price for the sexual freedom enjoyed by their husbands.

Growing numbers of Indian women who have had sex only with their husbands are now being infected with HIV. In Pune, a study in 1994 found that 14% of married women with STDs - none of whom reported sexual contacts outside their marriages - were HIV infected. Increasing numbers of pregnant women are tested positive for HIV. For example, at the HIV sentinel surveillance centre in Salem District, Tamil Nadu, HIV prevalence among pregnant women rose from 0.1% in September 1994 to 0.9% in October 1995.

HIV is also transmitted through sex between men, many of whom may be married and continue to have sex with their wives. Amongst male sex workers, HIV infection is now reaching alarmingly high levels. In some such group in Maharashtra State, half were

found to be HIV-infected in 1995. In India the issue of HIV transmission among men who have sex with men cannot simply be dismissed as a problem of a 'minority' group. In such a huge country as India, a 'minority' group may consist of millions of people spread over a wide geographical area.

In some parts of the country, particularly in the slums of many big cities and in the northeastern States, HIV is spreading through the sharing of drug-injecting equipment. In Manipur State, HIV has spread with deadly speed amongst injecting drug users, estimated to number about 15,000. In 1989 there were no HIV infections reported within this group. Yet by 1994, according to the Indian Council for Medical Research, the HIV infection rate had reached an estimated 90%.

Contaminated blood is also an important source of HIV infection. Of the nearly 2 million bottles of blood that are transfused every year in India, more than half are supplied by people who sell their blood. Many do so out of dire poverty; some also sell sex. In 1992, 86% of a group of commercial blood donors screened in Bombay were found to be HIV-infected. Although the Government has made HIV screening mandatory, not all blood banks comply. By 1994, 12% of all HIV infections in the country were estimated to have been acquired through HIV-contaminated blood.

Social ostracism is distressingly common and often brutal towards the HIV infected. In Chennai, 97.7% of the HIV positives interviewed by APN+ (Asian-Pacific Network of People with HIV) said that they had faced discrimination even by doctors.

Pre-marital sex in India

Traditionally, in all mainstream Indian societies pre-marital sexual relationships among both women and men are strongly disapproved of, but there has always been more laxity for men than women. Also, opportunities for pre-marital experience have always been greater for men than for women.

The gradual rise in age at marriage of both men and women in India during the last few decades with the consequent prolongation of the period between puberty and marital sex has perhaps contributed to an increasing practice of pre-marital sex. Substantial proportion of boys and girls in contemporary India have to pass through a long period of heightened sexual desires and experience what is termed by Kakar & Chaudhary (1970) "a sexual crisis". The average age at marriage for both men and women in India has been raising by about one per decade. By now, 1996, it is nearly 21 years for women and over 26 years for men. Increasing exposure in recent years to sexually explicit music, dance and other performances in television programmes, cinemas and videos is also expected to do the same.

Box 2.2 : Percentages of men and women who reported ever having pre-marital sexual experience

Type of Survey	Location & Year	Sample	% Reporting			Reference
			M	M&F	F	
STUDENTS:						
Handed Questions	Hyderabad 1992-93	72 M College	28	---	---	Goparaju 1994
Handed Questions	Madras Early '80s	634 M, 486F College	61	---	48	Reddy et al. 1983
Handed Questions	4 towns Maharashtra 1993	129 M&F College	---	19	---	Savara & Sridhar 1994
Handed Questions	Delhi 1992	M School	25	---	---	Seghal et al. 1992
Question. Interview	Delhi 1978-79	300 F College	---	---	6	Rakesh 1992

URBAN MIDDLE AND UPPER CLASSES :						
Handed Questions	Calcutta, Delhi, Madras 1993	240M, 220F	17	---	8	Basu 1994
Handed Questions	4 towns, Maharashtra 1993	259 M&F	---	26	---	Savara & Sridhar 1994
Magazine Question.	All India 1991	1404 M	65	---	---	Savara & Sridhar 1992
URBAN LOWER CLASS :						
Question. Interview	Lucknow 1976	300 M STD patients	81	---	---	Narayan 1984
Handed Questions	4 towns, Maharashtra 1993	264 M&F Blue collar workers	---	25	---	Savara & Sridhar 1994
Handed Questions	4 towns, Maharashtra 1993	258 M&F Migrant workers	---	32	---	Savara & Sridhar 1994
Handed Questions	4 towns, Maharashtra 1993	139 M&F Loom workers	---	12	---	Savara & Sridhar 1994

Source: Nag, M. Sexual behaviour and AIDS in India. 1996

The findings of the surveys, given in Box 2.2, consistently contradict the commonly held perception that pre-marital sex in India, particularly among students, is rare. In none of the samples of students surveyed so far, was the proportion of male students reporting pre-marital sexual experience less than 19%. Behavioural data collected from students that female students, confirm the finding from attitudinal data are more conservative than male students regarding pre-marital sex.

Only two survey findings are available for the pre-marital sexual experience of female students: 6% among college students in Delhi and 48% among college students in Chennai (difference concerned to the figures may be due to sampling bias of the Chennai sample). Pre-marital sex among the urban middle class people in India is also rare. The findings of the 'Debonair' questionnaire survey - 65% of the male respondents reporting pre-marital sexual experience - is open to serious doubts due to the high sampling bias. Methodologically more reliable are the findings of the 17% for men and 8% for women in the Calcutta-Delhi-Chennai survey, and of the 25% for men and women in the Maharashtra four-towns survey.

The figure of 25% of male college students in a Delhi school (Sehgal et al., 1992) and 28% of male students in Hyderabad (Goparaju, 1994) reporting pre-marital sexual experience call for an urgent need for appropriate sex education in Indian schools and colleges. Neighbours, relatives, female sex workers, friends and fiancées have been mentioned as partners in a few studies.

With pre-marital sex gaining increasing acceptance among the new generation, the incidence of sexually transmitted diseases including AIDS has risen. Teenagers and those in the early 20s now constitute a third of the cases testing HIV positive. The DEGA institute study found that prostitutes topped the list of premarital sexual partners among men. For researchers these are danger signals because prostitutes are a major reservoir for the AIDS virus.

Extra-marital sex in India

Despite of the ideals and situational constraints, references to extra-marital sexual relationships are not uncommon in Indian literature, but empirical studies are lacking. A study conducted among middle class working women in the Delhi metropolis in the 1950s and 1960s shows that attitudes towards extra-marital relationships underwent identifiable changes towards permissiveness within a single decade, although different

norms of sexual morality for married women and men were still maintained (Kapur, 1973).

A study among the educated middle class in Calcutta, Delhi, and Chennai found that the proportion with experience of extra-marital sex was 9% among men and less than 3% among women (Basu 1994). Another study of a similar quality in four towns of Maharashtra found that the corresponding proportion was 7% in the middle class group and varied from 1 to 12% in the three lower class groups. No generalisation is possible from these findings but they indicate that extra-marital sexual relationships are less frequent in India than in Western countries.

Sexual promiscuity is the single most important way by which the epidemic spreads in India. The major cause underlying this phenomenon may be the India middle class never really believed it was vulnerable to the insidious spread of HIV pandemic. Sexologists and other experts are reporting that the old concepts of middle-class morality are breaking down.

A just released 11-year old study conducted by the Chennai based DEGA Institute on the sexual mores of the middle and upper class is an indication of just how much has changed. Of the 16,154 persons surveyed, as many as 43% of them admitted to having had premarital sex. Among those who had married, one out of five people said they had extramarital relations. They did not think that such behaviour exposed them to the risk of sexually transmitted diseases such as AIDS came out when only two percent of them admitted to using contraceptives such as condoms while having sex.

Changes in the social environment and workplace are referred to as major reasons for dramatic shift in the sexual behaviour of the middle class. Industrial growth has spawned a breed of traveling executives who spend nearly half of their working lives away from home. At the same time, women have become an increasingly visible part of the professional workforce. Taking into account these facts together, there are numerous settings for increasing number of casual sexual relationships.

In the Indian context, in fact women are turning out to be the most vulnerable group, as sexuality is not in their command, nor are they in command in a relationship. Female sexuality is controlled by the male because of the sex stratification system which automatically anoints the male as superior. Even according to WHO figures two women get HIV infected every single day and there are more than three million infected women the world over. Studies on the female sex workers of Mumbai, indicate that they could not dictate terms in a sexual encounter or insist that the male should use condoms. Their demand is casually spurred.

The HIV/AIDS Situation in Kerala

The state of Kerala witnessed an eight fold increase in the number of HIV infection from the year 1993 to 1994. There were 1000 reported cases of HIV up to 1994. According to the data given by State AIDS Cell, Kerala, the number of total (up to 30-09-1996) HIV-seropositives and AIDS cases officially reported are 1575 (1275 male & 300 female) and 142 respectively. Kozhikode holds the highest number of HIV positives (468; 363 male & 105 female) followed by Thrissur (459; 368 male & 91 female) and Thiruvananthapuram (355; 291 male & 64 female). The age group between 21 and 40 years is the most affected age category in Kerala. Heterosexual transmission accounts for more than 95% of cases identified in Kerala (SAC - Kerala, 1996).

As per the available data Kerala had the fifth highest cumulative rate of HIV cases in India. Breakdown of the characteristics of the 1,575 HIV positive cases known to State AIDS Cell, Kerala, is not possible, as no individual patient data are available. The only breakdown which is possible is for the HIV positive cases confirmed by the HIV/AIDS Surveillance Centre in Medical College, Thiruvananthapuram. As of February 1995 they had performed 30,368 tests since this was initiated in September 1986. 454 of these proved to be HIV positive. The major category is given as "heterosexual promiscuous", with only a few cases of homosexual or bisexual men or IV drug users.

A detailed description of the HIV status of Kerala is furnished in the table 2.9.a., and the cumulative distribution of reported HIV infection in Kerala is given in table 2.9.b.

Table 2.9.a. HIV positives in Kerala (Up to 30-09-1996).

District	Total	Age-group				
		0-10	11-20	21-30	31-40	41-50
Thiruvananthapuram	355	0	5	69	74	14
Kollam	16	1	0	4	4	1
Pathanamthitta	18	0	0	3	2	1
Alappuzha	23	0	0	12	8	1
Kottayam	62	0	2	20	6	3
Idukki	9	2	0	1	0	0
Ernakulam	95	0	1	38	4	4
Thrissur	459	2	3	102	86	26
Palakkad	18	0	1	6	0	0
Malappuram	29	0	1	17	8	1
Kozhikode	468	0	2	25	8	2
Wayanad	2	0	0	1	1	0
Kannur	15	0	0	8	5	0
Kasargod	6	0	0	0	0	0
Total	1575	5	15	306	206	53

Source: State AIDS Cell, Kerala.

Table 2.9.b. The cumulative distribution of reported HIV infection in Kerala (up to 30-09-1996).

Year	Number	Rate of infection
Up to 1994	1000	35.30
1995	1353	
Up to 30-09-1996	1575	

Source: State AIDS Cell, Kerala.

People who tested positive when attempting to obtain a visa to travel to Gulf countries to work apparently form a sizeable percentage of all identified HIV positive cases. This reflects two issues: (i) that their HIV status is uncovered by such testing, and thus it is the screening itself which helps create this group of cases. (ii) that these men often spend time in Mumbai while awaiting their travel papers. It is believed that they become infected during this time, and therefore constitute a group at risk. Unfortunately denominator data are not available as many HIV tests are obtained privately and remain unreported, therefore the true infection prevalence rate remain unknown.

There is as yet no sentinel site surveillance in the State, the HIV prevalence rates in defined populations is not available. The current data largely consists of those tested on the clinical suspicion, on requirements for a visa and as blood donors. There are no reported studies of HIV prevalence among particular population groups like CSWs, IV drug users, and STD Clinic attendees, except for voluntary blood donors, among whom the HIV prevalence is less than 1 per 1,000 in Thiruvananthapuram and Kochi.

Sexual behaviour in Kerala

Not many studies are currently available which unmask the sexual behaviour of Keralites. It can be assumed that, Keralites' sexual behaviour will not be much different from other parts of India.

In a recent study conducted by University Health Centre, University of Kerala, Thiruvananthapuram (1996) - 17.6% of male and 10.7% female students having love-affair had sexual intercourse with their partners. Among the total of 1743 students from various colleges under Kerala University, 16.5% of the male students and 2.7% of the females students had sexual intercourse with outsiders. 9.7% of the male and 1.2% of the female students had reported to have homosexual experience.

In yet another recent study conducted among 125 randomly selected people of both sexes, in a sub-urban area of Thiruvananthapuram (Jayasree, A.K., 1996) display the following observations. 62.4% of the study population reported that they know people having extra-marital sexual relationships, and 56.8% of sample know people having pre-marital sex. In both the cases number of partners ranges from 1 to 10.

Regarding the first sexual intercourse of the study population, 29% of the sample revealed that, they had it with a person other than their spouse; i.e., with a relative, friend, CSW., or domestic servant. All of them were males. 8.9% of males had their first sexual intercourse before 15 years of age. 24.5% of males and 32.8% of females had it before the of 20 years. 14% of the women reported that, their husbands have extra-marital sex and 11% women told that, their husbands had pre-marital sexual relations.

Having more than one sexual partner is reported by 51.1% of the male and 7.6% of the female subjects, during their life period. 69.6% of the men and 9.2% of the women masturbate. Majority of the sample never shared their sexual problems, fears and thoughts with others, the figures being 44.8% (male) and 57.8% (female).

The same study uncover some interesting remarks on condom use. Only 39.6% people used condoms; and of this, majority (81.8%) used it as a method of contraception. 60.4% of the people never used condoms in their sexual acts. The main reasons for not using condoms are: do not feel (71.6%); do not like (10.4%); spouse do not like (10.4%).

Kerala's HIV inroads are made by the large migrant population in Mumbai, the NRIs (Non-Resident Indians) with Mumbai links apart from a contingent of promiscuous interstate truck drivers cohabiting without protection with women on the ambiguous red trail. Surveys have shown that more than 90% of truckers visit commercial sex workers a week, that 68% of them never use condoms. Even normally males are condom averse, according to studies. Migrants visit Mumbai brothels where HIV virus has made a significant presence. Out of the 480 sex workers rescued from Mumbai brothels, 400

were found to be HIV positive. Though Kerala can boast that there is no red street here, covert prostitution is rampant and call girl rackets flourish. Homosexuality is widely prevalent in Kozhikode, Malappuram and Kannur. The trend is visibly present among the beedi workers of Malabar (India Today, 1997).

An in-depth survey of Gulf migrants by the Centre for Development Initiative showed that they indulge in homosexuality as Islam prohibits prostitution. Their life style appears to promote bisexuality, homosexuality and brothel culture, with prostitution remaining as a sub-culture. Migrant labour marry late, indulging in promiscuity during their long spell of bachelorhood, contracting sexually transmitted diseases which are open invitation to the AIDS virus.

Recently a number of Malayalees are getting deported from the Gulf after they are found to be HIV carriers through check-ups which are mandatory in the Gulf. Most of them return home and vanish without a trace, obviously spreading the virus with impunity.

Modes of transmission in developing world

The modes of transmission of HIV are identical throughout the world. The key routes of transmission of HIV, already apparent from the earliest stages of the epidemic, can be simply stated as sexual transmission, blood/tissue transmission (parenteral transmission) and maternofetal transmission (perinatal transmission). Despite intense social exposure to people with AIDS and HIV infection, there is no evidence for transmission by means other than sexual or blood contact, or from mother to child. In particular, nonsexual household contact and exposure to insects in an HIV endemic area have been ruled out as a route of infection (Mann JM, Quinn TC, Francis M, et al., 1986; Webb PA, Happ CM, Maupin CM, et al., 1989).

Sexual Transmission

In a global sense, HIV infection is primarily a sexually transmitted disease. Sexual contact with an infected person is estimated to account for nearly 90% of cases of HIV infection and AIDS throughout the world (WHO-GPA, 1992). In contrast to the industrialised countries, heterosexual intercourse accounts for the overwhelming majority of cases of HIV infection acquired sexually in developing countries.

Sexual transmission can be from man to man or man to woman and woman to man. Unprotected receptive anal intercourse is the most effective mode of sexual transmission of HIV (Detels R, English P, et al., 1989). It is not only practised by homosexual and bisexual men, but also by heterosexual couples. Whereas this practice seems to be unusual in sub-Saharan Africa, it may play a significant role in the spread of HIV in Latin America in selected Caribbean countries and in some Asian cities (Parker RG, Tawil O, 1991).

Increasingly the evidence suggest that there is little difference in the risk of infection to a regular male or female partner of an infected man, by anal or vaginal intercourse respectively; the rate of infection for regular partners is about 50%-60%. Among homosexuals, spread from an active to a passive partner is the best documented, with passive intercourse being a major risk factor established in epidemiological studies. However, few homosexuals are exclusively active or exclusively passive, so the pattern of spread is less easily delineated than among heterosexuals. Certainly some exclusively active homosexuals do become HIV infected, so there is clearly some risk of passive to active transmission, in some ways equivalent to female to male spread. There is no clear evidence on the role of anal intercourse in the heterosexual spread of HIV infection; while it is obviously a potential route, there is nothing to suggest that it is a common route of acquisition of HIV for heterosexuals.

The efficiency of heterosexual transmission can be greatly enhanced in the presence of well-defined risk factors, including more advanced immunodeficiency in the

infecting partner, the presence of conventional STDs in either partner, anal intercourse, and sex during menses (Laga M, Nzila N, Goeman J, 1991; Wasserheit JN, 1992). It is most likely that the rampant and sustained heterosexual epidemic in the Third World is only possible because of a common occurrence of such amplifying factors, possibly addition to high-risk behaviour patterns. At a population level, the overall efficiency of heterosexual transmission may increase as the epidemic progresses, as more infected people become immunodeficient. This may presently be a relevant factor in Africa.

Parenteral transmission

Transmission of HIV by blood and blood products became evident at an early stage; it was most evident among haemophilic recipients of Factor VIII concentrates from up to several thousand donors each year. Rare instances of transmission through organ transplantation represent an extension of this type of transmission, whether through free virus or virus-bearing cells. The high-risk group of blood transmission is the young adult population - the very population from which blood was generally donated.

Blood transfusion is the most efficient mode of HIV transmission, with nearly all recipients of HIV-seropositive blood becoming infected (Colebunders R, Ryder R, et al., 1991). Blood transfusion remains the third most common route of HIV infection in Africa behind heterosexual and perinatal transmission. This is largely due to an inability to implement screening of blood donors and other measures to assure a safe blood supply, as a result of a failing health care system. The continuing transmission of HIV through contaminated blood and blood products is tragic as the technology to prevent it is available.

Sharing of injection equipment is the most common route of HIV transmission by blood in Asia, Latin America, and the Caribbean. Illicit injecting drug use is mainly associated with the major routes of drug trafficking, and in several populations there has been a recent shift from smoking or inhaling drugs to injection (Des Jarlais DC, Friedman

SR, et al., 1992). The fulminant spread of HIV-1 among injecting drug abusers in Bangkok in the late 1980s paralleled closely the patterns of spread of HIV-1 among injecting drug abusers in several cities in the advanced world. The intravenous drug misuse in Thailand began mainly in urban slum-areas, but it is now spreading in rural areas too (Ford N, Koetswang S, 1991).

The major route of blood to blood spread in developed countries is by the sharing of equipment between injecting drug abusers and, once HIV infection arises in a drug misusing community, its spread can be extremely rapid - as shown on the East Coast of the USA, in Southern European countries and parts of Scotland. The spread of HIV has been facilitated by the common practice of drawing back blood into the syringe during use, which means that it becomes extensively contaminated with blood cells of previous user(s). This practice helps to explain the discrepancy between the apparent ease of transmission in drug abusers as opposed to 'needle-stick' injuries amongst health care workers, where the risk appears to be extremely small, and certainly substantially less than for hepatitis B virus. Rare instances have been described where exposure of broken skin or mucous membranes to blood of HIV-infected individuals appear to have resulted in transmission of HIV.

Perinatal transmission

Maternofetal transmission has been clearly shown for HIV and appears to occur early in pregnancy, as shown directly by virological studies of several early fetuses and as implied by the occurrence of a characteristic dysmorphism amongst children born to infected mothers. On a world scale, transmission of HIV from mother to child during or after pregnancy is the second most common mode of spread of HIV. It is the major source of HIV infection in children, and has become a true public health problem in much of Africa, where 1 million children had been infected as of early 1993 (WHO, 1993). In general higher frequencies of mother to child transmission were observed in Africa (30-40%) (Dunn DT, Newell ML, et al., 1992).

Although mother to child transmission of HIV-2 undoubtedly can occur, it seems unusual with a much lower rate of transmission than for HIV-1 (Poulsen AG, Aaby P, et al., 1989; Ekpini RA, Sibailly T, et al., 1991). Transmission by breast milk has been suggested by a single case where the mother received a contaminated blood transfusion postnatally. The implications for breast milk banks or wet nursing are self-evident, and include the avoidance of donation by high-risk mothers, the possible pasteurisation of milk (which would seem to inactivate HIV) and even the idea of screening breast milk donors.

Dynamics of HIV Spread

Over the past decade it has not only become clear that the epidemiology of HIV-1 is not homogeneous throughout the world, but also that it is in continuous evolution (Piot P, Laga M, et al., 1990). Monitoring this heterogeneity in the epidemic is essential for assuring an adequate public health response. Box 2.3, lists major variables that influence the spreads of HIV infection in a population. They can be grouped in biological, demographic, behavioural, and economic/political determinants.

As a rule, the spread of a sexually transmitted agent such as HIV is defined by the equation $R_o = BcD$, where R_o is the reproductive rate, B is the average probability that infection is transmitted from an infected person to a susceptible individual, c is the average rate at which new partners are acquired, and D is the average duration of infection (Anderson RM, May RM, 1987). It is the mix and interaction of risk determinants directly (i.e., biological or behavioural variables) or indirectly (i.e., demographic and economic/political variables) influencing these three factors that determine how HIV-1 infection spreads in a population. Conversely, interventions affecting any of these factors decrease the reproductive rate.

Box 2.3. Variables Influencing the Spread of HIV Infection in a Population.**Biological Variables**

Level of viremia
Infectivity and virulence of HIV strains (strain variation)
Prevalence of other STDs
Lack of male circumcision
Use of certain vaginal products

Behavioural Variables

Rate of partner change
Sexual mixing patterns
Size of and rate of contact with core groups
Type of sexual intercourse (anal intercourse, intercourse during menses)
Level of condom use
Behaviour and infection rate of partners
Prevalence of injecting drug use

Demographic Variables

Proportion of sexually most active age groups
Male to female ratio
Rate and growth of urbanisation
Migration patterns

Economic and Political Factors

Performance of the health care system
Response to the epidemic
Poverty, deprivation, lack of education
War and social disturbance
Women's status
Attitudes toward sex

Adapted from: Piot P, Laga M, Ryder RW, et al. The global epidemiology of HIV infection: continuity, heterogeneity, and change. *J AIDS* 1990; 3: 403-412.

The Impact of HIV/AIDS in Developing Countries

The impact of AIDS on the individual and on society has not become fully visible as yet and goes beyond the suffering of infected individuals and their relatives and friends. More than any disease of our time, AIDS will have a long term impact on the

demography, economy, social system, and health sector in the seriously affected countries.

Demographic Impact

The ultimate demographic impact of the AIDS epidemic is controversial but will vary among countries in proportion to the level the epidemic reaches. A conservative estimate is that in sub-Saharan Africa, the population growth rate will decline from an average of 3% to less than 2% per year around the year 2000 (Bongarts JA, 1989; Stanley EA, Seity ST, et al., 1989). In countries with a slower population growth, such as Asia or Latin America, a severe AIDS epidemic may even lead to negative population growth. The reduction in population growth will be due to increased mortality, mainly among young adults - driving force of a nation (Armstrong J, Bos E, 1992). Thus in a population with an adult HIV seroprevalence of 10% in 1987 (a reality in several African countries), the adult mortality had doubled by 1992. In Thailand, it is estimated that by the year 2000, 30% of all deaths will be due to AIDS (Sittitrai W, Brown T, et al., 1992), and in Abidjan, Côte d'Ivoire, AIDS is now the leading cause of death in adults (DeCock KM, Barrere B, Diaby L, et al., 1990). Instead of benefiting the population by reducing its growth rate, the mortality rates in ages 15-44 would have tragic effects on the economy, the social structure, and the fabric of society (Over M, Piot P, 1993).

AIDS is now reversing the gains of child survival initiatives in a growing number of developing countries. The historic trend of a gradual increase of the life expectancy at birth had been reversed in countries such as Uganda and Rwanda, where by 2020 life expectancy for males at birth will be approximately 15 years below projected life expectancy without AIDS (Armstrong J, Bos E, 1992)

Impact on Health Sector

One of the most visible aspects of the burden of HIV infection are the large numbers of emaciated men and women with AIDS in many African hospitals. In many

cities they now constitute up to half of all patients, with AIDS being the major cause of death among hospitalised patients (Harsing SE, Baende E, et al., 1990).

As an increasing number of people with HIV develop AIDS, the demand for health care will rise rapidly, and hospitals in some Asian and American cities will probably face situations similar to those encountered in Africa today. AIDS patients not only occupy beds that could be used for patients with treatable diseases, but they will also account for both an absolute and relative increase in health care expenditure (Scitovsky A, Over M, 1988). In Thailand, about 1% of total bed days were required for AIDS in 1991, but this will increase to 12% by the year 2000, when the total direct costs for care will be 20-65 million dollars (Viravoidya M, Obremsky S, Myers C, 1992). In San Juan, Puerto Rico, the cost of care of AIDS was projected to reach 2 billion dollars by the year 2000, threatening to overwhelm the health care system of Puerto Rico (Kouri Y, Shepard DS, et al., 1991). Planning for absorbing this enormous burden of patients is a top priority for health care systems in the developing world.

The disease of tuberculosis has been greatly affected by the HIV epidemic, with rising incidence rates wherever HIV has become endemic (Bloom BR, Murray CJL, 1992). HIV-induced immunodeficiency is thought to lead to reactivation of latent infection with *Mycobacterium tuberculosis*, and is the driving force behind a new tuberculosis epidemic accompanying the AIDS epidemic. HIV seroprevalence rates among tuberculosis patients in Africa and Haiti are now often around 30-50%. In other developing countries they are still low, but usually higher than in the general population (Elliott AM, Luo N, et al., 1990; Werneck EB, Silva SGC, et al., 1992).

Economic and Social Impact

AIDS has become among the five leading causes of healthy life lost in sub-Saharan cities accounting for 15% of the total disease burden (Over M, Piot P, 1993). AIDS affects mainly young adults in the most productive years of their life and has an

impact on a variety of economic and social sectors. Whereas the direct medical costs to society are large, the magnitude of the far more important indirect costs is enormous (The World Bank, 1992). In Thailand, the indirect costs are estimated at over 2 billion dollars for the year 2000, 50 times more than the health care costs (Viravoidya M, Obremsky S, Myers C, 1992).

The loss of productivity in industry, agriculture, and services will affect the gross domestic product (GDP) in severely affected countries. In Tanzania, it was estimated that the real GDP growth rate in the period 1985-2010 would decline by 15 and 28%, from 4% per annum to 2.9-3.4% per annum as a result of AIDS (Bertozzi SM, 1991).

AIDS has profound impact on the household and basic community as a result of illness, death of bread-winners, a growing number of orphans, increased expenses for health care, and loss of purchasing power (Barnett T, Blakie P, 1992). AIDS truly may become a destabilising factor in society as a whole.

HIV/AIDS prevention: Rays of hope

The very serious situation in sub-Saharan Africa as a whole masks important regional differences in the epidemic. It is encouraging to note that HIV prevalence rates have remained relatively low (in the 2 - 5% range) and more or less stable in the adult populations of several African cities (for example, Cotonou, Benin; Libreville, Gabon; and Yaoundé, Cameroon). Current studies investigating the reasons for these low, stable prevalence will no doubt contribute to more effective prevention approaches elsewhere.

There is good evidence that concomitant infection with other STDs, particularly those characterized by genital ulcers, facilitates HIV transmission, and that STD treatment diminishes the transmission of HIV. In a randomized study in the Mwanza region of Tanzania, a near 40% reduction in new HIV infections was achieved through

the implementation of a comprehensive public health STD prevention and care programme.

Recent trends in HIV infection in women attending several antenatal clinics in Uganda show significant declines in HIV prevalence. Between 1990-1993 and 1994-1995, HIV prevalence in pregnant women at sentinel sites decreased 29% overall. Even more encouragingly, prevalence diminished by 35% in young women aged 15-19 and 20-24. Since infection levels in these young age groups reflect more recent patterns, these data suggest that there has been a substantial reduction in the rate of new infections among young Ugandans over time. Judging from surveys of such populations, behaviour change may account for the reported declines.

In Thailand, HIV prevalence in military conscripts dropped from 3.6% in 1993 to 2.5% in 1995. There are indications that prevention efforts are taking effect. In national surveys conducted in 1990 and 1993, the percentage of men visiting sex workers declined from 22% to 10%. Condom use in commercial sex transactions is now the norm.

A recent international study has shown that it is possible to prevent HIV among drug injectors through the early and vigorous implementation of prevention activities, such as community outreach and needle exchange programmes.

Influence of Education on HIV/AIDS Prevention

As a major actor in the development of human resources - through the teaching of literacy and numeracy, the transmission of basic knowledge and skills for survival, and the delivery of vocational, tertiary, and professional training - the education system bears both a special burden in terms of being affected by AIDS and special responsibilities for responding to its impacts. Sex education suited to the needs of diverse groups of people is an integral part of HIV/AIDS prevention. But sex education is a very sensitive, controversial and complex issue in the conservative socio-cultural environment of India. Contents and strategies of sex education for groups of people differing in age, sex,

education, and occupation are to be tailored to the needs, interest and absorbing capacity of each group.

Noting the effects of sex education in other industrialised countries, many helping professionals believe that the US rate of teenage pregnancy and the spread of AIDS and other STDs could be curtailed through extensive sex education, including coverage of contraception. According to CDC (1988), sex education programmes are apparently raising public awareness of AIDS. Evidence shows that young people are becoming better informed about how AIDS is transmitted.

The information and education programmes cannot exist in isolation. The decision making process must be placed within the social context. Educational messages and counselling must be backed up by STD service provision, availability of general health services, and the easy access to, and the availability of good quality, affordable condoms.

All too often, HIV prevention programmes focus on providing information, and encouraging individuals to change their behaviour. But just knowing the facts is not enough to change people's sexual behaviour for preventing HIV/AIDS, it is influenced by a large number of factors like:

- Knowledge (what people know or do not know)
- Beliefs, attitudes and self-esteem (what they think or feel, and what they feel able to do)
- Peer pressure and social influences (how other people in the community behave, think and feel)
- Wider environment (culture, religion, economic opportunities, health policies, legislation, and service provision)

People's age and sex also affect what they do. As in all communities men and women are expected to act in very different ways, both sexes are influenced by very

strong and widely held beliefs about appropriate male and female behaviour (AIDS action, 1995).

There are studies, which support the view that **information** and **knowledge** alone do not always lead to expected behaviour change. In the Trinidad National AIDS Programme, some 765 women were educated about AIDS by staff trained to communicate about prevention and availability of health services. Knowledge increased but high risk behaviour did not change. Women expressed reluctance to request men to use condoms for fear of being labelled promiscuous and refused to discuss the subject with partners because they believed condoms were used by the sick or unfaithful (Kambon, 1993).

Although young people have been increasingly exposed to AIDS prevention messages, the impact of the threat of HIV/AIDS on their sexual behaviour appears mixed. On the one hand, the 1988 national survey of 15- to 19-year-old males revealed that experienced male adolescents were engaging in intercourse less frequently, and apparently with fewer partners, than was the case in the late 1970s (Sonenstein et al., 1990). On the other hand, one random survey of 16- to 19-year-olds showed that most remained unconcerned about AIDS (Strunin & Hingson, 1987). Only 15% reportedly changed their sexual behaviour because of the spectre of HIV/AIDS. A survey of 99 adolescent females who consulted an adolescent health clinic in Arkansas showed a high level of awareness about AIDS. Their sexual behaviour remained largely unchanged, however. Only 17% of these young women reported that they and their partners had used a condom to prevent transmission of HIV (Rickert et al., 1989).

Most theories of health education focus on change in knowledge, beliefs and skills of individuals as causes of behaviour change. Romer, D and Hernik, R. (1992) argue that this neglects the important contribution of social environment in supporting healthier behaviour and describe a model of social consequences that allow alternative routes of educational influence at both individual and social levels. The model assumes that basic knowledge and skills for avoiding health threats may not be sufficient for

behaviour unless socially mediated influences that can inhibit behaviour changes are addressed. This is especially crucial, given the nature of HIV infection and the controversy surrounding its discussion.

The advent of AIDS presents the medical, mental health, and educational communities with an unparalleled challenge in meeting demands for developing programs to contain the spread HIV/AIDS and for compassionate treatment of people with HIV/AIDS. As frightening as AIDS may be, it is preventable.

Complacency and denial of the existence of AIDS remains a problem for developing countries and the tendency to regard AIDS a problem of others is growing. Meanwhile, for those working in AIDS, it has become clear that HIV/AIDS is no longer an emergency but a fact of life. However, there is still a tremendous opportunity for prevention, if only we confront the issues that have been known for decades, and which AIDS has forced to the forefront.