

AIDS in Mexico: Trends and Projections

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The first case of AIDS in Mexico was reported in 1981. Through mid-1988, 1,502 cases had been reported, the incidence of cases having doubled every 7.7 months. Of the cases in adults, 87.6% were sexually transmitted, transfusion with contaminated blood or blood products accounted for 10.8%, and intravenous drug abuse for 0.3%. In the 56 pediatric AIDS cases reported, transmission through contaminated blood accounted for 67.9%, sexual contact for 5.4%, and perinatal transmission for 19.6%. The disease appears to be spreading from the large cities to peripheral and rural areas, and to be spreading faster among heterosexuals than among homosexual and bisexual males. Projections based on continued exponential doubling at the 1983-1986 rate suggest the cumulative AIDS case total could exceed 75,000 by the end of 1991. More conservative estimates based on an observed lengthening of the doubling time predict as many as 260,000 cases by the end of 1994.

Broadly speaking, AIDS epidemiology around the world can be regarded as involving four transmission patterns found in distinct geographic regions, as follows:

- In some parts of Africa and the Caribbean, transmission began before the 1970s. High levels of HIV infection have been found, the agent being transmitted predominantly through heterosexual contact, perinatal contact, and blood transfusions (1).
- In the United States and Western Europe, transmission typically began toward the end of the 1970s and has produced high levels of HIV infection among homosexual and bisexual males and intravenous drug abusers. HIV transmission through blood transfusions has been limited. In general, persistent but low levels of heterosexual transmission have occurred, and perinatal transmission has been occurring in hyperendemic areas (2).
- In Latin America outside the Caribbean, transmission began in the early 1980s and has produced moderate prevalences of infection among groups engaging in high-risk practices, chiefly homosexual and especially bisexual males. Blood transfusions have played an important role in HIV transmission, one that has not been completely eliminated; but the proportions of cases occurring as a result of intravenous drug abuse and perinatal contact have been low (3, 4).
- In Asia and Oceania, transmission of HIV began in the mid-1980s among groups engaging in high-risk practices. However, there is as yet no evidence of transmission through blood products, and levels of perinatal transmission are low (4).

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Analysis of these different epidemiologic patterns suggests that HIV transmission first involves homosexuals with many partners; but then, as the epidemic progresses, the agent comes to spread mainly between heterosexuals with fewer partners. Perinatal transmission reflects HIV transmission to women, both sexually and through blood transfusions. The experiences of some countries to date have indicated that transmission via blood transfusion can be controlled by energetic measures designed to detect HIV infections in blood donors (5).

AIDS EPIDEMIOLOGY IN MEXICO

As of June 1988 a cumulative total of 1,502 AIDS cases had been reported in Mexico, the number having grown exponentially and having doubled, on the average, once every 7.7 months. The dynamics of past HIV transmission in Mexico is reflected in the sex ratio of AIDS patients (11 males to one female) as well as their age distribution.

Among adult males, 92.7% of those afflicted acquired the infection through sexual contact. Of this 92.7%, most (58.6%) was accounted for by people identified as homosexuals, a smaller share (26.3%) by ones identified as bisexuals, and the remaining 7.8% by ones identified as heterosexuals. Also, 5.7% of the adult males with AIDS were infected via contaminated blood or blood products, with 4.3% being transfusion recipients, 1.1% hemophiliacs, and 0.3% having been infected through intravenous drug abuse. Regarding the relatively small number of adult females with AIDS, some two-thirds appear to have acquired their infections through blood transfusions and the remainder through heterosexual contact.

Overall, the most frequent mode of HIV transmission in the adults with AIDS was sexual contact, which ac-

counted for 87.6% of the reported cases, while transfusion with contaminated blood or blood products accounted for 10.8% and intravenous drug abuse for 0.3%. In addition, 56 pediatric AIDS cases were reported, of which transmission through contaminated blood accounted for 67.9%, sexual contact for 5.4%, and perinatal transmission for 19.6% (6). The modes of transmission of the remaining 1.3% of adult cases and 7.1% of pediatric cases are unknown.

CURRENT TRENDS AND PROJECTIONS

Trends in the numbers of AIDS cases in Mexico indicate that the disease is spreading from the large cities to the suburbs and countryside. Also, the incidence of AIDS is rising faster among women and children than among young men, even though the latter still account for the largest number of cases. It appears that the disease is spreading faster among heterosexual males than among homosexual and bisexual males.

If one directly applies the curves derived from 1983–1986 and 1983–1987 (first half) AIDS case data, the resulting projections indicate that the cumulative number of AIDS cases occurring in Mexico by the end of 1991 could range from 64,304 to 76,602. As Table 1 shows, the higher projection was derived from the 1983–1986 data, while the lower projection was obtained by including data from the first half of 1987. Later data have not been used in the projections because not all cases beginning in the second half of 1987 and the first half of 1988 have been diagnosed.

It should also be noted that exponential growth curves do not accurately describe the AIDS case growth rates observed in all countries. In the United States, for example, no exponential growth of AIDS cases has been seen since 1983. Hence, a

Table 1. Reported AIDS cases in Mexico by time of onset, 1981–June 1988, and exponential projections of case numbers based on 1983–1986 and 1983–June 1987 data.

Year and first or second half	Reported AIDS cases		Estimated AIDS cases (cumulative total)	
	No.	Cumulative total	1983–1986	1983–1987 (first half)
1981	{ 1	1	5	5
	{ 2	1	7	8
1982	{ 1	3	12	12
	{ 2	8	19	20
1983	{ 1	18	30	31
	{ 2	18	47	48
1984	{ 1	18	75	76
	{ 2	54	119	118
1985	{ 1	79	189	186
	{ 2	141	301	291
1986	{ 1	156	477	456
	{ 2	296	757	716
1987	{ 1	369	1,201	1,122
	{ 2	253	1,905	1,760
1988	{ 1	87	3,024	2,759
	{ 2		4,798	4,327
1989	{ 1		7,614	6,784
	{ 2		12,081	10,638
1990	{ 1		19,171	16,680
	{ 2		30,421	26,154
1991	{ 1		48,274	41,010
	{ 2		76,602	64,304

number of possible adjusted curves have been proposed, among them a dampened exponential curve. (A principal problem involved in applying this latter curve is accurately determining in advance the point where the exponential growth starts decelerating.) Another alternative is to project various estimates based on changes in the incidence growth rate and doubling interval.

In this regard it appears relevant that growth in the incidence of AIDS cases in Mexico City appears less rapid than it was, and that the doubling intervals observed there are longer than those found in other jurisdictions. It thus appears that the phase of rapid growth in Mexico City may be giving way to slower exponential growth.

Nationwide, by estimating the number of cases associated with different doubling rates, we can project various possible behavior patterns for the epidemic. Table 2 indicates two such possible patterns.

CONCLUSIONS

Overall, the number of AIDS cases in Mexico to date has continued to grow at an exponential rate, despite the decelerating growth rate observed in Mexico City. Projections of anticipated AIDS cases based on observed growth rates lead to anticipation of continued exponential growth. However, projections of this growth must be reduced in order to incorporate the observations for Mexico

Table 2. Estimates of the cumulative AIDS cases that would be expected in Mexico during 1988-1994, by year of origin, if the incidence rate's doubling time were prolonged as shown.

Year	Intermediate reduced rate of increase			Low reduced rate of increase		
	Cumulative cases	Monthly rate of increase (%)	Doubling time (months)	Cumulative cases	Monthly rate of increase (%)	Doubling time (months)
1988	2,427	8	8.6	2,427	8	8.6
1989	6,339	8	8.6	5,622	7	9.9
1990	14,683	7	9.9	13,022	7	9.9
1991	34,011	7	9.9	26,752	6	11.6
1992	69,873	6	11.6	54,960	6	11.6
1993	143,549	6	11.6	100,144	5	13.8
1994	261,563	5	13.8	182,474	5	13.8

City, where about 20% of the population and one-third of the AIDS cases in the country are concentrated.

AIDS case projections must also consider relevant transmission patterns and sociodemographic factors. For example, HIV is expected to spread most extensively in marginal urban and rural settings, most commonly afflicting people with low socioeconomic status. Increased transmission of the disease among women and children presages a wider age distribution of AIDS cases, even though most cases are still expected to occur among young men.

In this same vein, although the upward trend in HIV transmission among homosexual males is expected to persist, the proportion of AIDS cases among exclusively homosexual males is expected to decline because of increased HIV transmission among bisexuals and heterosexuals. It also seems probable that AIDS cases associated with receipt of blood and blood products will decline over the next four years or so as a result of HIV detection in blood donors.

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