MINISTRY OF HEALTH
BRAZIL

Health Surveillance Epidemiological situation of Hansen's disease in Brazil

2008

THE CURRENT HANSEN'S DISEASE SITUATION IN BRAZIL

Hansen's disease (HD) control is based on the early diagnosis of cases, its treatment, and cure, aiming at eliminating sources of infection and preventing sequels. The public health aim of Coordination of the National Hansen's Disease Control Program (PNCH/MoH/Brazil) is to control the disease and, for this purpose, it gives priority to monitor its epidemiological aspects through the detection rate of new cases. In addition, we will present data per 100,000 population to facilitate comparisons with other diseases.

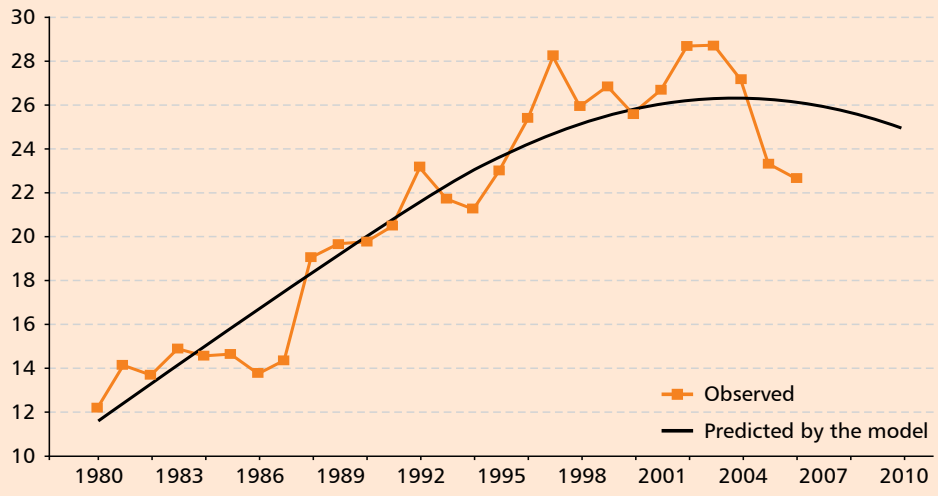
HANSEN'S DISEASE TRENDS*

To better understand the evolution of HD in Brazil, the PNCH carried out trend studies based on detection rate of new cases. This rate is influenced mainly by the actual incidence and by the diagnostic performance of the health services Ministry of Health. Also, the relation between detection and actual incidence comprises the hidden prevalence, which is directly associated with the intensity of transmission of the disease. Reducing the transmission of HD presupposes reducing the hidden prevalence by detecting the disease as early as possible, so that its duration is reduced before it is diagnosed. From an operational perspective, epidemiological surveillance systems vary in their capacity to monitor and control diseases. In the last two decades, this capacity has varied in Brazil. Long historical data series, such as the one that is currently available for detection rate of new cases, are necessary to infer the indicator trend. The statistical adjustment of the historical series is intended to capture the indicator trend, considering the variations as random. Apart from the trend description, the adjustment of models allows for figures to be predicted by extrapolation for coming years, assuming that there won't be any changes in the detection rate behavior in relation to the past. Based on these considerations, the trend for Hansen's disease detection rate was studied from 1980 to 2006 by region and by state, in the total population and in children under 15 (1994-2007), and figures for the 2008-2010 period were predicted. The historical series of new detected cases was adjusted to a parabolic time function

Note: *Data from SINAN up to 2006

(second-degree polynomial) and also to a linear function through negative binomial regression, with the logarithm as the link function and the population logarithm as the offset variable, using the Stata program, version 9. The results obtained are shown in GRAPHS 1 and 2, as well as in FIGURE 1.

GRAPH 1 – Trend of HD detection rate per 100,000 population, observed and predicted figures, Brazil, 1980 – 2010.



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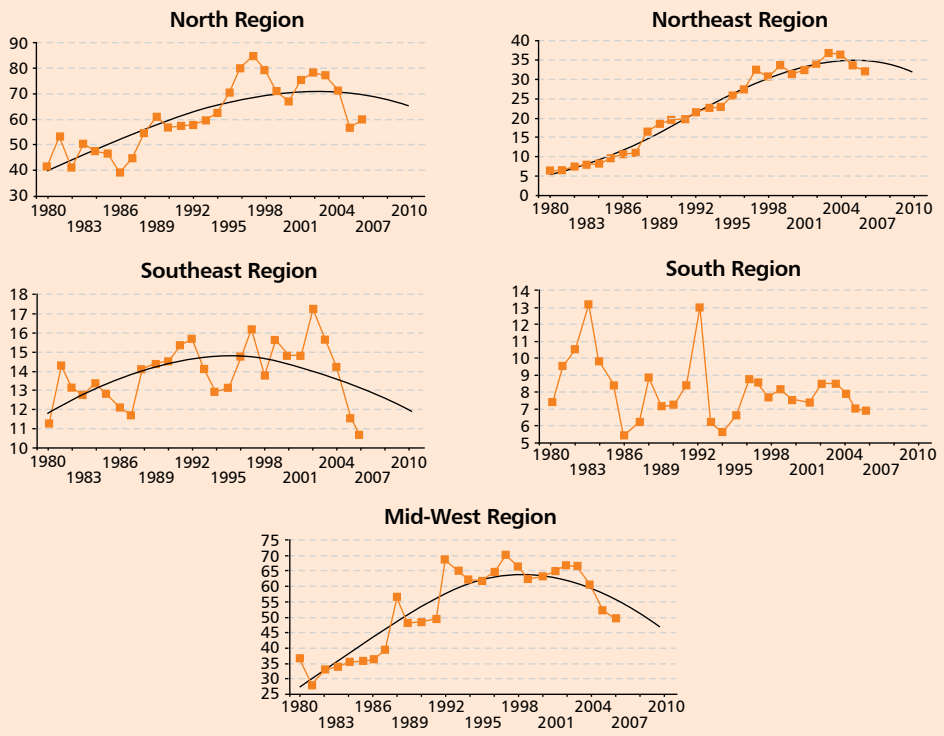
Many Brazilian states experienced, during the 1980s and 1990s, a rising new case detection rate in the total population. The adjustment of the historical series to a parabolic function can capture a reduction in the rate of increase of the detection rate over time and even changes in the direction of the variable over time, that is, its transition from higher to lower levels. Most of the historical series was adjusted to the parabolic model, with an increase in the detection rate followed by stabilization and drop. The moment of change from higher to lower levels was observed earlier in the state of Santa Catarina (South) and later in some northeastern states. More detailed spatial analyses and correlations with social indicators, such as those related to population migrations, can contribute toward clarifying the evolution behavior of Hansen's disease detection rate over time both in Santa Catarina state and in the other states covered by the study.

Despite reduction in detection of new cases, even in the most endemic areas – Northern, Northeast and Midwestern – it must be pointed out that it is still high.

FIGURE 1 – Graphs showing the trend of HD Detection rate per 100,000 population, observed and predicted figures, Brazilian regions, 1980 – 2010.



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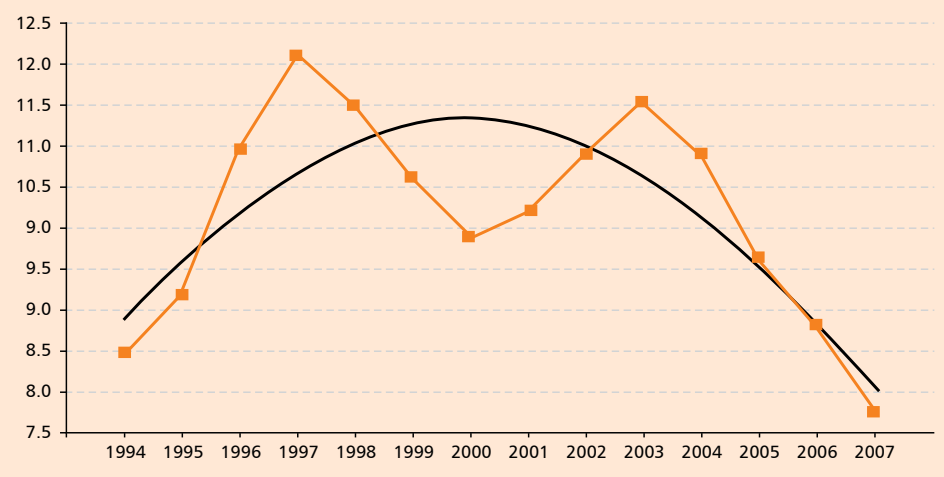
As for new cases in children under 15 years old, if the detection rate reflects a decrease or increase in the actual incidence, it is expected that such increase or decrease will be faster in this age group, since transmission in this population is likely to have occurred recently. On the other hand, if the detection rate reflects only operational variations, a similar behavior would be expected in all age groups.

The relative reduction rate is lower for the total of cases than for children under 15, which is consistent with the assumption that this drop reflects a reduction in the actual incidence of Hansen's disease.

GRAPH 2 – Trend of the detection rate of new HD cases in children under 15 years old per 100,000 population, observed and predicted figures, Brazil, 1994 – 2007.



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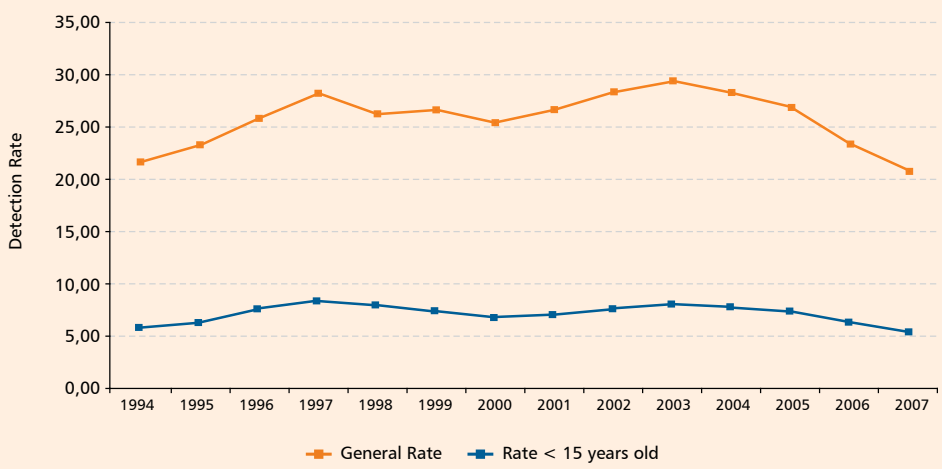
DESCRIPTIVE ANALYSIS

One of the PNCH priorities is to monitor children under 15 years old affected by HD. These cases are associated with recent diseases and active transmission foci, and their epidemiological surveillance is an important measure for controlling Hansen's disease. The goal established by the PNCH for the Government Plan (PAC-Growth Acceleration Plan) is to reduce the detection rate of new cases in children under 15 years old by 10.0% in Brazil by 2011. The evolution of this indicator in the total population and in children under 15 years old between 1994 and 2007 is shown in GRAPH 3.

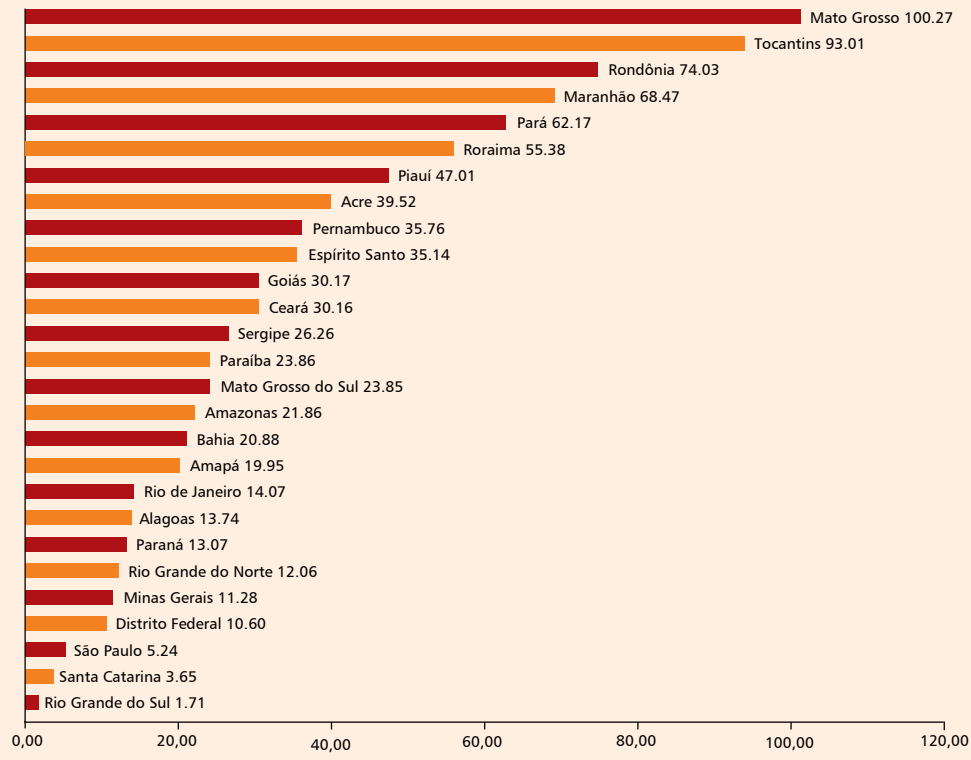
Graph 3 – Rates of detection of new Hansen's disease cases in the total population and in children under 15 years old per 100,000 population, Brazil, 1994 – 2007.



Source: SINAN/SVS-MS

GRAPH 4, which shows the detection rates of new HD cases registered in different states in 2007, evinces the serious situation faced in the Legal Amazon region with respect to HD. With a population amounting to 12.9% of the Brazilian population in 2007, the region composed by 9 states, accounted for 38.9% (15,532) of all new cases detected in Brazil at large. The Legal Amazon region faces physical and social barriers that make it difficult for its population to access health care services, and demographic and social production aspects prevailing in its geographic space link it, historically, to the evolution of HD in Brazil.

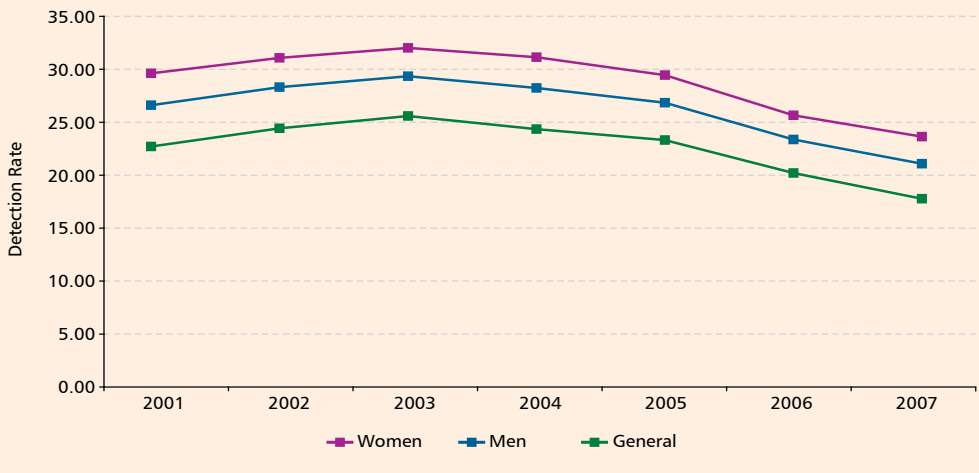
GRAPH 4 – Detection rates of new HD cases per 100,000 population, States of the Federation, Brazil, 2007.



Source: SINAN/SVS-MS

GRAPH 5 shows the evolution of the detection rate of new cases in the total population and by gender. It can be noticed that the average rates between 2001 and 2007 were 28.9/100,000 population for men and 22.6/100,000 for women. Figures for men ranged from 23.6/100,000 in 2007 to 32.0/100,000 in 2003 and for women from 17.8/100,000 in 2001 to 25.6/100,000 in 2003. The evolution of this indicator in the seven-year monitored period was more intense for men than for women, in proportions that ranged from 20.1% in 2003 to 24.8% in 2007.

GRAPH 5 – Detection rate of new HD cases per 100,000 population, in the total population and by gender, Brazil, 2001 – 2007.

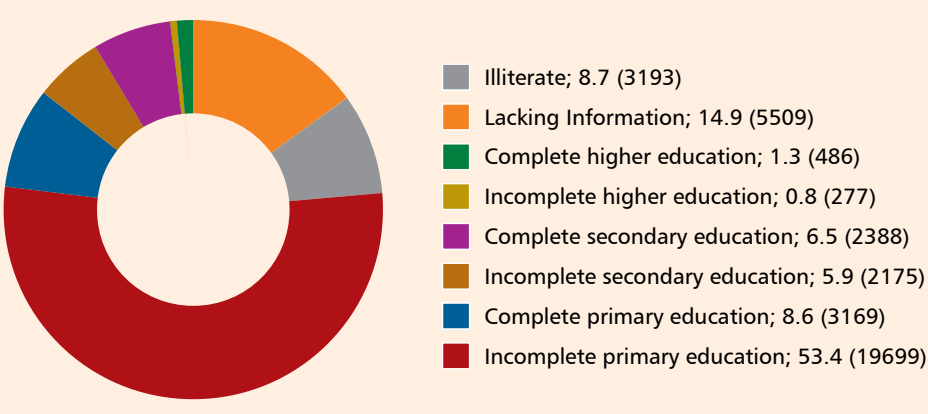


Fonte: SINAN/SVS-MS

GRAPH 6 shows the distribution of new Hansen's disease cases among persons aged 15 and above according to their schooling level in 2007. Legally, the proper age for enrolling in primary education in Brazil is seven years and, optionally, six years; the minimal compulsory duration of primary education and secondary education is, respectively, eight and three years. Education for young people and adults was designed for those who could not enroll in primary and secondary schools at the proper age or dropped out from the school system.

Although the education situation in Brazil has improved, IBGE data related to the 2005 National Household Sample Survey (PNAD) show that the country had about 14.9 million illiterates aged 15 and above, about 11% of Brazilian population, and that 14.4% of all students aged from 18 to 24 years old were still enrolled in primary education in that year. As for schooling, 8.7% of all records of new Hansen's disease cases in 2007 referred to illiterate people and 53.4% involved people with incomplete primary education; 8.6% referred to individuals with complete primary education; 5.9% involved people with incomplete secondary education; 6.5% referred to individuals with complete secondary education; 0.8% involved people with incomplete higher education; and 1.3% referred to individuals with complete higher education. Considering the observed age bracket, of people aged 15 and above, the prevalence of cases among illiterate and low-schooled people evinces a known association between Hansen's disease and socially excluded populations.

GRAPH 6 – Distribution of new HD cases in the population aged 15 and above, according to schooling level, Brazil, 2007.

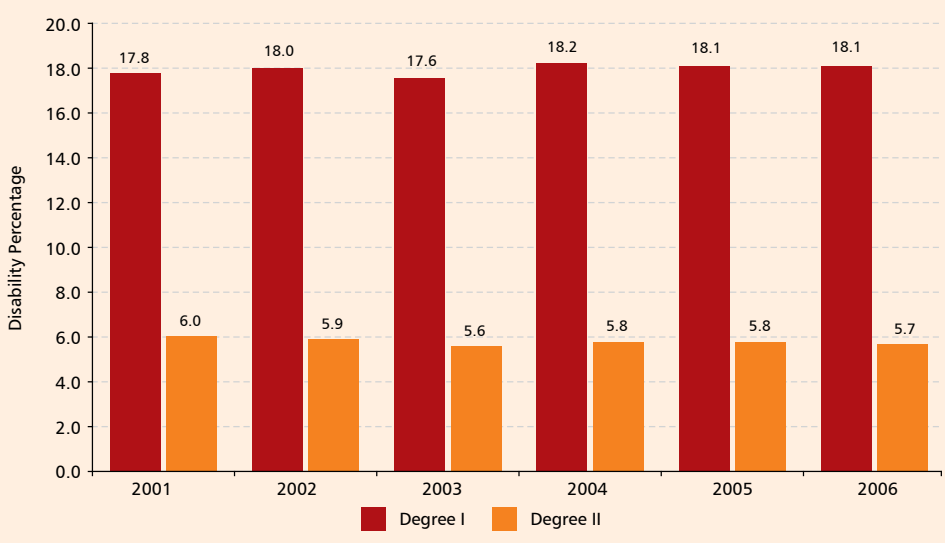


Source: SINAN/SVS-MS

According to the PNCH standards, the disability percentages registered in the monitored period are considered of average magnitude for degree I, ranging from 5% to less than 10%, and of high magnitude for degree II, above 10% (GRAPH7). Despite efforts towards early diagnosis, Brazil still has a significant number of people with disabilities caused by HD every year.

As observed all over the world, the higher percentage of new cases presenting grade II were found in lower endemic states. The quality of patient examination and recording are one of the weaknesses of this Programme component. At this moment, the 2007 information of this indicator is not reliable due to serious problem regarding to the recent form changing. Probably, it was caused by multiple reasons: transference of this data trough the new version of the national information system (SINAN) or linked to the form fill/form typing.

GRAPH 7 – Disability degree in new HD cases, Brazil, 2001 – 2006*

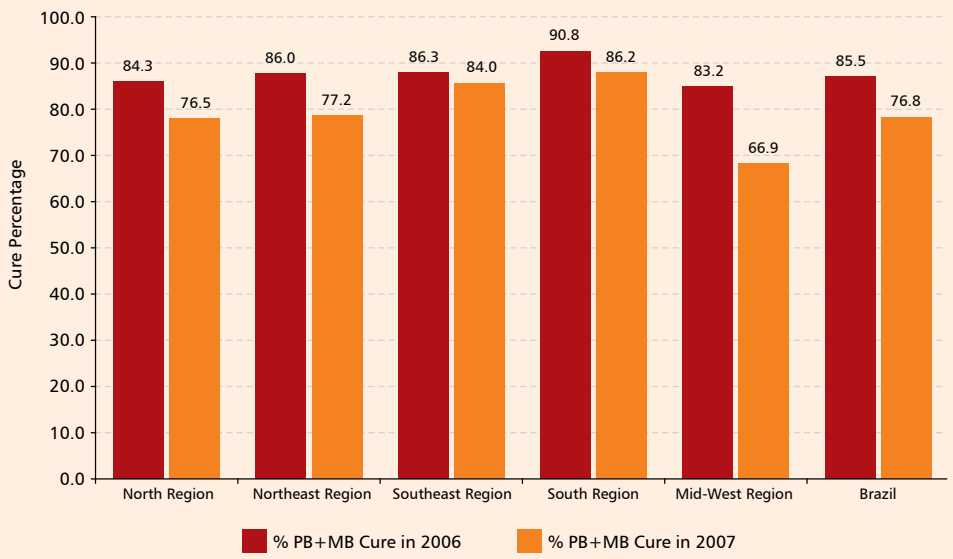


*Disability degree from 2007 are under adjustment.

Source: SINAN/SVS-MS

GRAPH 8 shows cure percentages in cohorts of new cases involving paucibacillary (PB) and multibacillary (MB) patients in 2006 and 2007, in Brazil and its regions. In 2006, cure percentages in paucibacillary cohorts amounted to 84.6% in the North Region, to 87.1% in the Northeast Region, to 88.6% in the Southeast Region, to 92.6% in the South Region and to 83.6% in the Mid-West Region.

GRAPH 8 – Cure rate of HD in paucibacillary and multibacillary cohorts, regions and Brazil, 2006 – 2007.

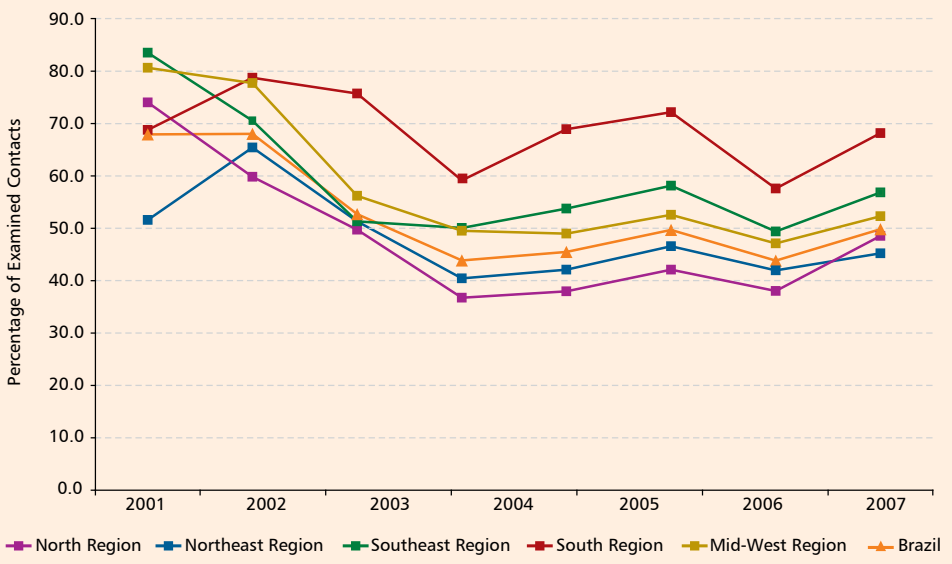


Source: SINAN/SVS-MS

The operational changes that followed the updating of SINAN may have had a negative effect on the evolution observed in the cohort result (cure rates) regarding the two last years, which situation might have also been influenced by the fact that the distribution of blister packages was discontinued in 2007. According to the parameters set out in the PNCH for monitoring the indicator, these cure rate percentages can fall below the acceptable range, i.e. from 75.0% to less than 90.0%. PNCH's goal, as set out in the Pact for Life, is to ensure 90.0%, classified as a good percentage, by 2011.

GRAPH 9 shows the evolution observed in the percentage of people who were examined during intradomiciliary contacts for new cases diagnosed in Brazil and its regions between 2001 and 2007. The average percentage registered for Brazil as a whole was 50.5%, ranging from 43.8% in 2006 to 68.0% in 2001. The target established by the PNCH for the indicator is a gradual annual growth of 12.0% until 2008.

GRAPH 9 – Percentages of examined contacts of new HD cases, Brazil and its regions, 2000 – 2007.



Source: SINAN/SVS-MS

TABLE 1 shows the number of cases in children under 15 years old (child rate) and in the general population, in 2007, and their proportional distribution by gender, operational classification, and disability degree, in Brazil, its regions and states. The child rate amounted to 7.6% of all cases registered in Brazil in 2007.

The highest percentage of child rates was registered in the North Region, 9.9%, followed by the Northeast Region, 8.6%, and by the Southeast and Mid-West regions, in which the same percentage, 5.6%, was observed. The lowest percentage was registered in the South Region, where cases in children under 15 accounted for 1.9% of all cases.

In Brazil, 55.2% of all new cases were men. For men, percentages ranged from 52.1% in the Northeast Region to 59.8% in the North Region. In Brazil, the multibacillary (MB) percentage accounted for 53.7% of all cases, and the lowest percentage, 51.3%, was registered in the North Region, while the highest one, 68.3%, was observed in the South Region.

Disability grades were assessed in 87.1% of the HD new cases, This percentage varied from 85% in the Northeast Region to 91.5% in the South Region. As observed all over the world, the higher percentage of new cases presenting grade II were found in lower endemic states. The quality of patient examination and recording are one of the weaknesses of this Programme component. At this moment, the 2007 information of this indicator is not reliable due to serious problem regarding to the recent form changing. Variations in the proportional distribution of cases in children under 15 and other ages, gender, operational classification, and disability degree are all described by WHO (2008) among countries and large regions of the world. However, it should be considered that, despite Brazil's continental dimensions and regional diversity, variations in these parameters within a country may be influenced by the operational conditions of the same national health care system.

TABLE 1 – New cases in the total population and in children under 15 years old,											
STATES	NEW CASES	%	NEW CASES	CLASSIFICATION BY GENDER				OPERATIONAL			
	< 15 years old	< 15 years old	General	M	%	W	%	PB	%	MB	
NORTH	827	9.9	8.324	4.981	59.8	3.343	40.2	4.055	48.7	4.269	
RO	78	6.6	1.177	645	54.8	532	45.2	673	57.2	504	
AC	33	11.9	278	193	69.4	85	30.6	129	46.4	149	
AM	87	11.7	741	448	60.5	293	39.5	398	53.7	343	
RR	18	7.8	230	134	58.3	96	41.7	89	38.7	141	
PA	486	10.8	4.507	2774	61.5	1733	38.5	1.994	44.2	2.513	
AP	12	9.4	127	77	60.6	50	39.4	55	43.3	72	
TO	113	8.9	1.264	710	56.2	554	43.8	717	56.7	547	
NORTHEAST	1.416	8.6	16.458	8.580	52.1	7.877	47.9	7.989	48.5	8.469	
MA	392	9.1	4.290	2484	57.9	1806	42.1	1.804	42.1	2.486	
PI	108	7.5	1.441	725	50.3	716	49.7	757	52.5	684	
CE	164	6.5	2.514	1.347	53.6	1.167	46.4	1.078	42.9	1.436	
RN	36	9.7	372	166	44.6	206	55.4	179	48.1	193	
PB	55	6.3	871	436	50.1	435	49.9	473	54.3	398	
PE	337	11.0	3.072	1.455	47.4	1.617	52.6	1.641	53.4	1.431	
AL	20	4.7	424	225	53.1	199	46.9	230	54.2	194	
SE	48	9.0	534	263	49.3	271	50.7	301	56.4	233	
BA	256	8.7	2.940	1.479	50.3	1.460	49.7	1.526	51.9	1.414	
SOUTH EAST	437	5.6	7.861	4.275	54.4	3.585	45.6	3.564	45.3	4.297	
MG	114	5.1	2.224	1.232	55.4	992	44.6	737	33.1	1.487	
ES	103	8.3	1.237	630	50.9	607	49.1	789	63.8	448	
RJ	138	6.2	2.215	1.139	51.4	1.075	48.5	1.045	47.2	1.170	
SP	82	3.8	2.185	1.274	58.3	911	41.7	993	45.4	1.192	
SOUTH	34	1.9	1.784	988	55.4	796	44.6	565	31.7	1.219	
PR	25	1.8	1.374	773	56.3	601	43.7	457	33.3	917	
SC	5	2.3	221	123	55.7	98	44.3	69	31.2	152	
RS	4	2.1	189	92	48.7	97	51.3	39	20.6	150	
MID-WEST	310	5.6	5.494	3.208	58.4	2.286	41.6	2.306	42.0	3.188	
MS	15	2.7	556	335	60.3	221	39.7	240	43.2	316	
MT	183	6.3	2.918	1.738	59.6	1.180	40.4	1.365	46.8	1.553	
GO	102	5.8	1.762	1.002	56.9	760	43.1	592	33.6	1.170	
FEDERAL DISTRICT	10	3.9	258	133	51.6	125	48.4	109	42.2	149	
BRAZIL	3.024	7.6	39.921	22.032	55.2	17.887	44.8	18.479	46.3	21.442	

*Disability degree from 2007 are under adjustment.

DEFINITION OF HIGHER-RISK AREAS

Detecting areas of greater risk for the disease allows the control program to concentrate on regions with a higher transmission rate, with a focus on geographically continuous spaces and on increasing epidemiological effectiveness. Cases of transmissible diseases are not expected to be randomly distributed in the population, but rather aggregated in specific areas as a result of the transmission. The cluster approach avoids situations where silent areas are ignored due to a low detection effort and municipalities with many cases are given priority due to the size

gender, operational classification, Disability grade, regions, states, Brazil, 2007.

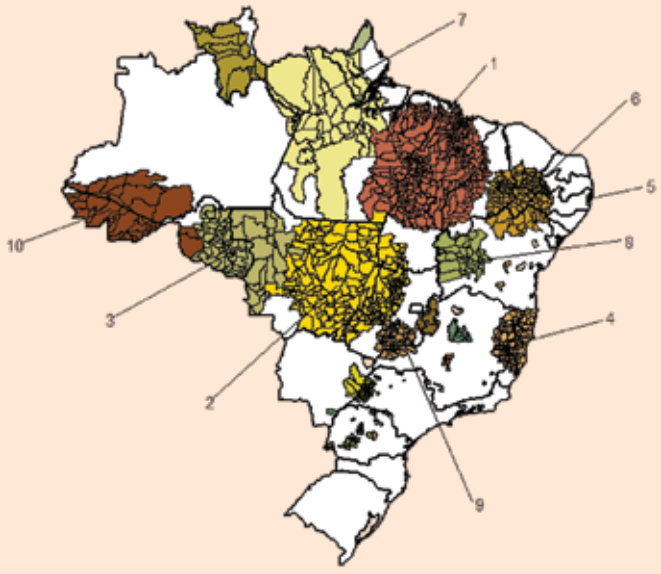
CLASSIFICATION		DISABILITY DEGREE*							
%	Total 2007	Degree 0	Degree I	Degree II	Assessed	% Assessed	% Degree II	% Degree I e II	Total 2006
51.3	8.324	6.927	1.285	365	8.577	93.4	4.3	605	9.182
42.8	1.177	1023	222	75	1320	98.3	5.7	23	1343
53.6	278	456	33	16	505	95.8	3.2	22	527
46.3	741	612	147	61	820	96.7	7.4	28	848
61.3	230	194	41	12	247	96.1	4.9	10	257
55.8	4.507	3510	636	148	4294	92.3	3.4	360	4654
56.7	127	121	27	5	153	82.7	3.3	32	185
43.3	1.264	1011	179	48	1238	90.5	3.9	130	1368
51.5	16.458	11.348	2.524	779	14.651	87.9	5.3	2.010	16.661
57.9	4.290	2805	696	217	3718	81.9	5.8	821	4539
47.5	1.441	994	222	64	1280	93.8	5	85	1365
57.1	2.514	1665	362	130	2157	90.3	6	232	2389
51.9	372	182	39	15	236	87.1	6.4	35	271
45.7	871	693	115	45	853	89.4	5.3	101	954
46.6	3.072	2304	512	156	2972	92.9	5.2	226	3198
45.8	424	262	94	24	380	87	6.3	57	437
43.6	534	364	61	15	440	85.1	3.4	77	517
48.1	2.940	2079	423	113	2615	87.4	4.3	376	2991
54.7	7.861	5.302	1.786	664	7.752	92.5	8.6	626	8.378
66.9	2.224	1510	685	264	2459	96.2	10.7	96	2555
36.2	1.237	952	156	46	1154	95.4	4	56	1210
52.8	2.215	1627	464	185	2276	90.2	8.1	248	2524
54.6	2.185	1213	481	169	1863	89.2	9.1	226	2089
68.3	1.784	1.158	438	153	1.749	91.6	8.7	161	1.910
66.7	1.374	916	332	113	1361	90.1	8.3	149	1510
68.8	221	138	42	22	202	96.7	10.9	7	209
79.4	189	104	64	18	186	97.4	9.7	5	191
58.0	5.494	5.350	1.177	307	6.834	91.0	4.5	677	7.511
56.8	556	405	82	29	516	82.8	5.6	107	623
53.2	2.918	2427	667	113	3207	89.7	3.5	368	3575
66.4	1.762	2372	361	144	2877	94.1	5.0	179	3056
57.8	258	146	67	21	234	91.1	9.0	23	257
53.7	39.921	30.085	7.210	2.268	39.563	90.7	5.7	4.079	43.642

SINAN/PNCH/SVS/MS, August, 2008

of their population and not because of their higher risk. For identifying Hansen's disease transmission clusters, the spatial scan statistics was used, which is the Poisson method that takes into account the distribution of the population, based on the average rate of new cases detection rate by municipality between 2005 and 2007 (cases from SINAN, may 2008). The cases were spatially allocated according to the geographic coordinates of the municipalities, with an approximation of the actual location. The 10 most likely clusters, all of which were statistically significant, comprised 1173 municipalities, 53.5% of the new cases detected during the considered period, and only 17.5% of the Brazilian population.

FIGURE 2 shows the map of Brazil and the location of the 10 most important clusters.

FIGURE 2 – The 10 first clusters of Hansen's disease cases, identified through detection rate of new cases between 2005 and 2007, Brazil*



*Cluster 10 is affected by the edge effect, that is, no data are available for the other side of the border, making it irregular.

PENNA, MLF/MS, 2008

The map of the clusters, which were identified based on 2005-2007 data, confirms the concentration of Hansen's disease cases in the Legal Amazon region.

Monitoring the indicators and their interrelationships is one of the central aims of the PNCH, for which purpose epidemiological analysis and operational surveys are being carried out. More detailed data by age group should clarify important issues for controlling the disease. One of the priorities of the PNCH is to adopt an investigative approach toward higher-risk clusters for the occurrence of HD, addressing different aspects from the biological and social aspects of the disease. At operational level, PNCH's actions are being designed and carried out integrating regions, states and municipalities based on the configuration and comprehensiveness of clusters.

Tiragem: 1ª edição – 3.000 exemplares
Impresso no Brasil/Printed in Brasil

Elaboração, edição e distribuição
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Departamento de Vigilância Epidemiológica
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