



Article/Artigo

Assessment of integration of the Leprosy Program into Primary Health Care in Aracaju, State of Sergipe, Brazil

Avaliação da integração do Programa de Hanseníase na Atenção Primária em Aracaju, Estado de Sergipe, Brasil

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ABSTRACT

Introduction: The aim of this study was to assess the epidemiological and operational characteristics of the Leprosy Program before and after its integration into the Primary Healthcare Services of the municipality of Aracaju-Sergipe, Brazil. **Methods:** Data were drawn from the national database. The study periods were divided into *preintegration* (1996-2000) and *postintegration* (2001-2007). Annual rates of epidemiological detection were calculated. Frequency data on clinico-epidemiological variables of cases detected and treated for the two periods were compared using the Chi-squared (χ^2) test adopting a 5% level of significance. **Results:** Rates of detection overall, and in subjects younger than 15 years, were greater for the *postintegration* period and were higher than rates recorded for Brazil as a whole during the same periods. A total of 780 and 1,469 cases were registered during the *preintegration* and *postintegration* periods, respectively. Observations for the *postintegration* period were as follows: I) a higher proportion of cases with disability grade assessed at diagnosis, with increase of 60.9% to 78.8% ($p < 0.001$), and at end of treatment, from 41.4% to 44.4% ($p < 0.023$); II) an increase in proportion of cases detected by contact examination, from 2.1% to 4.1% ($p < 0.001$); and III) a lower level of treatment default with a decrease from 5.64 to 3.35 ($p < 0.008$). Only 34% of cases registered from 2001 to 2007 were examined. **Conclusions:** The shift observed in rates of detection overall, and in subjects younger than 15 years, during the *postintegration* period indicate an increased level of health care access. The fall in number of patients abandoning treatment indicates greater adherence to treatment. However, previous shortcomings in key actions, pivotal to attaining the outcomes and impact envisaged for the program, persisted in the *postintegration* period.

Keywords: Leprosy. Epidemiology. Program and project evaluation. Family health. Primary health care.

RESUMO

Introdução: O estudo avalia características epidemiológicas e operacionais do programa de hanseníase no período anterior e posterior à integração nos serviços de Atenção Primária do município de Aracaju-Sergipe, Brasil. **Métodos:** Os dados foram obtidos da base nacional. O período estudado foi dividido em *pré-integração* (1996-2000) e *pós-integração* (2001-2007). Calcularam-se os indicadores epidemiológicos de detecção ano a ano. Frequências de variáveis clínico-epidemiológicas dos casos detectados e tratados foram comparadas entre os dois períodos utilizando-se qui-quadrado (χ^2) com nível de significância de 5%. **Resultados:** As taxas de detecção geral e em menores de 15 anos aumentaram no *pós-integração* e se mantiveram acima das obtidas para o Brasil em ambos os períodos. Houve 780 e 1.469 casos nos períodos *pré* e *pós-integração*, respectivamente. No período *pós-integração*, observou-se: aumento na proporção de casos com grau de incapacidade avaliado ao diagnóstico, de 60,9% para 78,8% ($p < 0,001$) e, ao final do tratamento, de 41,4% para 44,4% ($p < 0,023$); aumento na proporção de casos detectados por exame de contatos, de 2,1% para 4,1% ($p < 0,001$); diminuição do abandono de tratamento de 5,64 para 3,35 ($p < 0,008$). Apenas 34% dos contatos registrados nos anos 2001-2007 foram examinados. **Conclusões:** As oscilações verificadas nas taxas de detecção geral e em menores de 15 anos no período *pós-integração* sugerem ter havido incremento no acesso. A redução do número de abandonos indica melhora na adesão ao tratamento. Insuficiências pré-existentes em ações de importância crucial para os resultados e impactos esperados do programa persistiram no período *pós-integração*.

Palavras-chaves: Hanseníase. Epidemiologia. Avaliação de programas e projetos. Saúde da família. Atenção primária.

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Received in 30/04/2011

Accepted in 19/09/2011

INTRODUCTION

In Brazil, actions for diagnosing and treating leprosy have historically been conducted at specialized state-run units. Since 1994, Brazil's Ministry of Health has devised and promoted the Family Health Strategy (FHS) as a priority model for organizing primary health care services. In response to initiatives by the World Health Organization (WHO) recommending integration of leprosy control into primary health care (PHC), Brazil has established the integration of leprosy control actions (LCA) into primary health care as a key directive toward achieving the goal of eliminating leprosy¹. Thus, the main strategy proposed for implementing leprosy actions was training family health care teams (FHCT), through training courses and distribution of technical guides.

The FHS was implemented in Aracaju in 1998². Integration of the LCA began only in 2000 following training of FHCT³. In 2007, the municipality had 128 FHCT, distributed among 43 family health units, providing coverage for 86.7% of the population².

Traditionally, appraisals of the performance of the Leprosy Control Program (LCP) have been based on a set of indicators defined by the National LCP, compiled from information contained in notification/investigation records held on the Brazilian Disease Notification System (*Sistema de Informação de Agravos de Notificação - SINAN*), a system developed in the 1990s as a tool for collecting, processing, storing, and analyzing data on mandatory notifiable diseases in Brazil⁴. These indicators are categorized into two groups denoted by the Ministry of Health as *epidemiologic* and *operational*⁵. However, the use of these indicators for assessment purposes has several drawbacks. One of these weaknesses is the lack of robustness of the information sourced from data collected at local and municipal levels. Many municipalities lack adequate systems to oversee data entry into the system or to monitor the information held. Nevertheless, for states and municipalities in which

the system is well managed, the assessment of information from the system enables valuable analyses, which help managers assess and monitor local actions⁶.

In this regard, the use of data from SINAN for individual municipalities and locales is potentially positive. Reports have described highly heterogeneous situations among different municipalities from within the same area or even across services offered by the same municipality. Greater proximity of the action agents, namely, health care managers and professionals, with these data increases the likelihood of the information leading to improvements.

The aim of the present study was to analyze the epidemiological indicators and the clinico-epidemiological characteristics of leprosy during the *preintegration* and *postintegration* periods of LCA at family health units in the municipality of Aracaju.

METHODS

This descriptive study involved analysis spanning 12 years (Jan 1996 to Dec 2007) and was restricted to diagnosed cases of leprosy in patients residing in the municipality of Aracaju in Sergipe, Brazil. Data were sourced from the SINAN through the Aracaju Municipal Secretariat for Health and the State Secretariat for Health of Sergipe. In a bid to increase the reliability of the data and reduce the risk of under-registration, the study used data collected in 2009 on the years 1996 to 2007.

Aracaju, the capital of State of Sergipe, covers an area of 174km² and had an estimated population of 544,035 inhabitants in 2009. The city accounts for the highest number of leprosy cases in the state and had an overall detection rate of 49.22 cases for every 100,000 inhabitants in 2007⁷. The integration of the LCP into family health units commenced in 2000³, and therefore, the analysis was split into two study periods: the 1996 to 2000 period corresponded to the phase prior to the integration of the LCA and was denoted the *preintegration* period, and the period spanning from 2001 to 2007 represented the *postintegration* period.

The database was organized to ensure exclusion of duplicate and inconsistent records. Individual compulsory notification records and/or clinical charts were analyzed in the remaining cases of inconsistencies. To standardize the records for current classification, cases with a disability grade 3, registered up to 2001, were converted to grade 2 disability, in accordance with the instrument standardized by the WHO, revised in 1998, and adopted in Brazil.

Given that leprosy detection rates fluctuate over longer periods, to assess the endemic picture for the municipality, a descriptive analysis of the indicators recommended for monitoring and assessing the epidemic, compiled on an annual basis encompassing aspects of morbidity, magnitude, and epidemiological profile, was carried out⁵.

The following indicators were included: annual rate of detection of new cases per 100,000 inhabitants, annual rate of detection of new cases in the population aged between 0 and 14 years per 100,000 inhabitants⁵, and proportion of disability grade 2 in new cases per 1 million inhabitants at time of diagnosis⁸. Because of the inconsistency of some of the variables held on the database, the following indicators were excluded: proportion of leprosy cases with grade 2 physical disability on diagnosis among new cases detected and assessed on an annual basis and proportion of leprosy cases with grade 2 physical disability among cases assessed at conclusion of

multidrug therapy (MDT) on an annual basis. It was decided not to use the rate of annual prevalence of leprosy per 10,000 inhabitants because of the change in the criteria used to calculate this figure during the study period and also owing to the intrinsic weakness in the prevalence indicator currently in use.

From the year of initial diagnosis, the clinico-epidemiological variables were taken (gender, age-group, operational classification, disability grading (DG) rating at diagnosis, DG rating at end of treatment (MDT), detection method, contacts examined, and case outcome) as a proxy representing the quality of the service. The evolution of these variables over time was analyzed for the two time frames studied. The first period was the *preintegration* stage, characterized by a health care service centralized at a single health unit, whereas the second encompassed the *postintegration* period, during which, the LCA were integrated into PHC.

Data were stored on the EpiInfo™ software program, version 3.3, from the Centers for Disease Control and Prevention (CDC), October 2004. Frequency distributions were compared using the Chi-squared (χ^2) test adopting a 5% level of significance ($p < 0.05$).

Ethical considerations

The project was previously approved by the Research Ethics Committee of the Clinics Hospital, University of São Paulo Medical School (n° 1032/08) and by the Research Ethics Committee of Tiradentes University (n° 030108).

RESULTS

Detection rates

From 1996 to 2007, a total of 2,249 cases of leprosy were detected in Aracaju, the municipality with the highest number of cases of the disease in Sergipe. **Table 1** shows data obtained by this study set against official figures on the epidemic in Brazil⁹. Shifts over the period point to an increase in overall detection during the years subsequent to integration of the LCP in PHC in 2000. A peak in detection was found in 2003, reaching a rate of over 50/100,000 inhabitants, a level maintained for the two preceding years.

The raw rates of detection in individuals between 0 and 14 years of age showed some variations, predominantly during the period following integration, peaking both in 2002 and 2005 when the detection rate reached its highest point of more than double the rate for the previous year. The trend in the detection rate in children revealed a pattern of a slight rise, where rates for Sergipe consistently exceeded those of Brazil as a whole for almost all years studied⁹.

Taken together, the overall detection rate between 2003 and 2006, plus the detection rate among individuals younger than 15 years, classify the municipality as hyper-endemic. During the other years studied, the pattern of the epidemic was classified as very high⁵. The shift in the epidemiological picture for the disease coincided with the rising number of FHCTs incorporated into PHC and with the intensifying of the process of implementing the FHS in the municipality.

The proportion of new cases rated as DG2 at diagnosis (per million inhabitants) was calculated only for years in which the DG percentage assessed at diagnosis exceeded 75%. For the years 2001, 2002, 2003, 2005, and 2006, the proportion of cases (per million inhabitants) showed a stable pattern with rates of 14.95, 12.66, 27.1, 16.04, and 11.87, respectively.

TABLE 1 - Epidemiological indicators for leprosy from 1996 to 2007.

Period	Year	Overall detection rate (per 100,000 population)		Detection rate in individuals < 15 years (per 100,000 population)	
		Brazil*	Aracaju**	Brazil*	Aracaju**
Preintegration	1996	25.79	41.1	7.5	13.29
	1997	28.27	28.52	8.28	7.7
	1998	26.23	30.9	7.86	9.89
	1999	26.6	37.03	7.3	9.1
	2000	25.44	38.78	6.72	7.82
Postintegration	2001	26.61	31.81	6.96	5.39
	2002	28.33	35.65	7.47	13.7
	2003	29.37	53.56	7.98	13.54
	2004	28.24	50.04	7.68	15.61
	2005	26.86	51.94	7.34	18.09
	2006	23.37	41.95	6.22	8.57
	2007	21.19	35.16	6.07	6.94

*Brazil's Ministry of Health⁸. **Database used by the study.

Clinico-epidemiological characteristics of cases

With regard to gender for the study period as a whole, the cases were predominantly women, but the gender distribution for the two study periods did not differ significantly ($p = 0.164$).

Of the 2,249 cases included, 2,077 (92.4%) were older than fifteen years when first diagnosed. Comparing the two study periods, the proportion of leprosy patients aged between 0 and 14 years was 8% and 7.32% for *preintegration* and *postintegration* periods, respectively, a difference not reaching statistical significance ($p = 0.696$). A total of 351/780 (45%) cases in the age bracket of 20 to 44 years were diagnosed during the *preintegration* period versus 707/1,469 (48.3%) during the *postintegration* period.

The majority of cases detected were of the paucibacillary (PB) type for both study periods. Although an increase in multi-bacillary (MB) cases was seen (from 36.2% to 40%), this difference was not statistically significant ($p = 0.073$).

Table 2 shows the epidemiological variables by period of LCA integration in the municipality.

The proportion of new cases with DG rated at diagnosis was 60.9% and 78.1% for *preintegration* and *postintegration* periods, respectively. A decrease in the percentage of cases in which DG was not rated was found for the *postintegration* period ($p < 0.001$).

Analysis of DG assessment at end of treatment revealed that DG was not rated in 58.6% and 55.7% of cases during *preintegration*

and *postintegration* periods, respectively, where the reduction in cases without registered disability reached statistical significance for the *preintegration* period ($p < 0.023$).

In terms of detection method, a significant association ($p < 0.001$) was found with probable increased detection by contact examination, following the integration of LCA to PHC. Entry to the system as *relapsing* was included in this study under the category of *other methods of detection*, and from 1996 to 2000, only 3/780 (0.4%) of cases were entered as *relapsing*, whereas from 2001 to 2007, 59/1,469 (4%) of cases were registered under this mode of entry (data not shown in **Table 2**).

With regard to the number of patients undergoing treatment during the years assessed, 106/780 (13.6%) and 1,014/1,469 (69%) of patients had their contacts registered during *preintegration* and *postintegration* periods, respectively. The proportion of contact examinations per new

TABLE 2 - Clinico-epidemiological variables by period of integration of leprosy control actions into health care services.

Variable	1996-2000		2001-2007		p value*
	n	%	n	%	
Disability grade at diagnosis (n = 2,249)					
DG 0 and 1	457	58.6	1,090	74.2	< 0.001
DG 2	18	2.3	57	3.9	
unknown	305	39.1	322	21.9	
Total	780	100.0	1,469	100.0	
Disability grade at end of multidrug therapy (n = 2,249)					
DG 0 and 1	321	41.15	631	42.95	< 0.023
DG 2	2	0.26	20	1.36	
unknown	457	58.59	818	55.68	
Total	780	100.0	1,469	100.0	
Detection method (n = 2,249)					
contact examination	16	2.1	60	4.1	< 0.001
others	756	96.9	1,312	89.3	
unknown	8	1.0	97	6.6	
Total	780	100.0	1,469	100.0	
Treatment outcome (n = 2,213)					
treatment completed	701	89.9	1,293	90.2	< 0.008
defaulter	44	5.6	48	3.4	
others	35	4.5	92	6.4	
Total	780	100.0	1,433	100.0	

DG: disability grading. * Pearson's χ^2

leprosy case was 568/780 (0.73) during the *preintegration period* versus 2,100/1,469 (1.43) for the *postintegration period*, showing improved compliance with the contact examination action.

Concerning the type of outcome registered, a significant reduction in the percentage of defaulters was found for the *postintegration period* ($p < 0.008$).

DISCUSSION

Comparing raw rates of detection overall, from 1996 to 2007, the epidemic was consistently worse in Aracaju than in Brazil as a whole for virtually all years studied⁹. These results point to an overall increase in detection after the integration of the LCP into PHC.

Worldwide, the trend in the rates of detection of new cases showed no decline between 1995 and 2000¹⁰, but a downward shift was evident from 2002 to 2008¹¹. In India, the country with the highest number of leprosy cases, the rate of detection steadily increased between 1982 and 2002¹². A similar steady upward trend also has been seen in Latin America¹⁰. Brazil accounts for over 90% of cases found in South America, and detection rates between 1980 and 2004 showed a steady rise^{13,14} with levels set to fall from 2010¹³. For the North-East region of Brazil in particular, the largest increase in detection rates occurred between 1980 and 2004, although this area also had a higher regression rate than any other region in the country¹⁴.

The upward shift in detection rates seen in Aracaju is similar to the trend reported in other Brazilian studies¹⁵⁻¹⁹, but a steady decline is evident from 2003 onward. These results contrast with the pattern reported for states in the process of eliminating the disease as a public health problem, such as Paraná²⁰ and São Paulo²¹, which exhibited a pattern of steady decline in detection rates over the same time frame.

The relatively stable pattern of detection rates in individuals between 0 and 14 years of age, with a marked rise during the *postintegration period*, is consistent with a study conducted in Duque de Caxias where twin peaks of detection were identified in this age group. This double-peak pattern may be explained by the initial phase of integration or strategic actions carried out the previous year¹⁶.

Other studies in Brazil involving individuals younger than 15 years have revealed a pattern of endemicity varying from average to very high^{18,22,23}. Rates for the Vale do Jequitinhonha were found to exceed those State of Minas Gerais, where parameters for the region were responsible for sustaining the epidemic and contributed to its classification of high to very high²⁴. In the State of Espírito Santo, analysis of the trend of detection in individuals under 15 years of age showed an upward pattern between 1980 and 2003, with rates stabilizing between 1996 and 2003¹⁹. Although other studies have shown similar slight increases in detection in children²⁵ or have pointed to a steady pattern over time²⁶, a study in a historic series performed in Bahia is noteworthy. The cited study found a substantial increase in the rate of detection among minors over the past two decades¹⁵, demonstrating the recent surge in transmission of the epidemic⁵.

Frequency of new cases with DG 2 at diagnosis is a recent measure currently calculated per 1 million inhabitants⁸, which is employed to assess the magnitude of deformity caused by leprosy in the general population, to compare it against other diseases, and to indicate the efficacy of early case detection⁵. The measure currently lacks parameters defined by WHO or the Brazilian Ministry of Health

to aid its interpretation. Nevertheless, the world target is to reduce this figure by at least 35% between 2011 and 2015, whereas the target for Brazil is a 13% reduction from 2008 to 2015⁵. Despite the accuracy issues associated with this indicator because of the characteristics of the epidemic and to the limited knowledge of the operational reality of actions in each country, the measure can contribute toward improving the quality of leprosy services²⁷. The limitation of this study in interpreting this indicator may be attributable to the lack of data or to the under-reporting of physical disabilities at diagnosis, particularly from 1996 to 2000, during which time, the mean percentage of DG assessment was less than 75%. However, inconsistencies in data regarding disability registration, particularly in the first few years of the series analyzed, must be taken into account.

Biological and sociocultural factors have been implicated as determinants of the greater incidence of leprosy found in men²⁸. Other studies carried out in Brazil have confirmed the disease's predominance in male subjects^{19,29-31}. However, the greater number of women found in the years assessed in the present study is in line with the findings of other investigations^{16,32-35}. One possible explanation for this phenomenon is that traditionally, women have a tendency to seek PHC assistance more readily than men^{28,36}. This difference is due to cultural gender issues (men delay longer in seeking medical help when ailing), as well as to the greater number of programs and activities available to women in the primary health care sphere.

The predominance of young adults observed in the present cases is consistent with other reports^{17,29,30,32,33,35,37,38}. This population group is more vulnerable to the risk of exclusion from the production cycle as a result of the disease and to the sequelae and stigma associated with leprosy³⁹. The percentage of individuals aged between 0 and 14 years afflicted by the disease may be a sign of active and recent transmission of the endemic, with under 15s being continuously exposed to the bacillus in the environment where they live⁴. This result also exposes the passive stance of local health services and limited efforts to actively identify cases²⁴ or implement other means of health surveillance.

Some Brazilian studies have confirmed the predominance of the clinical PB form^{29,35,37}, whereas others have reported a predominance of MB^{19,32,33,38,40}. In the present study, the PB clinical form was most prevalent in both study periods. Surprisingly, no increase in the proportion of PB cases was identified between the two periods, where an increase can usually be expected when a large increase in the number of cases detected occurs.

Disability grading at diagnosis is extensively used as an epidemiological indicator and as a tool for clinical assessment. The increase in the percentage of cases with DG ratings at diagnosis points to the probable involvement of health services fulfilling and performing this control action more effectively. The value obtained for this parameter is regarded as regular as a rating of health care quality and for monitoring results of the LCA⁵.

The high percentage of cases lacking disability rating records, especially during the *preintegration period*, attests to the fact that physical disability ratings is an LCA, which presents problems in quality and registration of assessments²⁷. Although a slight increase in the proportion of cases with DG rated at diagnosis was seen in the *postintegration period* in this investigation, other Brazilian studies have confirmed a rise, followed by a fall, in the proportion of DG 2 ratings during the period of *postintegration* of LCA as a result of the measures put in place^{16,26,30}.

Although a lower number of cases lacking registration of disability grade was found during the *postintegration* period both at diagnosis and at end of MDT, indicating a slight improvement in this component of the program, the percentage attained remains low. The finding of lower proportions of cases with DG ratings at the end of MDT is consistent with the results of other studies^{30,41,42}. When analyzed individually by year, the DG records do not reach the minimum value required to calculate the indicator for proportion of DG2 among patients concluding MDT⁵. This problem may be due, in part, to patients not returning to the service for formal discharge. However, it is likely that this problem is largely attributed to the low importance placed on the registration of follow-up information by health care professionals and information services. The low levels of registration of physical disability at conclusion of MDT found in the present study were similar to those identified by other studies^{30,42}. This limited checking of DG may have resulted from under-registration of data and indicates that this activity has not yet been incorporated satisfactorily into the routine practice of the services.

The domiciliary contact examinations for new cases diagnosed is one of the main strategies of achieving early diagnosis and help reduce transmission of the disease^{43,44}.

According to the WHO, estimated risk of relapse after introduction of MDT is 1.1% for PB and 0.8% for MB⁴⁵. With regard to the admission of relapsing cases, the number of relapses exceeded expected rates, a finding which might be attributed to the organizational structure of the health services⁴⁶, alcohol abuse, nonadherence to treatment^{47,48}, diagnostic failure, or to the fact that individuals treated as PB can subsequently develop generalized MB lesions after partial improvement in signs and symptoms⁴⁹.

Akin to the findings of the present study, an assessment of integration of LCP into PHC in Betim, Minas Gerais, reported that the surveillance of contacts had not been adequately addressed. Although the program had made advances on other aspects, the lack of registration precluded comparison between contact examination coverage before and after integration³⁰.

Consequently, the contact examination was deemed a poor indicator in the cited study for not having attained 50% contact examination coverage⁵, reflecting a similar situation for the indicator proportion of contacts examined in the present study (37%). Low coverage of contacts examined also was found by other studies, which reported rates ranging from 11.8% to 46%^{42,50,51}. Compared with the regular range for the parameter, between 50% and 74.9% of contacts examined⁵, Dessunti⁵² and Fuzikawa³⁰ obtained values of 51% and 61.7%, respectively. These values were close to the means found for Brazil (54%) and State of Sergipe (61.8%) in a national survey assessing the years 2001 to 2008. These results served to highlight the shortcomings of this control action in Brazil. Only the States of São Paulo and Espírito Santo attained proportions deemed *good* for the parameter, registering 78.3% and 75.5% of contacts examined, respectively⁵³. However, a higher level of local organization and more effective priority given to contact surveillance have led to higher rates in some Brazilian municipalities such as Fortaleza, State of Ceará, where, in a single year, the contact examination coverage increased to 76% as a result of an integral care program for those with leprosy in the region⁵⁴.

In terms of number of examined contacts registered, the *postintegration* period showed a statistically significant increase in the number of cases detected by contact examinations, reiterating the fundamental importance of this activity.

Finally, another relevant finding was the reduction in percentage of treatment default during the *postintegration* period. However, it should be noted that this percentage is limited in that it does not take into account patient cohorts but, rather, patient outcomes on the register each year.

The raw overall rates of leprosy detection in Aracaju were higher than the rates reported for Brazil as a whole, thus confirming the seriousness of the local epidemic. The shifts observed during the years studied indicated an increase in the rates of detection in general, and among individuals younger than 15 years, for the period following integration of the leprosy control actions in the municipality, suggesting increased access to health services. The lower number of defaults indicate higher adherence to treatment, suggesting improved access and presumably greater treatment quality after integration of the LCP in PHC.

However, the other operational indicators show that the family health care services have not remedied the previous shortcomings in actions pivotal to achieving the envisaged outcome and impact of the leprosy program, namely, surveillance of contacts and disability diagnosis and prevention activities. The performance profile of the leprosy program observed in this study resembles that of several other Brazilian municipalities studied, showing that family health care has a long way to go to achieve its goals of effective integration, even for a priority target such as leprosy after many years of integration.

ACKNOWLEDGMENTS

The authors would like to express their thanks to Arleide Franco de Jesus, Eliane Aparecida do Nascimento, Marco Aurélio de Oliveira Góes (State Secretariat for Health of Sergipe), and Fabrizia Tavares (Municipal Secretariat for Health of Aracaju) for granting access to the data and for collaboration in this study.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

FINANCIAL SUPPORT

This study was funded by the Pan-American Health Organization through the support program for research in tropical diseases TDR/PAHO/WHO (Project Identifiers: PAHO 300 SGP0941; PAHOERC REF N° PAHO-2009-11-0017.R1) and by the National Council of Scientific and Technological Development (CNPq).

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