

## Acquired Immunodeficiency Syndrome in Brazil

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**Aim.** To describe the acquired immunodeficiency syndrome (AIDS) epidemic in Brazil and analyze the impact of federal government measures addressing the problem since its onset.

**Method.** Retrospective review of AIDS epidemic data from its onset in 1980 up to the last published data in June 2001.

**Results.** AIDS was first reported in Brazil in 1980. By 1988, all 27 Brazilian states had diagnosed cases, and until June 2000 more than half of Brazilian municipalities had recorded at least one case of the disease. The AIDS incidence reached its peak between 1996 and 1997 (14.7 per 100,000 population), and then declined between 1998 and 2000 to 9 per 100,000 population. In the last two decades, the proportion of deaths has been also significantly reduced. These were not random events, but reflected the efficiency of the program implemented by the Brazilian Health Ministry's Coordination on Sexually Transmitted Diseases and AIDS. The program includes an epidemiological surveillance modeling system, which records cases from several regular epidemiological bulletins; national network of diagnosis and monitoring of HIV-infected individuals (ill or not); highly active antiretroviral therapy available free to all patients; mother-infant protection program; educational programs on condom use; the introduction of the female condom; development of AIDS studies in different areas to provide practical solutions; constant preoccupation about drug costs accounting for the patent breaking; and national production of many drugs currently in use.

**Conclusion.** Well-planned and implemented national program against AIDS can significantly reduce the burden of this disease to the population.

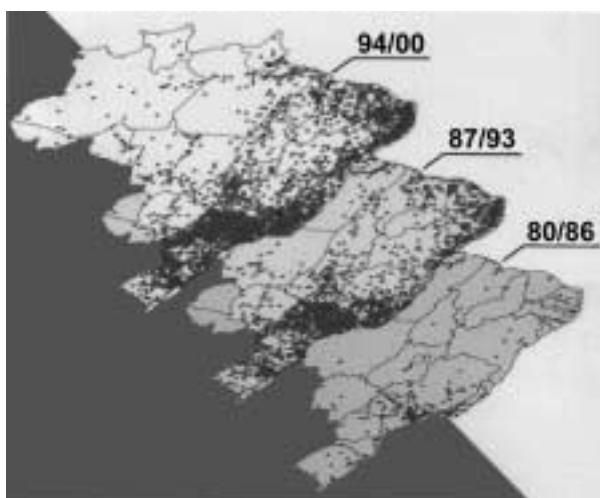
**Key words:** *acquired immunodeficiency syndrome; antiviral agents; Brazil; didanosine; HIV infections; sexually transmitted diseases; zalcitabine; zidovudine*

The first case of acquired immunodeficiency syndrome (AIDS) in Brazil was diagnosed retrospectively in 1980 (1-3), in a young, adult bisexual man, resident of the State of São Paulo, Southeast Brazil (Fig. 1). The progress of the epidemic was initially slow, occurring in the most populated regions of the country: the Southeast, Northeast, and South (Table 1; Fig. 2). The next 10 cases were recorded in 1982, all in the Southeast, eight in São Paulo, and two in Rio de Janeiro. In 1983, out of the 39 diagnosed cases, 2 were from the Northeast, 3 from the Center West Region, and the remaining 34 cases from the Southeast, of which 24 were residents of São Paulo State. In the same year, 3 cases were diagnosed in the South for the first time, all of them in the State of Rio Grande do Sul. In the following year, a total of 137 cases were reported in Brazil: 3 in the Northeast, 3 in the Center West, 124 in the Southeast, and 7 in the South (1-3). From 1980 to 1985, new cases were diagnosed almost exclusively in the States of São Paulo and Rio de Janeiro, principally in the capitals – the two largest and most populated cities (Table 1). In 1985, the State of Pará, in the Northern region, had recorded its first case of AIDS. Ever since, AIDS cases have been reported in all regions, and since 1988 in all 27 States of

Brazil (Tables 2 and 3) (1-3). Until June 2000, 59% of all 5,561 Brazilian municipalities had recorded at least one case of AIDS (Fig. 2).



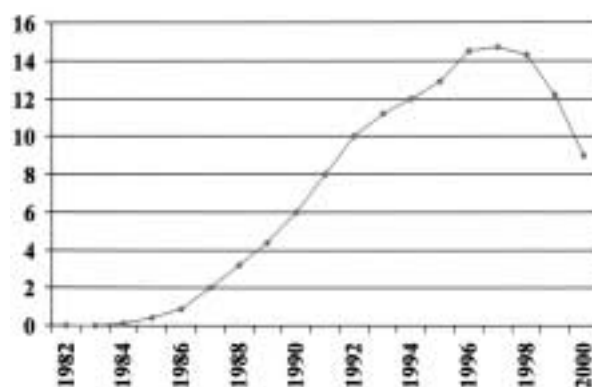
**Figure 1.** Regions of Brazil.



**Figure 2.** Acquired immunodeficiency syndrome (AIDS) in Brazil, 1980-2000. Distribution by municipality with at least one recorded case (according to ref. 1). The country maps show three time periods: 1980-1986, 1987-1993, and 1994-2000.

The analysis of coefficients of incidence trends (cases per 100,000 inhabitants) shows that the AIDS distribution has not been homogenous, not even within the same region (Tables 1-3). However, when the number of inhabitants in metropolitan areas is considered, it becomes clear that the incidence of AIDS is greater in the most densely populated areas and that evolution of AIDS epidemic increases with time (1).

The curve showing the evolution of AIDS incidence (per 100,000 population) from the beginning of the epidemic to December 2000 reached its peak in 1996 (14.5/100,000) and 1997 (14.7/100,000) and then declined to 9.0/100,000 inhabitants in 1998-2000 period (Fig. 3) (1-3). There were at least three reasons for this trend. The first was related to preventive measures initiated by the Brazilian Health Ministry's National Coordination on Sexually Transmitted Diseases and AIDS, based on the use of male and female condoms, the mother-child protection program, and the screening of blood donors and milk donors. The second was the introduction of the highly active antiretroviral therapy in December 1996, which was made available free of charge to all patients in Brazil



**Figure 3.** Coefficient of AIDS incidence (per 100,000 population) by year of diagnosis, Brazil, 1982-2000 (1-3).

**Table 1.** The distribution of cases of acquired immunodeficiency syndrome (AIDS) and its incidence in Brazil per area and per year in 1980-1986 period<sup>a</sup>

Area	No. (CI) <sup>b</sup> of cases							
	1980	1981	1982	1983	1984	1985	1986	
Brazil (total)	1 (0.0)	- (-)	10 (0.0)	39 (0.0)	137 (0.1)	573 (0.4)	1,192 (0.9)	
North:	- (-)	- (-)	- (-)	- (-)	- (-)	1 (0.0)	6 (0.1)	
Amazonas	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	1 (0.1)	
Roraima	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	-	
Pará	- (-)	- (-)	- (-)	- (-)	- (-)	1 (0.0)	3 (0.1)	
Amapá	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	-	
Tocantins	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	2 (0.2)	
Northeast:	- (-)	- (-)	- (-)	2 (0.0)	3 (0.0)	30 (0.1)	79 (0.2)	
Maranhão	- (-)	- (-)	- (-)	- (-)	- (-)	5 (0.1)	4 (0.1)	
Piauí	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	4 (0.2)	
Ceará	- (-)	- (-)	- (-)	- (-)	- (-)	6 (0.1)	12 (0.2)	
Rio Grande do Norte	- (-)	- (-)	- (-)	1 (0.0)	1 (0.0)	- (-)	3 (0.1)	
Paraíba	- (-)	- (-)	- (-)	- (-)	- (-)	4 (0.1)	2 (0.1)	
Pernambuco	- (-)	- (-)	- (-)	1 (0.0)	2 (0.0)	10 (0.2)	17 (0.3)	
Alagoas	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	10 (0.4)	
Sergipe	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	-	
Bahia	- (-)	- (-)	- (-)	- (-)	- (-)	5 (0.0)	27 (0.2)	
Center-West:	- (-)	- (-)	- (-)	- (-)	3 (0.0)	13 (0.2)	33 (0.4)	
Mato Grosso do Sul	- (-)	- (-)	- (-)	- (-)	2 (0.1)	2 (0.1)	8 (0.5)	
Mato Grosso	- (-)	- (-)	- (-)	- (-)	- (-)	5 (0.3)	8 (0.5)	
Goiás	- (-)	- (-)	- (-)	- (-)	1 (0.0)	3 (0.1)	6 (0.2)	
D.F. <sup>c</sup>	- (-)	- (-)	- (-)	- (-)	- (-)	3 (0.2)	11 (0.8)	
Southeast:	1 (0.0)	- (-)	10 (0.0)	34 (0.1)	124 (0.2)	512 (0.9)	975 (1.7)	
Minas Gerais	- (-)	- (-)	- (-)	2 (0.0)	6 (0.0)	38 (0.3)	61 (0.4)	
Espírito Santo	- (-)	- (-)	- (-)	- (-)	- (-)	4 (0.2)	7 (0.3)	
Rio de Janeiro	- (-)	- (-)	2 (0.0)	8 (0.1)	42 (0.4)	142 (1.2)	309 (2.5)	
Sao Paulo	1 (0.0)	- (-)	8 (0.0)	24 (0.1)	76 (0.3)	328 (1.2)	598 (2.1)	
South:	- (-)	- (-)	- (-)	3 (0.0)	7 (0.0)	17 (0.1)	99 (0.5)	
Paraná	- (-)	- (-)	- (-)	- (-)	1 (0.0)	4 (0.0)	16 (0.2)	
Santa Catarina	- (-)	- (-)	- (-)	- (-)	1 (0.0)	- (-)	9 (0.2)	
Rio Grande do Sul	- (-)	- (-)	- (-)	3 (0.0)	5 (0.1)	13 (0.2)	74 (0.9)	

<sup>a</sup>If no data are provided, there were no recorded incidents of AIDS cases (1-3).

<sup>b</sup>Coefficient of incidence rate (per 100,000 population).

<sup>c</sup>Distrito Federal (Brazil Capital City) - Brasília.

**Table 2.** The distribution of acquired immunodeficiency syndrome (AIDS) cases and its incidence in Brazil per area and per year in 1987-1993 period

Area	No.(CI) <sup>a</sup> of cases						
	1987	1988	1989	1990	1991	1992	1993
Brazil (total)	2,813 (2.0)	4,535 (3.2)	6,295 (4.4)	8,907 (6.0)	11,805 (8.0)	14,924 (10.0)	16,760 (11.2)
North:	25 (0.3)	45 (0.5)	63 (0.7)	93 (1.0)	135 (1.3)	200 (1.9)	235 (2.3)
Rorônia	9 (1.1)	6 (0.7)	1 (0.1)	10 (1.1)	4 (0.4)	27 (2.2)	28 (2.3)
Acre	2 (0.5)	2 (0.5)	4 (1.0)	4 (0.9)	7 (1.7)	7 (1.6)	8 (1.8)
Amazonas	4 (0.2)	11 (0.6)	16 (0.8)	29 (1.5)	35 (1.7)	57 (2.6)	66 (3.0)
Roraima	1 (0.9)	1 (0.9)	8 (6.8)	7 (5.8)	13 (6.0)	7 (2.9)	7 (2.9)
Pará	9 (0.2)	21 (0.5)	31 (0.7)	35 (0.7)	65 (1.3)	87 (1.8)	112 (2.4)
Amapá	– (–)	3 (1.3)	2 (0.8)	1 (0.4)	3 (1.0)	9 (2.9)	1 (0.3)
Tocantins	– (–)	1 (0.1)	1 (0.1)	7 (0.7)	8 (0.9)	6 (0.6)	13 (1.3)
Northeast:	211 (0.5)	333 (0.8)	547 (1.3)	683 (1.6)	962 (2.3)	1,172 (2.7)	1,309 (3.0)
Maranhao	11 (0.2)	19 (0.4)	35 (0.7)	56 (1.1)	77 (1.6)	84 (1.7)	111 (2.2)
Piauí	8 (0.3)	10 (0.4)	11 (0.4)	22 (0.8)	34 (1.3)	31 (1.2)	28 (1.1)
Ceará	16 (0.3)	45 (0.7)	77 (1.2)	92 (1.5)	186 (2.9)	252 (3.9)	211 (3.2)
Rio Grande do Norte	17 (0.8)	13 (0.6)	30 (1.3)	29 (1.3)	55 (2.3)	62 (2.5)	76 (3.1)
Paraíba	17 (0.5)	12 (0.4)	15 (0.5)	40 (1.3)	42 (1.3)	58 (1.8)	85 (2.6)
Pernambuco	71 (1.0)	96 (1.4)	164 (2.3)	180 (2.5)	229 (3.2)	252 (3.5)	307 (4.2)
Alagoas	9 (0.4)	24 (1.0)	24 (1.0)	36 (1.5)	34 (1.4)	63 (2.4)	77 (3.0)
Sergipe	6 (0.4)	17 (1.2)	16 (1.2)	24 (1.7)	18 (1.2)	40 (2.6)	45 (2.9)
Bahia	56 (0.5)	97 (0.9)	175 (1.5)	204 (1.8)	287 (2.4)	330 (2.7)	369 (3.0)
Center-West:	103 (1.1)	136 (1.4)	184 (2.0)	296 (3.2)	544 (5.8)	705 (7.2)	743 (7.6)
Mato Grosso do Sul	14 (0.8)	22 (1.3)	35 (2.0)	81 (4.5)	88 (4.9)	121 (6.6)	185 (10.0)
Mato Grosso	27 (1.7)	20 (1.2)	26 (1.6)	48 (2.8)	78 (3.9)	98 (4.5)	106 (4.9)
Goiás	43 (0.9)	59 (1.3)	66 (1.7)	83 (2.1)	172 (4.3)	262 (6.3)	234 (5.6)
D.F. <sup>b</sup>	19 (1.1)	35 (2.0)	57 (3.2)	84 (4.5)	206 (12.9)	224 (13.5)	218 (13.1)
Southeast:	2,324 (3.7)	3,710 (5.9)	5,036 (7.9)	6,988 (10.8)	8,867 (14.2)	11,291 (17.6)	12,406 (19.3)
Minas Gerais	125 (0.8)	189 (1.3)	261 (1.7)	388 (2.5)	542 (3.4)	874 (5.4)	1,283 (8.0)
Espírito Santo	18 (0.7)	32 (1.3)	51 (2.1)	55 (2.2)	83 (3.2)	114 (4.3)	162 (6.1)
Rio de Janeiro	688 (5.2)	994 (7.4)	1,299 (9.6)	1,575 (11.4)	1,739 (13.6)	2,222 (17.1)	2,303 (17.7)
Sao Paulo	1,493 (4.7)	2,495 (7.9)	3,425 (10.6)	4,970 (15.0)	6,503 (20.6)	8,081 (24.9)	8,658 (26.7)
South:	150 (0.7)	311 (1.5)	465 (2.2)	847 (3.9)	1,297 (5.9)	1,556 (6.9)	2,067 (9.2)
Paraná	33 (0.4)	76 (0.9)	91 (1.1)	165 (2.0)	296 (3.5)	431 (5.0)	548 (6.4)
Santa Catarina	19 (0.4)	54 (1.3)	97 (2.2)	222 (5.0)	327 (7.2)	410 (8.8)	569 (12.2)
Rio Grande do Sul	98 (1.1)	181 (2.1)	277 (3.1)	460 (5.1)	674 (7.4)	715 (7.7)	980 (10.2)

<sup>a</sup>Coefficient of incidence rate (per 100,000 population).<sup>b</sup>Distrito Federal (Brazil Capital City) – Brasília (1-3).

by the National Antiretroviral Therapy Consensus (4). The third was a possible delay in notification of AIDS cases (5). The decline was not uniform in all regions. It was higher in the Southeast, and less evident in the South (3).

From the beginning of 1980 to June 30, 2001, the National Coordination on Sexually Transmitted Diseases and AIDS registered 215,810 cases (3). Of these, 3.4% in children, and 96.5% in adults. Sex distribution showed that 73.7% were men and 26.3% women (Table 4). However, the proportion of men and women with AIDS noticeably changed during the epidemic evolution. In 1985, men to women ratio for all categories of exposure was 24:1, whereas in 1999/2000, it was 2:1. This was due to the increase in the number of heterosexually transmitted cases (1).

Sexual exposure was the predominant mechanism of transmission throughout the epidemic (Table 5) (3). There was, however, a reduction in the number of homosexual and bisexual exposures, and an increase in the number of heterosexual ones. There was also an increase in the number of perinatal transmissions due to the increase in heterosexual exposure. In relation to blood exposure, there was no change in the numbers of intravenous drug users, but a reduction among hemophiliacs and patients submitted to blood and derivate transfusions was noticeable because of adequate donor selection and the introduction of obligatory serologic tests for diagnosis of HIV-1 and HIV-2 infection. Only a single case of acci-

dental transmission was recorded. Of the 215,810 AIDS cases recorded in Brazil in 1980-2001 period, 56,584 (26.2%) were in women, of whom 48,984 were of childbearing age. In 1999, the number of pregnant women infected with AIDS was estimated at 12,898 (6): 2,512 (19.5%) received zidovudine intravenously at the time of delivery. On the basis of these findings, the "Surveillance Program for HIV-Positive Pregnant Women and Exposed Children" was introduced to assist in reversing the trends previously shown (6).

The distribution of AIDS cases for individuals aged 19 and over according to their educational level at the time of diagnosis varied over time (Table 6). Cases of AIDS in the groups who completed secondary or lower level of education increased during the period from 1991 to 2001 in comparison with the beginning of the epidemic. At the same time, there was a reduction in the number of cases in the group with higher education (1-3). If schooling is taken as an indicator of socioeconomic status, then the profile of the epidemic changed in recent years, affecting poorer individuals more strongly.

As far as the mortality rate attributed to AIDS is concerned, from the beginning of the epidemic in 1980 to June 30, 2001, as many as 105,595 deaths were attributed to AIDS (Table 7) (3). This corresponds to 48.9% of the total number of cases recorded during the same period. It is important to note that at the beginning of the epidemic the mortality

**Table 3.** The distribution of acquired immunodeficiency syndrome (AIDS) cases and its incidence in Brazil per area and per year in 1994-2001 period

Area	No. (CI) <sup>a</sup> of cases							
	1994	1995	1996	1997	1998	1999	2000	2001 <sup>b</sup>
Brazil (total)	18,224 (12.0)	19,890 (12.9)	22,343 (14.5)	22,593 (14.7)	22,102 (14.3)	20,008 (12.2)	15,012 (9.0)	3,024
North:	321 (3.1)	363 (3.4)	432 (4.0)	500 (4.7)	502 (4.7)	389 (3.2)	279 (2.3)	96
Rondônia	39 (3.0)	45 (3.3)	42 (3.1)	41 (3.0)	25 (1.9)	16 (1.2)	30 (2.3)	9
Acre	10 (2.2)	1 (0.2)	6 (1.3)	13 (2.8)	15 (3.3)	27 (5.1)	17 (3.1)	11
Amazonas	93 (4.1)	94 (4.0)	103 (4.4)	152 (6.5)	161 (6.9)	202 (7.8)	143 (5.4)	27
Roraima	6 (2.4)	8 (3.0)	16 (6.0)	14 (5.3)	15 (5.7)	17 (6.4)	30 (11.0)	1
Pará	148 (3.1)	179 (3.6)	217 (4.4)	217 (4.4)	223 (4.5)	48 (0.8)	12 (0.2)	24
Amapá	6 (1.9)	17 (5.2)	19 (5.8)	33 (10.1)	19 (5.8)	37 (8.4)	24 (5.2)	1
Tocantins	19 (1.9)	19 (1.9)	29 (2.9)	30 (3.0)	44 (4.4)	42 (3.7)	23 (2.0)	23
Northeast:	1,457 (3.3)	1,549 (3.5)	1,916 (4.3)	2,111 (4.7)	2,494 (5.6)	2,248 (4.9)	1,689 (3.6)	480
Maranhao	124 (2.4)	143 (2.8)	162 (3.1)	173 (3.3)	188 (3.6)	160 (3.0)	118 (2.2)	43
Piauí	62 (2.3)	75 (2.8)	69 (2.6)	93 (3.4)	75 (2.8)	102 (3.7)	99 (3.6)	23
Ceará	262 (4.0)	329 (4.9)	320 (4.8)	310 (4.7)	567 (8.5)	396 (5.6)	206 (2.9)	106
Rio Grande do Norte	93 (3.7)	70 (2.7)	104 (4.1)	123 (4.8)	155 (6.1)	113 (4.3)	109 (4.1)	3
Paraíba	88 (2.7)	89 (2.7)	120 (3.6)	118 (3.6)	155 (4.7)	183 (5.4)	135 (4.0)	0
Pernambuco	348 (4.7)	383 (5.2)	529 (7.1)	536 (7.2)	644 (8.7)	459 (6.1)	431 (5.6)	189
Alagoas	71 (2.7)	80 (3.0)	97 (3.6)	119 (4.5)	84 (3.2)	102 (3.8)	13 (0.5)	0
Sergipe	91 (5.8)	77 (4.8)	75 (4.7)	90 (5.7)	89 (5.6)	97 (5.7)	62 (3.6)	0
Bahia	318 (2.6)	303 (2.4)	440 (3.5)	549 (4.4)	537 (4.3)	636 (4.9)	516 (3.9)	116
Center-West:	924 (9.2)	1,121 (10.9)	1,149 (11.2)	1,362 (13.3)	1,144 (11.2)	833 (7.4)	565 (4.9)	114
Mato Grosso do Sul	169 (9.0)	201 (10.5)	194 (10.2)	221 (11.6)	246 (12.9)	209 (10.3)	126 (6.1)	1
Mato Grosso	170 (7.6)	204 (8.8)	279 (2.1)	294 (12.7)	217 (9.4)	71 (3.0)	90 (3.7)	22
Goiás	344 (8.1)	448 (10.4)	379 (8.8)	512 (11.9)	393 (9.1)	278 (5.7)	61 (1.2)	31
D.F. <sup>c</sup>	241 (14.2)	268 (15.4)	297 (17.1)	335 (19.3)	288 (16.6)	275 (14.0)	288 (14.3)	60
Southeast:	13,011 (20.0)	13,948 (21.2)	15,400 (23.4)	14,813 (22.5)	13,406 (20.4)	12,290 (17.6)	8,587 (12.1)	1,420
Minas Gerais	1,482 (9.1)	1,357 (8.3)	1,413 (8.6)	1,357 (8.3)	1,167 (7.1)	1,311 (7.6)	960 (5.5)	182
Espírito Santo	205 (7.5)	202 (7.3)	231 (8.4)	306 (11.1)	271 (9.8)	331 (11.3)	260 (8.7)	78
Rio de Janeiro	2,381 (18.2)	2,703 (20.5)	3,251 (24.6)	3,390 (25.6)	3,102 (23.5)	2,247 (16.3)	1,097 (7.9)	287
Sao Paulo	8,943 (27.2)	9,686 (29.0)	10,505 (31.5)	9,760 (29.3)	8,866 (26.6)	8,401 (23.5)	6,270 (17.2)	873
South:	2,511 (11.1)	2,909 (12.7)	3,446 (15.1)	3,807 (16.6)	4,556 (19.9)	4,248 (17.4)	3,892 (15.7)	914
Paraná	651 (7.6)	790 (9.1)	929 (10.7)	1,053 (12.2)	1,221 (14.1)	1,223 (13.0)	1,182 (12.5)	254
Santa Catarina	722 (15.3)	932 (19.6)	1,039 (21.8)	1,018 (21.4)	1,173 (24.6)	1,093 (21.4)	1,127 (21.8)	498
Rio Grande do Sul	1,138 (12.1)	1,187 (12.5)	1,478 (15.6)	1,736 (18.3)	2,162 (22.8)	1,932 (19.4)	1,583 (15.7)	162

<sup>a</sup>Coefficient of incidence rate (per 100,000 population).<sup>b</sup>Preliminary data up to June 30, 2001, subject to revision.<sup>c</sup>Distrito Federal (Brazil Capital City) – Brasília (1-3).**Table 4.** Distribution of acquired immunodeficiency syndrome (AIDS) cases in Brazil according to age and sex from the beginning of 1980 to June 30, 2001<sup>a</sup>

Age (years)	No. (%) of cases		
	men	women	total
< 5-12	3,770 (1.7)	3,554 (1.7)	7,314 (3.4)
13-19	3,185 (1.5)	1,661 (0.8)	4,846 (2.3)
20-49	111,994 (51.9)	47,323 (21.9)	159,317 (73.8)
> 50	39,997 (18.5)	3,993 (1.9)	43,990 (20.4)
Unknown	280 (0.1)	63 (0.0)	343 (0.1)
Total	159,226 (73.7)	56,584 (26.3)	215,810 (100.0)

<sup>a</sup>Preliminary data up to June 30, 2001 (3).

rate was 100%. There was a general downward trend until 1990, which became more pronounced until 1995, and even more significant until June 30, 2001.

### National Program Against AIDS

From 1980 to 1988, there were substantial difficulties in the actual diagnosis of AIDS, complicated by other opportunistic infections and an empirical therapeutic approach. During this phase, we gained greater understanding of HIV infection and its pathogenic mechanisms, and the Ministry of Health started implementation of its National Program. These explain the variations in mortality rate during the observed period. In 1989, zidovudine (AZT) was introduced as a specific antiretroviral monotherapy (7,8). In 1990, the Ministry of Health started distributing AZT as part of the National Program of Sexually

Transmitted Diseases and AIDS. In subsequent years, there was also the possibility of monotherapy with ddC (zalcitabine) and ddl (didanosine), both provided by the Ministry of Health. In 1994, following the 10th International AIDS Conference in Yokohama, Japan, 1994, combined antiretroviral therapy was also introduced in Brazil. The decisive step taken by the Ministry of Health's National Coordination of Sexually Transmitted Diseases and AIDS was the organization of the National Consensus on Antiretroviral Therapy in March 1996 (4). This resulted in recommendations for the use of a potent, combined antiretroviral therapy. Protease inhibitors were also introduced in De-

**Table 5.** Acquired immunodeficiency syndrome (AIDS) cases in Brazil according to period of diagnosis and type of exposure in 1980-2001 period<sup>a</sup>

Type of exposure	No. (%)		
	1980-1990	1991-2001 <sup>a</sup>	total
Sexual	14,106 (57.0)	102,809 (53.8)	116,915 (54.2)
homosexual	7,778 (31.4)	28,952 (15.1)	36,730 (17.0)
bisexual	3,745 (15.1)	17,231 (9.1)	20,976 (9.7)
heterosexual	2,583 (10.4)	56,626 (29.6)	59,209 (27.4)
Blood	5,807 (23.5)	37,082 (19.4)	42,889 (19.4)
i. v. drug users	4,526 (18.3)	34,583 (18.1)	39,109 (18.1)
hemophiliac	598 (2.4)	657 (0.3)	1,255 (0.6)
transfusion	683 (2.8)	1,842 (0.9)	2,525 (1.2)
Perinatal	454 (1.8)	5,553 (2.9)	6,007 (2.8)
Occupational	– (–)	1 (0.0)	1 (0.0)
Unknown	4,383 (17.7)	45,615 (23.9)	49,998 (23.2)
Total	24,750 (11.5)	191,060 (88.5)	215,810 (100.0)

<sup>a</sup>Preliminary data up to June 30, 2001 (3).

**Table 6.** Acquired immunodeficiency syndrome (AIDS) cases in Brazil in patients over 19 years of age, according to period of diagnosis and their education level, in 1980-2001 period<sup>a</sup>

Education level	No. (%) of cases		
	1980-1990	1991-2001	total
Illiterate	415 (1.8)	6,828 (3.7)	7,243 (3.5)
Elementary (1-8 grade)	7,692 (33.1)	91,643 (50.3)	99,335 (48.4)
Secondary (high school)	3,228 (13.9)	27,496 (15.1)	30,724 (14.9)
Higher	3,481 (15.0)	13,914 (7.6)	17,395 (8.5)
Unknown	8,381 (36.2)	42,449 (23.3)	50,830 (24.7)
Total	23,197 (11.3)	182,330 (88.7)	205,527 (100.0)

<sup>a</sup>Preliminary data from the beginning of 1980 to June 30, 2001 (3).

**Table 7.** Acquired immunodeficiency syndrome (AIDS) cases in Brazil with fatal outcomes according to year of diagnosis in 1980-2001 period<sup>a</sup>

Year	No. of cases	No. (%) of deaths
1980-1982	11	11 (100.0)
1983	39	38 (97.4)
1984	140	105 (75.0)
1985	573	462 (80.6)
1986	1206	916 (75.9)
1987	2,832	2,223 (78.5)
1988	4,585	3,630 (79.2)
1989	6,371	4,893 (76.8)
1990	8,993	6,633 (73.7)
1991	11,921	8,162 (68.5)
1992	15,060	9,773 (64.9)
1993	16,829	10,820 (64.3)
1994	18,341	11,190 (61.0)
1995	20,357	11,482 (56.4)
1996	22,943	10,090 (43.9)
1997	23,546	8,360 (35.5)
1998	24,017	7,493 (31.2)
1999	20,009	5,362 (26.8)
2000	15,013	3,425 (22.8)
2001 <sup>a</sup>	3,024	527 (17.4)
Total	215,810	105,595 (48.9)

<sup>a</sup>Preliminary data from the beginning of 1980 to June 30, 2001 (3).

ember of the same year. With this consensus, the national network of CD4 and CD8 lymphocyte counts using flow cytometry was initiated, which caused a considerable improvement in patient monitoring, especially in initial indications and modifications to antiretroviral therapy. In 1997, the National Network of Viral Burden Determination was established to give further support to AIDS therapy. Since then, the highly active antiretroviral combined therapy, and the markers of infection course (CD4 and CD8 T lymphocytes) have been made available for all patients in Brazil irrespective of their socioeconomic status. As a result, there has been a marked reduction in proportion of deaths (17.4% in 2001 – preliminary data) (5).

### Conclusion

In Brazil, which has a population of 170 million (9), important changes in the development of AIDS epidemic have been observed during the last two decades. These were not random events but reflected the efficiency of the program implemented and maintained by the National Coordination of Sexually Transmitted Diseases and AIDS, including above listed approaches: epidemiological surveillance mod-

eling system; national network of diagnosis and monitoring of HIV-infected individuals (ill or not); highly active antiretroviral therapy available to all patients in Brazil; mother-infant protection program; educational programs on condom use; introduction of female condom; development of AIDS studies in different areas to provide practical solutions; constant pre-occupation about drug costs accounting for the patent breaking and national production of many drugs currently in use. It is possible to imagine that the course and severity of the AIDS epidemic might have been different had the Health Ministry not adopted these initiatives.

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