Generation, Transmission Categories and Gender

AIDS in Sao Paulo, Brazil

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Abstract

The first case of AIDS in the State of Sao Paulo was reported in 1980. In 1985 both health authorities and the media projected a catastrophic HIV/AIDS evolution in Sao Paulo that, fortunately, did not take place.
Between 1955-71 were born 66% of the total AIDS cases in Sao Paulo. The generation born before 1955 did the sexual revolution for the generation born between 1955-71 who lived with liberal sex and drugs. The generation born in 1972 had 13 years old in 1985, was not sexually active when AIDS started to be disseminated in Sao Paulo and could prevent itself from the new disease more efficiently.
In the early years, the reported cases in Sao Paulo were mainly homosexual men followed by IDU. According to our estimates the number of new infections among homosexual men and IDU started to decrease already in 1985-86.
Heterosexual AIDS cases in the 1990's were infected before 1991 when HIV/AIDS was considered a disease of homosexual men and IDU. The increase of heterosexual AIDS cases in Sao Paulo means also the increase of female AIDS cases.

1. Introduction

In the State of Sao Paulo the total number of AIDS deaths has decreased both to male and female segments of the Capital and the countryside. The analysis of the reported cases of AIDS are usually presented by transmission categories, social and economical profile and age groups in the year of

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diagnosis. This paper introduces the analysis of the reported AIDS cases evolution per transmission category in the year of infection by HIV and studies the data per generation, that is, according to the year of birth.

The cases of AIDS are compulsorily reported. People infected by the virus (HIV), which do not show the disease (AIDS) are not reported. People infected with HIV, without direct therapy, show symptoms of AIDS after an average period of 8 years; the average survival time with AIDS is about 2 years (Bartlett/00). HIV do not necessarily contaminates all the people that get in touch with the virus. Contaminated people (HIV positive) could transmit the virus but not necessarily will develop the disease.

The first case of AIDS in the State of Sao Paulo was reported in 1980. The year of 1985 marks a turning point in the spread and evolution of the disease in the State: the number of AIDS cases increased from 76 in 1984 to 328 in 1985 while the number of deaths increased from 50 to 173. At that time, both health authorities and the media projected a catastrophic HIV/AIDS evolution in Sao Paulo that, fortunately, did not take place.

Four factors are contributing today to the decrease of the total number of AIDS deaths in Sao Paulo, which is responsible for approximately 50% of all reported cases of AIDS and deaths in Brazil during 1980-98.

First of all should be considered that the number of AIDS deaths has been decreased as a reflection of the prophylactic and therapeutic measures that has expanded the survival period of the patients with AIDS.

In a second place, the growth rate of AIDS deaths began to decline in the 80’s. Considering the average period of 8 years without AIDS symptoms and 2 years of survival, the decline of the rate of death growth in the 80' reflects the decline of

the number of infections in the 70's, when the HIV was not even known.

Third, the total number of reported cases of AIDS for homosexual (and bisexual) men began to decline in 1993 and the total number of reported cases of AIDS of injecting drug users (IDU) began to decline in 1994. The decline reflects the reduction of the contamination already in 1985-86, due to the alarm of the disease spread and the preventive steps against the infection.

At last, the generation that was born after 1971 was 13 years old, was not sexually active in 1985 and had not been contaminated in 1985. This generation was raised in a social milieu where AIDS has already been incorporated to local culture and could early change their behavior. The vulnerable generation, born between 1955 and 1971, was 14 to 30 years old in the period of AIDS dissemination (1985) and today is entering in the forties.

2. AIDS cases and deaths in the State of Sao Paulo (1980-98)

The State of Sao Paulo Reference Center STD/AIDS (CRT-DST/AIDS-SP) receives and analyses the data originated from the reports of AIDS cases and deaths in the State. The data of the historical series from 1980 on are continually revised to correct sub-notifications. Our analysis is restricted to the period 1980-98 because recent years are less reliable due reporting delays[1].

The State of Sao Paulo System of Data Analysis (SEADE) presents the number of deaths collected from the Registry Offices in the State. The SEADE historical series about AIDS deaths began in 1988 and are not updated.

[1] To an analysis of the methods to correct the reporting delays see BARBOSA/STRUCHINE/97.

Table 1 presents the number of AIDS deaths of residents in the State of Sao Paulo according to the two selected sources. The updated number of deaths of CRT-DST/AIDS-SP is superior to the number of deaths registered by SEADE between 1988 and 1990. From 1991 on, the numbers of CRT-DST/AIDS-SP are lower than the numbers of SEADE (see third column of Table 1). To analyze the evolution of AIDS deaths (rate of growth) we combined the two estimates, CRT-DST/AIDS-SP for 1980-90 and SEADE for 1991-98 (Table 1 details in bold the maximum points of deaths in the year of occurrence).

Table 1 – AIDS deaths by year of occurrence – State of Sao Paulo

Year of occurrence	Deaths in the year			CRT(80-90) and SEADE (91-98)		
	CRT (a)	SEADE(b)	(a/b)	In the year	Evolution	Accumulated
1980	0	-	-	0	-	0
1981	1	-	-	1	-	1
1982	2	-	-	2	2.00	3
1983	16	-	-	16	8.00	19
1984	50	-	-	50	3.13	69
1985	173	-	-	173	3.46	242
1986	296	-	-	296	1.71	538
1987	698	-	-	698	2.36	1236
1988	1377	1071	1.29	1377	1.97	2613
1989	2172	1661	1.31	2172	1.58	4785
1990	3152	3098	1.02	3152	1.45	7937
1991	4052	4218	0.96	4218	1.34	12155
1992	4717	5021	0.94	5021	1.19	17176
1993	5601	6433	0.87	6433	1.28	23609
1994	6184	7091	0.87	7091	1.10	30700
1995	**7526**	**7739**	0.97	**7739**	1.09	38439
1996	6684	7269	0.92	7269	0.94	45708
1997	4013	5536	0.72	5536	0.76	51244
1998	4060	4591	0.88	4591	0.83	55835
total	50774	53728	-	55835	-	-

Source: elaborated from SEADE/00 and CRT/DST/AIDS-SP/00 (updated: 31/mar/00).

According to the combined estimates of CRT-DST/AIDS-SP and SEADE, the number of AIDS deaths reached 56 thousand in the State of Sao Paulo between 1980 and 1998. The evolution of the number of AIDS deaths, as we emphasized in the introduction of

this paper, presents a declining rate of growth in the 80's. This reflects the declining rate of growth of the number of infections in the 70's, when HIV was not even known (see the penultimate column of Table 1).

The year of 1995 corresponds to the maximum number of AIDS deaths in the State of Sao Paulo. From 1996 on the total number of deaths decreases both to male and female segments of the Capital and the countryside of the State of Sao Paulo (WALDVOGEL/MORAIS/98)[2].

CRT-DST/AIDS-SP also presents the number of deaths related to the year of AIDS diagnosis - in this case the year do not necessarily corresponds to the year of death. Between 1980 and 1998 were reported 84.4 thousand cases of AIDS with 51.3 thousand deaths in Sao Paulo (see Table 2).

The number of deaths by year of diagnosis corresponds to the AIDS lethality rate. The lethality rate for 1980-98 registered 60.8%. The lethality rate for a same year of diagnosis has a tendency towards enlargement in time with the occurrence of deaths after the date of report. The difference between the number of reported cases and the number of deaths by year of diagnosis refers to the reported cases without death registration. According to Table 2, 33.1 thousand reported cases between 1980 and 1998 remain alive or without death registration.

The maximum number of deaths by year of diagnosis was reached in 1993, therefore 2 years before the maximum number of deaths by year of occurrence (1995 – see Table 1). The discrepancy of two years between the maximum number of deaths by year of diagnosis and the maximum number of death by year of occurrence reflects the average period of approximately two years of surviving estimated to the patients with AIDS.[3]

[2] More precisely: 1995 for men in the Capital, 1996 for men in the countryside and women in the Capital and 1997 for women in the countryside of the State of Sao Paulo.
[3] For the average period of survival see SAWYER/97 and MORAES/SEABRA/ELUF NETO/97.

2 – Reported cases of AIDS and deaths by year of diagnosis
State of Sao Paulo

Year of diagnosis	Cases (a)	Deaths (b)	(a-b)	(b/a)* (%)	Evolution	
					Cases	Deaths
1980	1	1	0	100.0	-	-
1981	0	0	0	-	-	-
1982	8	8	0	100.0	-	-
1983	24	24	0	100.0	3.00	3.00
1984	76	53	23	69.7	3.17	2.21
1985	328	262	66	79.9	4.32	4.94
1986	598	448	150	74.9	1.82	1.71
1987	1493	1183	310	79.2	2.50	2.64
1988	2495	2034	461	81.5	1.67	1.72
1989	3425	2752	673	80.4	1.37	1.35
1990	4970	3893	1077	78.3	1.45	1.41
1991	6503	4991	1512	76.7	1.31	1.28
1992	8081	5844	2237	72.3	1.24	1.17
1993	8658	**6095**	2563	70.4	1.07	1.04
1994	8943	6037	2906	67.5	1.03	0.99
1995	9686	6034	3652	62.3	1.08	1.00
1996	**10505**	5166	5339	49.2	1.08	0.86
1997	9760	3579	6181	36.7	0.93	0.69
1998	8866	2897	5969	32.7	0.91	0.81
Total	84420	51301	33119	60.8	-	-

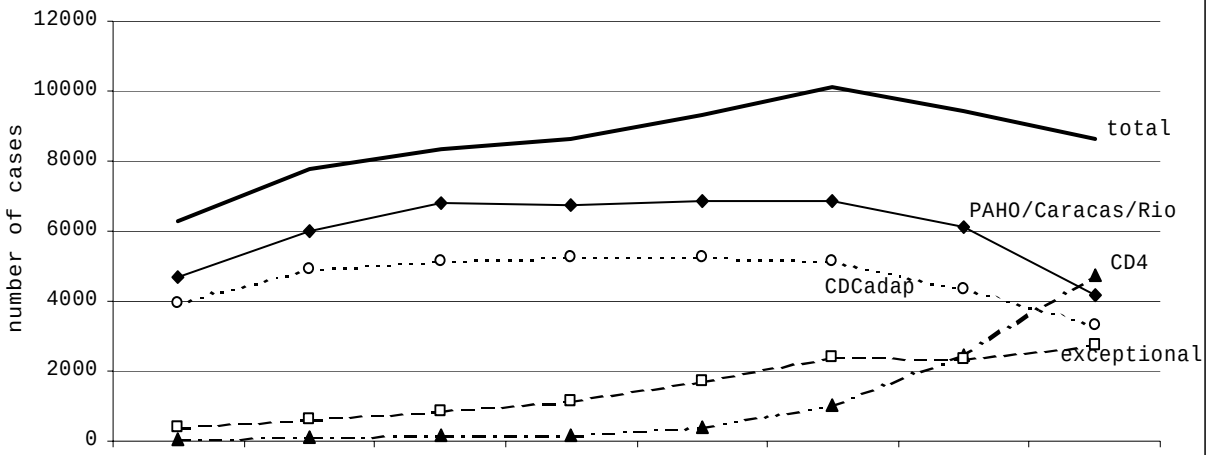
Source: elaborated from the BHM/00a (updated: 03/jun/00).
* Lethality rate.

Although the maximum number of deaths by year of diagnosis was reached in 1993, the total number of reported cases of AIDS increased until 1996. But, as the Brazilian AIDS-defining diagnosis criteria changed during the 1980-98 period, the total reported cases overestimates the evolution of AIDS in Sao Paulo. To correct the estimates, the research utilizes three different series according to the three Brazilian main AIDS-defining diagnosis (CDC-adapted, PAHO/Caracas/Rio and CD4). The Brazilian CD4 includes all patients with CD4 cell count less than 350/mm^3. CD4 was introduced in 1998 and boosted significantly the reported cases of AIDS (the CD4 criteria was also utilized in years before 1998 for cases reported with delay).

Figure 1 presents the number of reported cases by AIDS-defining diagnosis criteria for people 13 and more years old.

The criteria CDC-Adapted, PAHO/Caracas/Rio and CD4 are not excluding criteria, that is, the same case can be reported by more than one of these three criteria. According to the CDC-Adapted and PAHO/Caracas/Rio criteria the number of reported cases remained relatively stable between 1993 and 1996 and presented reduction of 36% (CDC-Adapted) and 39% (PAHO/Caracas/RIO) between 1996 and 1998.

Figure 1 - AIDS cases per year of diagnosis and AIDS-defining diagnosis criteria - 13 years old and more - State of Sao Paulo



Source: elaborated from BHM/00b (updated: 02/set/00)

The increase of the total cases between 1993 and 1996 is due to the actualization of the reported case by the incorporation of the exceptional cases from the SEADE[4]. Between 1996 and 1998, the reported cases decreased 14%. This reduction is underestimated because of the introduction of the CD4 criteria (less than 350 mm^3) which covers significantly more people with HIV than the CDC-Adapted and PAHO/Caracas/Rio criteria.[5]

[4] The actualization was made for deaths in 1995, 1996 and 1998 and are still in process. According to Table 1, the differences between SEADE and CTR-DST/AIDS-SP data are 166 in 1991, 304 in 1992, 832 in 1993, 907 in 1994, 213 in 1995, 585 in 1996, 1523 in 1997 and 531 in 1998. This deaths, if do not correspond to reported cases without death registration, should be reported as cases and deaths with year of diagnosis equal to the year of death occurrence.

[5] Internationally, CD<200 mm^3 is used to report AIDS; without therapy, the evolution of CD4 from 350 mm^3 to 200 mm^3 takes about 2 to 3 years.

The CD4 criteria began to be used from 1998 on but, due to reporting delays, it is relevant from 1996 on (the reported cases by CD4 criteria raised from 391 in 1995 to 4715 in 1998). The inclusion of the CD4 in the historical series damages the analysis of the reported cases of AIDS evolution. The same phenomenon had happened in 1992, when PAHO/Caracas/Rio was introduced.

3. Reported AIDS cases evolution per transmission category

The transmission categories are just an approximation to identify the behavior and vulnerability of groups in a specific location and period of time. The HIV transmission after the initial AIDS spread is more related with risk behaviors (like unsafe sex, share of syringe etc.) than with the existence of risk groups.

Safe sex practice has nothing to do with sexual preferences and the use of one way syringes (not shared) protects also the drug users. In that way, the vulnerability concept is not related to risk groups but to the behavior of the members of each “group” (divided also in cultural, social and economical categories).

Table 3 shows the total reported AIDS cases per transmission category and year of diagnosis.[6] To relocate the analysis from the AIDS diagnosis period to the HIV infection period it was considered that the AIDS symptoms appear approximately eight years after the infection.[7] To help the analysis of Table 3, besides the maximum points in bold, the year 1993 is in evidence because corresponds to 1985 as the

[6] The analysis of AIDS evolution per transmission category makes use of the total of reported cases under all AIDS-defining diagnosis criteria.
[7] The non-symptom period of eight years (Bartlett/00) can be used for Brazil in 1980-98, when the CDC–Adapted and PAHO/Caracas/Rio criteria were in use.

year of infection, our reference for the dissemination of AIDS in the State of Sao Paulo.

3 – AIDS cases per transmission category – State of Sao Paulo

Year of diagnosis	Year of infection	Homo sexual men	IDU men	Heterosexual		Others*		Total		
				Men	Women	Men	Women	Men	Women **	Total
1980	1972	1	0	0	0	0	0	1	0	1
1981	1973	0	0	0	0	0	0	0	0	0
1982	1974	7	0	1	0	0	0	8	0	8
1983	1975	18	2	1	1	2	0	22	2	24
1984	1976	62	1	2	0	8	3	73	3	76
1985	1977	261	9	6	4	42	6	318	10	328
1986	1978	443	39	15	10	79	12	569	29	598
1987	1979	847	261	66	40	230	49	1336	157	1493
1988	1980	1180	597	131	73	375	139	2138	357	2495
1989	1981	1437	965	234	151	476	162	2917	508	3425
1990	1982	1767	1688	285	257	770	203	4201	769	4970
1991	1983	2042	2280	520	406	903	352	5346	1157	6503
1992	1984	**2274**	2714	732	690	1231	440	6427	1654	8081
1993	1985	1998	**2783**	937	858	1498	584	6731	1927	8658
1994	1986	1905	2537	1047	984	1783	687	6844	2099	8943
1995	1987	1842	2454	1135	1206	2134	915	7165	2521	9686
1996	1988	1813	2480	1356	1527	**2317**	**1012**	**7500**	3005	**10505**
1997	1989	1839	2219	1358	1713	1689	942	6694	**3066**	9760
1998	1990	1702	1587	**1451**	**1878**	1453	795	5871	2995	8866
total	total	21438	22616	9277	9798	14990	6301	64161	20259	84420

Source: elaborated from BHM/00a (updated: 03/jun/00).
* Total 21291 cases: 373 hemophiliacs; 637 blood transfusion; 2333 children; 17946 ignored.
** IDU included.

Despite the fact that reported AIDS cases had increased until 1996, the absolute number of cases among homosexual men has declined since 1993, which corresponds to 1985 as the year of infection. The homosexual men represented the majority of reported cases and deaths at the very beginning of AIDS. In that sense, the reversion of AIDS cases among homosexual men in 1993 seems to reflect the adoption of preventive methods by this category already in 1985 when the disease started to spread.[8]

[8] To study homosexual and bisexual men behavior in Brazil, see PARKER/94.

After the homosexual men, IDU represented the second category of transmission. AIDS among IDU increased during the eighties but the number of cases per year among IDU has begun to decline since 1994, that corresponds to 1986 as the year of infection.[9]

The dissemination of AIDS reached the heterosexuals relatively late and postponed significantly the prevention measures among this category. According to Table 4, between 1980 and 1990, the homosexual men and IDU represented about 88.2% of the total reported cases.[10] The lack of time between HIV infection and AIDS dissemination (and prevention) among heterosexual males and females seems to explain the increase of the number of reported cases of heterosexuals, at least until 1998, which corresponds to 1990 as the year of infection.

4 – AIDS cases per transmission category (%) - State of Sao Paulo

Year of diagnosis	Year of infection	Homosexual men+IDU	Heterosexual		Total
			Men	Women	
1980-90	1972-82	88.2	6.8	4.9	100.0
1991	1983	82.4	9.9	7.7	100.0
1992	1984	77.8	11.4	10.8	100.0
1993	1985	72.7	14.2	13.0	100.0
1994	1986	68.6	16.2	15.2	100.0
1995	1987	64.7	17.1	18.2	100.0
1996	1988	59.8	18.9	21.3	100.0
1997	1989	56.9	19.0	24.0	100.0
1998	1990	49.7	21.9	28.4	100.0

Source: Table 3.

While restricted to homosexual men and IDU, AIDS used to be an almost exclusive male disease. The increase of reported cases of heterosexual was followed by the increase of reported cases among women, fact known as feminization of the disease. It has to be considered that besides being sexual partners of

[9] The IDU practice is the subject of FERNANDES/94.

[10] To calculate this percentage we excluded the ignored causes, hemophiliacs, blood transfusion and children.

heterosexual males, the heterosexual females are also partners of IDU and bisexual men.

The decrease of the absolute number of infections in each transmission category is related to the dissemination period of AIDS cases and deaths among the category. Homosexual men were the first reached category and have seen the number of infected people decrease since 1985; IDU have seen their infected members decrease since 1986. Reported cases of AIDS among heterosexual males and females are still increasing as a consequence of the contamination in the late eighties and, as we expect, must start to decrease in a near future.

It still has to be considered that, although the share of reported AIDS cases in 1998 is more significant among heterosexual males and females than among IDU and homosexual men, the heterosexuals represent the biggest part of the inhabitants of the State of Sao Paulo. There are absolutely more reported AIDS cases in 1998 among heterosexuals than among IDU and homosexual men. But relatively to the total of the population in each category, the incidence (rate, coefficient) of AIDS cases is larger for IDU and homosexual men than for heterosexuals. That occurs because homosexual men and IDU are minority groups in the population.

Besides the tendency of AIDS in became heterosexual, the disease has suffered a change in the process of dissemination, achieving more victims among the poor and spreading in the countryside of the State. Most researches about the development of the disease among the poor have, as reference, school grade and occupation categories of the reported cases. However, the increase of cases among the low-income classes does not mean necessarily bigger AIDS incidence in these classes, if we consider the number of AIDS cases in relation of the population of each class. About the spread of AIDS in the countryside between 1992 and 1994 see Szwarczwald/98. Some

specific studies also analyze the incidence of HIV/AIDS among prostitutes, prisoners, harbor workers, truck drivers etc.

4. Reported AIDS cases per year of birth

To develop the study of reported AIDS cases per year of birth we started with the reported AIDS cases per age group. Table 5 shows the reported cases per age group. The maximum point of reported AIDS cases per year of diagnosis was achieved in 1991 for the 13-19 years old group, 1993 for 20-24 group, 1995 for 25-29 and 1996 for the groups 30 years old and more.[11]

Table 5 – AIDS cases per group age and year of diagnosis
State of Sao Paulo - 1988-98

Year of diagnosis	0-12	13-14	15-19	20-24	25-29	30-34	35-39	40 and more*	Total
1988	101	10	112	371	510	511	365	515	2495
1989	123	8	152	498	756	705	508	675	3425
1990	168	6	199	826	1129	970	711	961	4970
1991	213	**18**	**271**	1005	1432	1412	897	1255	6503
1992	255	11	216	1109	1914	1730	1199	1647	8081
1993	275	13	193	**1171**	2085	1934	1251	1736	8658
1994	296	6	169	995	2066	2105	1467	1839	8943
1995	361	7	141	925	**2299**	2149	1615	2189	9686
1996	**387**	7	130	875	2280	**2600**	**1846**	**2380**	**10505**
1997	343	7	118	827	2064	2403	1698	2300	9760
1998	213	3	108	672	1801	2229	1575	2265	8866

Source: elaborated from BHM/00a (updated: 03/jun/00).
* Included unknown age.

Relocating the year of diagnosis to the year of infection, the maximum points of infection would be in 1983 for the age group between 5 to 11 years old; 1985 for the age group 12-16; 1987 for the group 17-21; and 1988 for the group 22 years old and more at the year of infection.

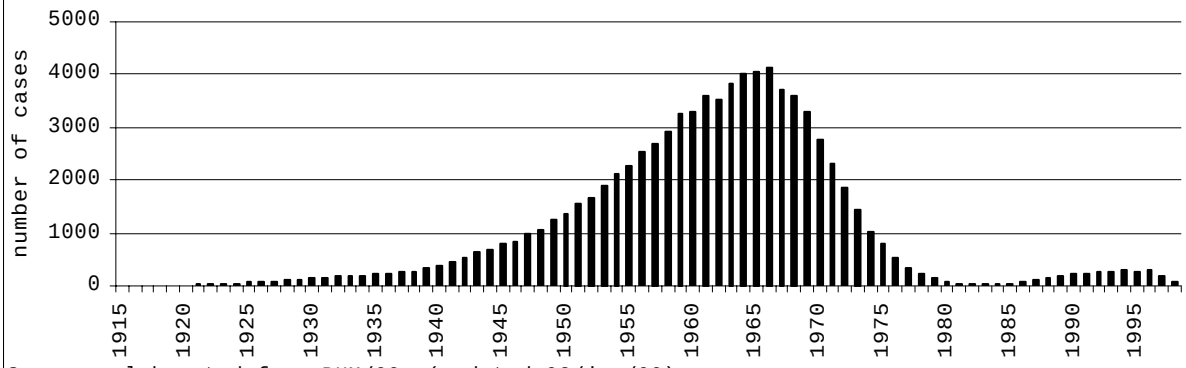
The analysis of AIDS cases per age group and year of diagnosis (or infection) shows the continuous movement of AIDS

[11] The relative share of each age group and the incidence coefficient of reported cases per 100 thousand inhabitants, according to diagnosis year, show the same results.

incidence from inferior to superior age groups. To clarify this movement we distributed the reported cases according to the year of birth.

Figure 2 shows the reported cases between 1980 and 1998 per year of birth. The median for the year of birth is 1962, while 66% of the total AIDS cases were born between 1955-71. The analysis of Figure 2 suggests that AIDS incidence in the State of Sao Paulo is related to the generation born between 1955 and 1971, that was 14 to 30 years old in 1985 and, as time goes, migrates to higher age groups.

Figure 2 - AIDS cases per year of birth - State of Sao Paulo - 1980-98



Source: elaborated from BHM/00a (updated:03/jun/00).

5. Final considerations

This research reveals that AIDS cases are concentrated in the generation who was born between 1955 and 1971 and was 14 to 30 years old in 1985 when AIDS spread in the State of Sao Paulo. The generation born between 1945 and 1954 had lived the golden years after World War II and is known as the generation that introduced significant cultural changes. From the rebel youth to the Woodstock hippies, through the anti-Vietnam movements and the May barricades in Paris 1968, the rebels with or without a cause had dreamed together with demi-gods like Che Guevara and James Dean. These sons of Marx and Coca-Cola, as the film director Jean-Luc Godard use to say,

prepared the way to a world full of sex, drugs and rock'n roll for the next generation, which was born between 1955 and 1971.

In 1985, the year of the AIDS dissemination in the State of Sao Paulo, the generation born between 1955 and 1971 achieved the age of 14 to 30 years old. This generation, which didn't trust anybody older than 30 years old, lived the so-called free love, including heterosexual and increasing homosexual practices. The pill and other contraceptive methods, as substitutes for condoms, were been used while Milton Nascimento was singing "each way of love worth love".[12] The use of narcotics also became popular among this generation.

Although the recent changes in the relative shares under category of transmission (relative increase of reported cases among heterosexual men and women), it is worth to mention that sex (homo, bi or hetero) and drugs are almost the exclusive transmission causes. It also has to be considered that the culture of "sex, drugs and rock'n roll", identified as a typical "middle class culture", reached the society as an all, including the low-income classes which is suffering the pauperism process of AIDS.

AIDS deaths per year of occurrence and reported cases and deaths per year of diagnosis are decreasing in the State of Sao Paulo. Considering the medium lack of eight years between infection and AIDS, the decrease of AIDS cases in the State is related to a reduction of the number of infections which, for the homosexual men and IDU, had already begun in 1985-86. It reflects the prevention measures by the time of AIDS dissemination and announcement of reported cases and deaths. In that sense, the catastrophic projections in the middle of the eighties about AIDS growth, even if not verified, were useful to restrain the increasing of contamination and,

[12] From the original in Portuguese: "qualquer maneira de amor vale amar".

probably, had contributed to the non confirmation of the catastrophic prognosis.

The homosexual men and the IDU were the first categories reached by AIDS, the firsts who adopted preventive measures and the firsts to presents a decrease of the absolute number of infected (1985-86) and reported cases (1993-94). The late proliferation of AIDS among heterosexual male and female delayed the use of protective methods in this category.

The number of AIDS deaths is declining today in both male and female populations in the State of Sao Paulo. The absolute number of heterosexual reported cases can also be on the way of reduction. As in 1998 were been reported AIDS cases infected before 1990, we can expect, and so we do, that the AIDS cases among heterosexuals, men and women, in Sao Paulo is in process of deceleration. Under the view of public health, however, it is important to consider that the generation born between 1955 and 1971 has been contaminated, acquired and probably still conserves cultural habits that make them still a vulnerable generation.

The generation born after 1971 was 13 in 1985 and achieved the age of 26 in 1998. According to a research of the Brazilian Health Ministry in 1998 (2000c), 66.4% of the young people between 16 and 25 years old were sexually active in the last 12 months (88.5% of the adults between 26 and 40 years old were sexually active). Among the sexually active population in the last 12 months, the condom was used by 44% of the young people and only by 24% of the adults from 26 to 40. Excluding couples without other eventual sex relations, the use of condom increases to 60% among the young’s and to 41% among the adults. The behavior of this new generation is probably contributing to the recently observed reduction of AIDS reported cases and deaths in the State of Sao Paulo.

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