Trend incidence of HIV-AIDS according to different diagnostic criteria in Campinas-SP, Brazil from 1980 to 2016

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Abstract *The objective of this study was to analyze the temporal trend of the incidence coefficients of HIV-AIDS infection via a retrospective ecological study and segmented regression in individuals older than 13 year reported at SINAN between 1980 and 2016. Of the 14,204 reported cases, 70.9% were male and 39.5% were white. The AIDS criterion presented growing incidence from 1986 to 1996 with Annual Percentual Change (APC) of 108.5% per year between 1983 and 1989 (CI: 90.3 – 128.4), between 1989 and 1998 the APC was 13.2% (CI: 8.2 – 18.3) and APC reduction in the period from 1998 to 2016, -6.2% (CI: -7.4 – -4.9). High coefficients of the death criteria between 1988 and 2002 (4.7/100,000 inhabitants), with a noticeable decrease after 1995. The growth of the HIV+ criteria from 2000 onward was observed, reaching 30.2 cases per 100,000 inhabitants in 2016. Although incidence rates still remain high in the municipality, these trends are consistent with the positive impact of early detection policies and access to clinical and therapeutic follow-up of individuals with HIV and AIDS in Campinas.*
Key words *Incidence, AIDS, HIV, Disease Notification, Health Information Systems*

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Introduction

AIDS is a disease of compulsory notification in Brazil since 1986 – although in a decentralized way –, being systematically registered in the Information System of Notifiable Diseases (SINAN – MS Ordinance No. 542, 1986) with changes in the notification codes of the disease over time . As of March 31, 2003, AIDS cases were considered based on the criteria of Centers for Disease Control (CDC) (code 100), CDC/Laboratory (code 200), Rio de Janeiro (RJ)/Caracas (code 300), CDC + CDC Laboratory (code 120), CDC + RJ/Caracas (code 130), CDC/Laboratory + RJ/Caracas (code 140), CDC + CDC/Laboratory + RJ/Caracas (code 123), Exceptional CDC (code 400), AIDS Related Complex (ARC) + Death (code 500), Death (code 600)[1,2].

From this date on, the main criteria were reviewed, keeping the RJ/Caracas criterion and introducing adaptations and adjustments to the Modified CDC criterion, being denominated as Adapted CDC. Regarding the other criteria, ARC + Death and Exceptional CDC were excluded; the Death criterion was kept and included not only the mention of AIDS and its related terms in some field of the Declaration of Death (DD), but also the mention of HIV infection or similar terms. Such variables are filled in SINAN according to the criteria described above, following a hierarchy in order of importance (from highest to lowest): 100, 300, 600 and 901. The categories 200, 120, 140, 123, 400 and 500 were excluded from the version 5.0 of SINAN, maintaining change and hierarchy criteria of the cases[1].

Since the 1990s, the state of São Paulo has demonstrated the intention to work with the notification of asymptomatic carriers of HIV, understanding that the epidemiological profile of these individuals represents a more recent pattern than AIDS cases. In 1994, the State STD/AIDS Program proposed the voluntary notification of HIV cases in São Paulo via the Asymptomatic Seropositive Information System (SIHIV)[3]. From 2000 on, the SINAN was used as an instrument for data transmission, and the adoption of this measure was different among municipalities[4], which led to estimates of the number of HIV infections, AIDS cases and deaths. These data enable the spatial-temporal monitoring of the disease in the country and the identification of regional inequalities in the incidence and mortality associated with AIDS.

Surveillance of the disease in Brazil includes the identification of the possibility of crossing databases (*Reck-link*). In addition to SINAN data, data obtained from the Mortality Information System (SIM), the Laboratory Testing System of the Brazilian Network of CD4+/CD8+ Lymphocyte Count and HIV Viral Load (SISCEL) System of Logistic Control of Medications (SICLOM), which are specific systems for the control of screenings and medicines in people living with HIV/AIDS (PLWHA). These systems have been used to analyze sociodemographic, behavioral, epidemiological and health services use variables, also allowing the monitoring of determining factors of the infection and its dissemination potential in specific population groups; thus, subsidizing prevention and control actions[5,6].

Studies have shown that the early diagnosis of HIV infection, prophylactic measures, clinical follow-up, and adherence to antiretroviral therapy has direct influence on patient survival[7,8]. On the other hand, HIV incidence coefficients in Brazil remain high over the last decade[9,10].

The epidemiological profile of HIV infection and AIDS has changed over the decades in Brazil (it is no longer concentrated in large urban areas, migrating to the countryside), with a decrease in mortality coefficients and a growth in case detection – although with distinct regional differences. Changes in the trend of the epidemic were observed at the end of the 2000s, considering the new Brazilian welfare policies[11].

Campinas is a large city in the countryside of the state of São Paulo, having the second highest prevalence of HIV/AIDS in the state in 2017[12]. The city has the DST-AIDS Municipal Program implemented since 1993, and, paired with the AIDS reference center of the University Hospital of Universidade de Campinas (Unicamp), care for approximately 80% of the municipality's demand. The municipal Program has implemented several actions for the prevention and early detection of HIV in recent decades, and a surveillance system that has been in place since the epidemic began[13], prioritizing educational, preventive and welfare actions in a decentralized, integrated and humanized manner, in partnership with civil society.

This study analyzed the incidence coefficients of HIV and AIDS to observe the progression of the disease in the context of the city of Campinas to prevent problems such as: increase in the number of cases, co-infections and failures in prevention, treatment and follow-up. The objective of this study is to analyze the temporal trend of the incidence coefficients of HIV infection and AIDS in individuals over 13 years of age in Cam-

pinas from 1980 to 2016, according to the notification criteria adopted by the Brazilian Ministry of Health (MS), HIV infection , AIDS and death, and sociodemographic and epidemiological variables.

Method

The total number of cases recorded in SINAN from 1980 to 2016 provided by the Department of Health Surveillance (DEVISA) of the city of Campinas were studied. This is an ecological study of the temporal trend of AIDS incidence coefficients per 100 thousand inhabitants in individuals over 13 years of age in Campinas. The estimated population of Campinas is 1,100,000 inhabitants. The city is located in the northeast of the state of São Paulo, and is an industrial, technological center and medical-hospital reference center of the region.

The inclusion criteria used for the study were individuals older than 13 years and living in the municipality of Campinas. The following variables were analyzed in the epidemiological notification form: sex (*male and female*); race/self-declared skin color (*white, black, yellow, brown, indigenous and ignored*); schooling in years of completed studies (*none, 1 to 3, 4 to 7, 8 to 11, 12 or more and ignored*); sexual practices (*men who have sex with men (MSM), women who have sex with women (WSW), heterosexual, bisexual, does not apply and ignored*); exposure to blood (*yes, no and ignored*) and diagnostic criterion (*AIDS, death and HIV+*).

Step 1: Calculation of population estimates for the 2013 to 2016 period

For the years of 2013 to 2016 the population estimates were calculated by adopting arithmetic growth, since this datum was not included in official Brazilian databases.

The population was considered to have evolved according to a constant growth by unit of time over the period between two official censuses (year to year, the growth is constant). For such, the mean of the populations between the two censuses was evidenced by the Mean Annual Growth (MAG) ($P_1 - P_0 / t_1 - t_0$, where: t_0 = year of the 1st census; t_1 = year of the 2nd census; P_0 = population of the 1st census; P_1 = population of the 2nd census). Assuming the constancy of this annual growth, to estimate a given population P_x in a year t_x, we used the expression (P_x =

$P_0 + [MAG (t_x - t_0)]$) (where $t_x - t_0$ = elapsed time between the date of the 1st census and the year intended to know the population)[14].

The population for the middle of the year must be known for the calculation of the coefficients, i.e., July 1st, but the census is given to September 1st. Therefore, to know the relative population of each year without the information, it was assumed that the MAG is constant, and the Mean Monthly Growth (MMG) was adopted – which is also constant – and the time unit (month) will be 1/12 of the MAG, i.e., MAG /12. To obtain the population of July 1, the following expression is used: $[P_{1/July/year} = P_{1/Sept. /year} - (2 \times MMG)]$ (where P = population)[14].

Step 2: Estimates of annual percentage variation

For the applicability of the proposed method, tests were conducted to determine if the incidence data during the time series studied had a presumption of reliability for the use of segmented regression. The following were verified: 1st) the homoscedasticity (to designate constant variance of the incidences for different temporal observations); 2nd) the autocorrelation (when there is no relation between values ordered according to time or space); 3rd) the normality of the residuals of the most suitable models for the adjustments (when the data follow normal distribution). The software Stata 11 was used for these analyses.

Annual Percentual Change (APC) was estimated, which shows positive or negative variations of the incidence during a time series via a segmented regression (SR), checking important points of change. Successive segments of the line are connected by these points of change. The number of points required to adjust each segment was automatically selected by the default setting (without the logarithmic transformation of the response variable) of the Joinpoint Regression Program version 4.5.0.1, provided by the United States National Cancer Institute[15,16]. 95% confidence intervals were calculated for APC.

The software uses trend data that fits into a simpler joinpoint model than the data from a normal incidence graph, allowing one to test whether an apparent in the trend is statistically significant. The significance tests use a Monte Carlo Permutation method, which can incorporate estimated variation for each point or use a Poisson variation model. Furthermore, the models can also be linear in the response log, which allows the calculation of APC[17].

The annual percentage changes obtained in the segmented regression (Joinpoint Regression) with the respective 95% confidence intervals and chi-square test with Yates' correction (considering 5% of significance for the statistical tests) were estimated.

Case incidence curves by the criterion of death and HIV infection were not analyzed by Joinpoint Regression because they did not meet the criteria of homoscedasticity and normality.

Step 3: Analysis of incidence coefficients

The codes 100, 200, 300, 120, 130, 140, 123 and 400 (AIDS definition criteria), code 600 (death) and code 901 (HIV+) were analyzed for comparison between the notification codes. All cases in individuals older than 13 years recorded with any disease code were considered for the AIDS criterion[18].

The detection coefficients of new cases or incidence coefficients were calculated using cases reported according to each diagnostic criterion ("AIDS", "HIV" and "death") as numerator and the populations of the censuses years and respective population estimates as denominators for every 100 thousand inhabitants.

Data were presented as tables and graphs with the trends of the incidence coefficients, with smoothing by moving averages (SMA), where each observation in the smoothed series represents the average of three adjacent points of the original series. This analysis removes random variations and shows the components of trend and cycle by weighting all past observations equally. For this, the software Excel 2013 for Windows was used.

The percentage distribution of notifications according to variables of interest and diagnostic criteria were not compared due to the high number of "ignored" categories in some variables. Since these values were high, a comparative analysis was unfeasible.

The project was approved by the Research Ethics Committee in Human Beings, Medical Sciences College, Unicamp.

Results

In Campinas, from 1980 to 2016, 14,204 cases of HIV/AIDS were reported in individuals over 13 years among all notification criteria, which is equivalent to 5.5% of cases reported in the state of São Paulo during the same period (n =

258,696) according to the 2016 Epidemiological Bulletin – AIDS and STD[2], with 76.6% cases of AIDS (all criteria) (n = 10,876).

Table 1 shows the percentage distribution of HIV/AIDS cases according to the disease notification criteria and sociodemographic and epidemiological variables. When comparing the distribution of notifications between genders, it was found that the highest proportion of cases is the AIDS criterion, with 76.4% among women and 77.1% among men. The mean age among men was 35.2 years and the median age was 33.8 years, among women was 35.1 years and 33.3 years, respectively. Data not shown in the table.

The concentration of cases is higher in the white race/skin color (39.5%), considering all the diagnostic criteria, with schooling between four and seven years (13.7%). Regarding the age groups, most are individuals between 30 to 39 years (38.9%). Regarding sexual practice, 58.1% were reported as heterosexual and 20.9% as MSM, of whom, 58.0% and 21.2% were reported with AIDS (all criteria), respectively. Regarding exposure to the virus via blood (considering injected drugs use (IDU), hemophilia history, blood transfusion and accident with biological material), 19.1% of the individuals presented this record (Table 1).

In the comparison of the incidence coefficients between sex and the diagnostic criteria in Campinas, there is an increase in the incidence of AIDS (all criteria) per 100 thousand inhabitants from 1986 to 1996 (Figure 1A). We can highlight high death coefficients, particularly between 1988 and 2002, reaching 4.7 cases reported by this criterion per 100,000 inhabitants, with a considerable drop after 1995, as evidenced by the decreasing trend of the smoothed curve (Figure 1B). The HIV+ notification criterion presents a considerable increase starting from the year 2000 – evidenced by the smoothed curve –, reaching 30.2 per 100 thousand inhabitants at the end of the period (Figure 1C).

For the 1983 to 1989 period, a significant growth in AIDS incidence coefficients occurred, as well as a large annual percentage variation of 108.5% per year (CI: 90.3 – 128.4), whereas in the following period the annual growth was lower, at 13.2% per year (CI: 8.2 – 18.3). For the 1998 to 2016 period, there was a reduction in incidence, with annual percentage variation of -6.2% per year (CI: -7.4 – -4.9) (Table 2).

The segmented regression considered more adequate to adjust the incidence coefficients in the AIDS notification criterion in individuals ol-

Table 1. Percentage of HIV/AIDS cases in patients older than 13 years according to diagnostic criteria, and sociodemographic and epidemiological variables in Campinas-SP, Brazil, 1980-2016.

		AIDS		Death		HIV+		Total***		p-value*
		N	%	N	%	N	%	N	%	
Gender	Female	3,185	29.3	54	19.0	891	29.3	4,132	29.1	0.001
	Male	7,691	70.7	230	81.0	2,151	70.7	10,072	70.9	
Race/skin color	White	3,970	36.5	9	3.2	1,634	53.6	5,613	39.5	0.000
	Black	563	5.2	2	0.7	282	9.3	2,847	6.0	
	Yellow	24	0.2	-	-	19	0.6	43	0.3	
	Brown	1,454	13.4	5	1.8	805	26.5	2,264	15.9	
	Indigenous	3	0.0	-	-	6	0.2	9	0.1	
	Ignored	4,862	44.7	268	94.4	298	9.8	5,428	38.2	
Schooling (in completed school years)	None	360	3.3	1	0.4	94	3.1	455	3.2	0.000
	1 to 3	1,541	14.2	12	4.2	101	3.3	1,654	11.6	
	4 to 7	1,480	13.6	3	1.1	460	15.1	1,943	13.7	
	8 to 11	1,244	11.4	3	1.1	398	13.1	1,644	11.6	
	12 or more	784	7.2	7	2.5	296	9.7	1,086	7.6	
	Ignored	5,469	50.3	258	90.8	1,695	55.7	7,422	52.3	
Age group (years)	13 to 19	194	1.8	4	1.4	136	4.5	334	2.3	0.000
	20 to 29	2,903	26.7	80	28.2	1,212	39.8	4,194	29.4	
	30 to 39	4,407	40.5	102	35.9	1,033	34.0	5,542	38.9	
	40 to 49	2,271	20.9	56	19.7	401	13.2	2,728	19.2	
	50 to 59	787	7.2	19	6.7	188	6.2	994	7.0	
	60 or older	266	2.4	8	2.8	65	2.1	339	2.4	
	Without DOB	49	0.5	15	5.3	9	0.2	73	0.5	
Sexual practice	MSM****	2,307	21.2	56	19.7	615	20.2	2,978	20.9	0.000
	WSW****	25	0.2	2	0.7	5	0.2	32	0.2	
	Heterosexual	6,311	58.0	171	60.2	1,792	58.9	8,274	58.1	
	Bisexual	875	8.0	22	7.7	250	8.2	1,147	8.1	
	Not applicable	147	1.4	3	1.1	29	0.9	179	1.3	
	Ignored	1,211	11.1	30	10.6	353	11.6	1,594	11.2	
Exposure to blood**	Yes	2,497	23.0	21	7.4	196	6.3	2,714	19,1	0.000
	No	3,972	36.5	10	3.5	1,996	65.6	5,977	42.0	
	Ignored	4,408	40.5	253	89.1	852	28.0	5,513	38.7	
Total***		10,876	100.0	284	100.0	3,044	100.0	14,204	100.0	

*p-value obtained from the Chi-Square Test with Yates correction and Fisher's exact test, without the Discarded criterion. The Chi-Square Test did not consider variables with zero and not informed. **We considered as exposure to blood: IDU, hemophilia history, blood transfusion and accident with biological material. ***All percentages are related to the corresponding values of each column of the variables. ****MSM (men who have sex with men), WSW (women who have sex with women).

der than 13 years in Campinas was the one with three points of change in the years 1983, 1991 and 1998, i.e., four segments of the line were sufficient to represent the coefficient trend in the 1980 to 2016 period (Figure 2).

Discussion

The trend of the AIDS incidence coefficients (all criteria) presented three points of change during the studied period, with a great increase in risk in the 1983-1989 period; decrease in incidence from 1998 on; and reversal of the trend to a downward one after 1999 until 2016.

The notifications by death criterion presented a delimited period of high incidence between 1988 and 2002, and the records of HIV infection per 100 thousand inhabitants continuously grew in Campinas since 1993, being higher among men. The changes adopted in the notification criteria over the studied period had no implica-
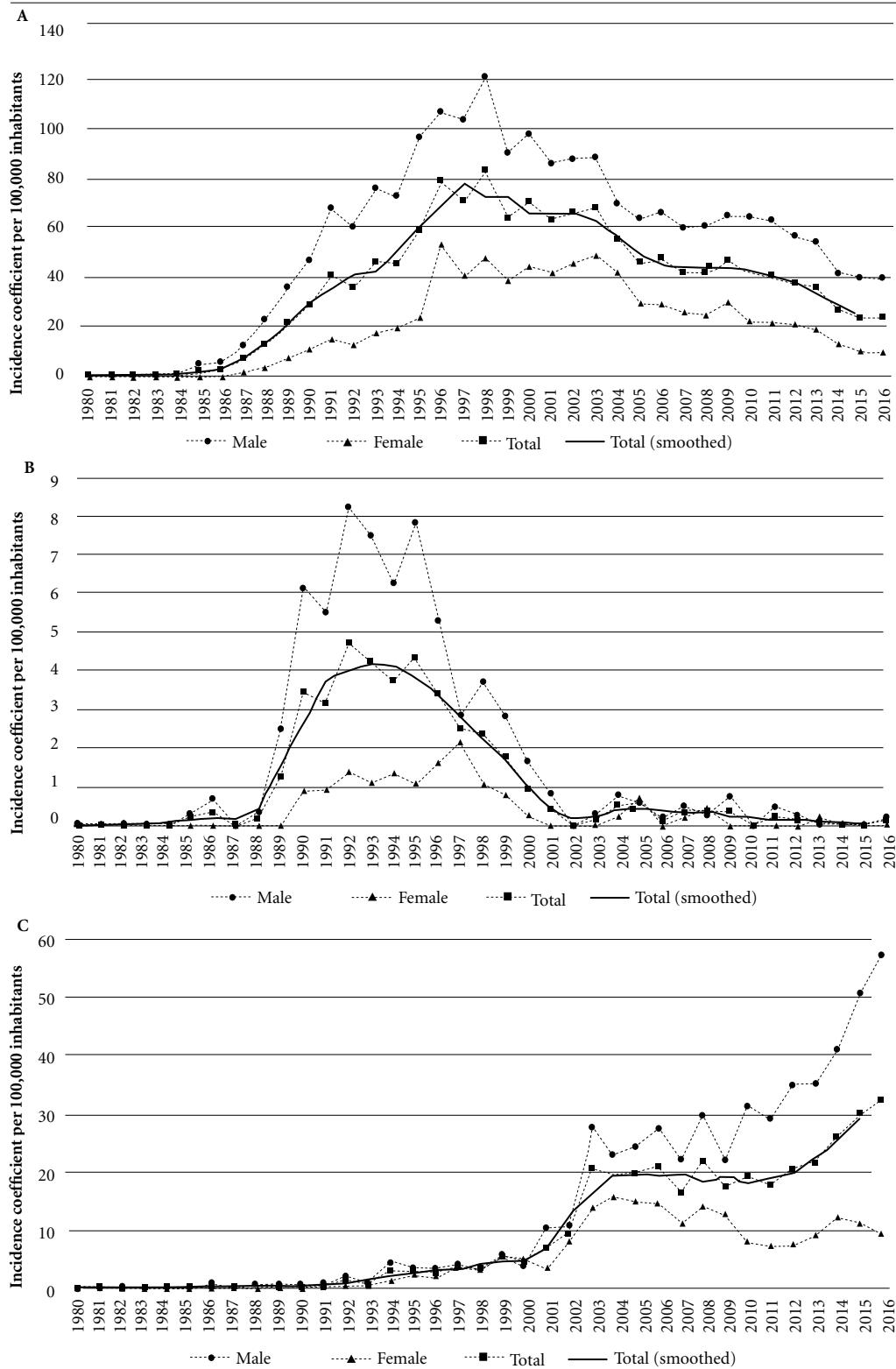
Figure 1. Incidence coefficients (per 100,000 inhabitants) associated with AIDS (ICD 10: B.20 to B.24) in individuals older than 13 years according to AIDS diagnosis (all criteria) (A), Death (B), and HIV+ (C) and sex (The total number of notifications presents a smoothed series by three-point moving averages). Campinas-SP, Brazil, 1980-2016.

tions for the temporal analysis presented since they simplified the definitions of infection and disease[1,2].

The decrease in the growth of the AIDS incidence rate in the 1990s coincides with the implementation in Campinas of the Municipal STD/AIDS Outpatient Clinic in 1990, of the Municipal Program of Sexually Transmitted Diseases and AIDS, and of the first Center for Orientation and Serological Support, both in 1993[13]. These centers oversaw the health care, as well as of the actions of prevention, HIV testing and counseling, as recommended by the Brazilian Ministry of Health.

The drop in incidence coefficients from 1998 onwards may have been a reflection of the actions of the STD-AIDS Program, of the early diagnosis and of the provision of combined antiretroviral therapy to patients with AIDS. The Reference Center (RC) on Sexually Transmitted Infections (STIs)/AIDS was created in 2002, combining the outpatient clinic, the counseling center and therapeutic home care that existed since 1996.

Free and universal access to antiretroviral treatment in the Brazilian Unified Health System (SUS), associated with technical recommendations and protocols (1996 Law No 9,313 on the free distribution of drugs to HIV-infected individuals and AIDS patients) were strategies of the Ministry of Health that had direct influence on the incidence of and mortality by AIDS in several regions of Brazil[10]. The increase in the percentage of patients with undetectable or reduced viral load possibly had an impact on the reduction of new cases[19]. In this perspective, this public policy contributes to reduce health inequalities, not only in Campinas[20].

Different epidemiological patterns are observed in the three periods identified by the Joinpoint Regression analysis. Over the whole analyzed period, most cases occurred in men;

Table 2. Annual percentage variation of the AIDS incidence coefficients (criterion 100) obtained by Joinpoint Regression. Campinas-SP, Brazil, 1980 to 2016.
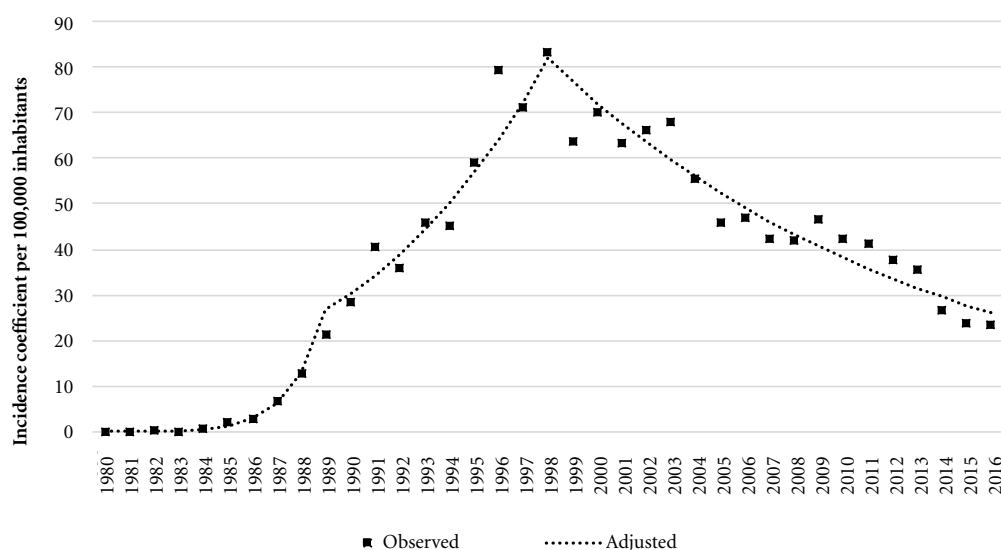
Period	APC* (%)	CI(95%)
1980 to 1983	17.7	-4.0 – 44.3
1983 to 1989	108.5	90.3 – 128.4
1989 to 1998	13.2	8.2 – 18.3
1998 to 2016	-6.2	-7.4 – -4.9

*APC: Annual Percentual Change, $p < 0.05$.

Figure 2. Incidence coefficients per 100,000 inhabitants in patients older than 13 years associated with AIDS (ICD 10: B.20 to B.24 – all criteria) according to year of diagnosis, obtained by Jointpoint Regression. Campinas-SP, Brazil, 1980-2016.

however, the HIV test was incorporated into the prenatal care routine, suggesting a greater opportunity for detection in the female population. The detection rate of new cases declined gradually during the 1990s, despite an increase in the absolute number of cases up to 1998 and changes in the sociodemographic profile of the epidemic. The decrease observed at the end of the studied series may not reflect the real incidence due to the possible inclusion of new cases inserted in the official databases via feedback[21].

The increase in notification rates of HIV patients in Campinas was noticeable since 1993, with the highest increase from 2000 onwards. The implantation of the Municipal Program in 1993 and of the STI-AIDS RC anticipated the strategy of the Ministry of Health, which instituted compulsory notification of HIV patients in 2014 (MS Ordinance No 1,271, 2014). Until then, the notification was conducted only in the monitoring services of attention to sexually transmitted infections and AIDS.

The increase in the HIV infection notifications is difficult to interpret because of changes in the availability of tests, in the willingness of both health professionals and individuals to be tested, in the organization of specific campaigns, as well as the differences between the notification systems adopted by the state of São Paulo and the Federal Ministry of Health. The representativeness of these rates changes given the long period elapsed from latency to immunodepression. However, studies in Brazil and other countries draw attention to the growth of HIV infection rates among MSM and vulnerable populations[9,21]. We must stress the importance on ensuring access not only to treatment, but also to prevention.

On the other hand, an increase in AIDS incidence by the death criterion occurred in the municipality from 1989 to 2001, peaking in the early 1990s and sharply dropping from 1996 on in men and 1997 on in women. This is an indicator that radically reveals the delay in the diagnosis and the silent nature of the epidemic, since the infection was notified from death. The drop in these rates was probably due to the increasing access of the population to the services of prevention, care and early detection of HIV infection in the municipality; thus, increasing the patients' survival chances, even of those diagnosed in the stage of intense immunodepression[14].

These aspects are strongly related to the reduction of the notification of cases with the death criterion, since from the detection, follow-up and

treatment of the disease, new cases started to be discovered early and with a better prognosis than in previous times[22].

The inclusion of the HIV testing in prenatal care (MS Ordinance no. 2,104, 2002) increased the early diagnosis of individuals with HIV, resulting in the investigation of partners and family members, as well as the prevention of vertical transmission. At the same time, prenatal and childbirth care are a viable form of obtaining estimates of the prevalence of HIV infection in the population of healthy and sexually active women, serving – although with some restrictions –, as monitoring indicators of infection in developing countries[23,24].

The reduction in the "death" notification criterion and growth in the notification rates of HIV infection suggest that people have earlier access to diagnosis. On the other hand, the Ministry of Health provides the rapid HIV test and promotes testing campaigns in partnership with states, municipalities and the civil society[25].

The fact that the number of confirmed cases of HIV is lower among MSM than among heterosexuals in Campinas reflects the retraction of the epidemic in the MSM population, which was the majority among the cases of disease at the beginning of the epidemic, but its proportional participation was progressively reduced and has shown a new increase in recent years, a fact that finds parallels in the Brazilian and international medical literature. Recent data on Brazil's epidemic show an increase in the incidence of HIV in men, MSM, with low schooling, and poor adherence to medication[26,27]. Similar growth has also been observed in other countries[28,29]. In Switzerland, the increase in HIV transmission among MSM reflected ignorance of their infection status and continuous risky sexual behavior (CRSB)[30].

In spite of information access campaigns, the lack of concern about the infection, the idea that AIDS is a treatable disease and CRSB are issues to be resumed in specific educational activities[31]. A national study conducted in 2008-2009 with MSM residing in ten Brazilian cities found that the number of individuals with little knowledge about HIV/AIDS and high social vulnerability is still high[32].

The expansion of testing strategies and the early treatment of individuals with HIV can reduce the incidence of the disease in the population[33]. Since 2013, the Brazilian Ministry of Health has adopted the antiretroviral treatment for all individuals diagnosed with HIV infection as a national guideline[34]. We can highlight

the World Health Organization's (WHO) "Second Generation Surveillance for HIV" proposal, which, in addition to HIV infection, stresses the importance of anticipating the diagnosis of the occurrence of the disease, identifying groups of people with behaviors that expose them to HIV infection[35].

The segmented regression technique identified significant points of change in the trend of AIDS detection in this study, since it estimated the annual percentage change. The smoothing by moving averages served to complement this technique and revealed the behavior of incidence according to the notification criteria and possible points of change in the time series more clearly, since SR identified these points, as well as estimated the increments in each segment of the line[36]. Although these points of change do not always correspond to the real points of variation[36], these techniques can be incorporated into the analyses of the epidemiological data of health services in Brazil since they provide a broader visualization of how the incidences behaved in the studied historical series.

Among the limitations of this study, we can highlight the use of secondary data and the large percentage of missing information ("ignored" category), particularly, as expected, among the cases reported with the "death" criterion and the variable "exposure to blood", making it difficult to study the profile of these patients in the various periods of the epidemic in the municipality. Ignored data regarding schooling are in much greater numbers than expected, indicating that PLWHA are still being monitored by the health network and this is not included in their records.

On the other hand, the coverage of AIDS cases records in SINAN has grown and improved in reporting quality over the last decade. The cases of AIDS with death criterion after the initial notification are reviewed in the State System of Data Analysis Foundation (Seade), São Paulo, reducing inaccuracies and providing feedback to the Information System of Mortality (SIM) in the state. The change in the case notification system in 2003 made it difficult to reconcile the variables among the information systems, decreasing from nine to three diagnostic criteria for AIDS. As previously mentioned, the health care characteristics are different among the cities of the state of São Paulo, and such changes can be searched to level them with the State Department of Health.

Despite these limitations, all reported and investigated cases of AIDS and HIV in Campinas were analyzed, covering the various periods of the epidemic. In conclusion, the results show a consistent decline in AIDS incidence (CDC criterion) – as well as by the death criterion –, in addition to an increase in reports of HIV infection in Campinas during the studied period. Although the incidence coefficients still remain high in the municipality, these trends are consistent with the positive impact of the policies of early detection and of access to clinical and therapeutic follow-up of individuals with HIV and AIDS in Campinas.

The development of actions and strategies to improve the quality of the data on information systems and the implications for improving the monitoring and evaluation of the characterization of HIV/AIDS cases is crucial to achieve more effective public policies for coping with the infection/disease.

Collaborations

MC Melo participated in the study design, analysis of data, review of the text, discussion of results and writing of the manuscript. MR Donalísio participated in the study design, collection and analysis of data, review of the text, discussion of results and writing of the manuscript. VC Almeida participated in the analysis of data, review of the text, discussion of results and writing of the manuscript.

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