Original article

Assessment of the implementation of the Leprosy Control Program in Camaragibe, Pernambuco State, Brazil*

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Abstract

Objective: to assess the implementation of the actions of the Leprosy Control Program in Camaragibe, Pernambuco State, Brazil. **Methods**: evaluative research with 'implementation analysis', based on criteria, indicators and parameters guided from the construction of the Logic Model; four components were assessed – management, health care, epidemiological surveillance, health education and communication –; direct observation/questionnaire was used, as well as data from the Information System for Notifiable Diseases. **Results**: the implementation of the program was incipient (58.3%); the estimate for the components varied from 'not implemented' (health education and communication, 48.0%), 'incipient' (management, 53.3%; health care, 57.2%) to 'partially implemented' (epidemiological surveillance, 73.0%); in 2012, it was observed low proportion of examined contacts (28.4%), treatment dropout (34.1%), limited standardization of patient care flow, and poor resolution of problems by managers. **Conclusion**: the level of implementation found was related to the organization of services, with negative repercussions regarding the result indicators.

Keywords: Health Evaluation; Leprosy; Communicable Disease Control; Program Evaluation; Primary Health Care.

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Introduction

Leprosy, an ancient infectious disease of chronic evolution, affects mainly the skin and peripheral nerves, leading to deformities and permanent physical disability, related to late diagnosis.[1]

Currently, the efforts to eliminate leprosy are concentrated in regions of high endemicity, located in some areas of India, Brazil, Indonesia, Congo, Nepal, Tanzania, Philippines, Madagascar, and Mozambique, where the disease is still an important Public Health issue.[2] India and Brazil remain, respectively, as the first and second countries on incidence of leprosy.[2]

In the Americas, Brazil is the country that has most cases of the disease, which remains with high magnitude in the North and Midwest macro-regions and in the metropolitan areas of the Northeast of the country.[3]

> *India and Brazil remain, respectively, as the first and second countries on incidence of leprosy.*

In Pernambuco State, in 2012, the endemicity prevalence was medium (from 4.9 to 1.0/10 thousand inhabitants), the general detection coefficient was very high (from 20.0 to 39.9/100 thousand inhabitants), and, among individuals under 15 years old, it presented hyperendemicity (values over 10.0/100 thousand inhabitants), according to parameters of the World Health Organization (WHO).[4]

These indicators point to an intense process of transmission and spread of the disease, which presents reported cases in almost every municipality in Pernambuco, with higher concentration in the Metropolitan Region of Recife, such as the municipality of Camaragibe: with a very high general detection rate, ranging from 20.00 to 39.99/100 thousand inhabitants in 2008, this municipality is seen as one of the most endemic of the state.[4]

The use of multidrug therapy in the treatment of the disease, the strategy to tackle the disease in endemic countries to less than a case per 10 thousand inhabitants and the decentralization of leprosy control actions (LCA) to primary health care, represent progress in the public policies of disease control worldwide. In Brazil, the implementation of LCA by the Family Health Strategy occurred in 1998 and represented an important guideline, adopted by the National Leprosy Control Program, to reduce the occurrence of the disease and break the transmission chain in the population.[5]

Despite the efforts and achievements, there are obstacles not only technical but also administrative and operational in the development of LCA that interfere in the process of decentralization of these actions. Among them, we should mention the fragility of appropriate assessment tools and systematic analysis of routine services, especially of municipal scope, with great impact on the program effectiveness.[6-8] Evaluation studies contribute to the improvement of interventions, and are a management tool that promotes the organization of services and dialogue between practice and management, enabling the institutionalization of assessment practices.[9]

The objective of the present study was to assess the implementation actions of the Leprosy Control Program in the municipality of Camaragibe, Pernambuco State, Brazil, in 2013.

Methods

Design

Evaluation study, with 'implementation analysis' of its second component, related to the influence of the implementation degree of the intervention over the observed effects.[9] Additionally, a normative assessment was performed in 2013, to compare the criteria and rules of the National Leprosy Control Program to what was observed at the place of the study. The investigation strategy was of single-case study, for enabling the observation of behaviors and organizational processes in many levels,[10] with the municipality of Camaragibe being the analysis unit and the Municipal Leprosy Control Program (MLCP), the case.

Context

Camaragibe is located in the west area of the Metropolitan Region of Recife, with total land area of 52.09 km^2, demographic density of 2,654 inhabitants/km^2 and estimated population, in 2012, of 146,847 inhabitants. The municipality has 29 neighborhoods, grouped into five political-administrative regions.[11] The MLCP of Camaragibe is developed at the primary care network, through the Primary Health Care, and

is composed of 42 Family Health teams, distributed into 40 Family Health units, besides a team of the Community Health Agents Program (CHAP) and a reference unit. The latter was excluded from the study for not developing actions of the program during the investigation period.

Stages of the evaluation process

The assessment was developed in four steps, as outlined below:

Step 1 – Construction of the Logical Model of MLPC

The Logical Model of MLPC intends to clarify the complex relationship between the structure, the process and the result and allows verifying the difference between planned intervention of LCA and empirical reality. The program was structured according to strategic areas (components) of the National Program: health care; epidemiological surveillance; management; and health education and communication. These strategic areas were developed by the teams from Family Health Care, at the management level of the Municipal Health Department of Camaragibe. The following documents from the Ministry of Health were used for its elaboration: Regulations and Ordinances (Ordinance No. 3,125, dated October 7th, 2010, which approves the guidance for surveillance, health care and control of leprosy; and Ordinance No. 594, dated October 29th, 2010, which classifies the comprehensive care for leprosy into levels I, II and III, in accordance with the infrastructure, competencies, equipment and core team); Technical Guides (Guide to Leprosy Control, 2002; Booklets for Primary Health Care Surveillance – Leprosy, 2.ed., 2008); and Management Report of the General-Coordination of the National Leprosy Control Program, 2011.[12] The need to use institutional documents from the Ministry of Health owes to the fact that these municipal programs adopt the guidelines and defined activities, recommended and validated in national scope, and their execution is the responsibility of municipalities. Figure 1 presents the Logical Model of MLPC, listing the activities and results expected to each of the four components aforementioned.

Step 2 – Development of the measure and judgment matrix

The Logical Model subsidized the development of the assessment questions that composed the measure and judgment matrix. Figure 2 presents, for each of the four components of MLPC, (i) indicators of structure, process and result dimension, (ii) parameters adopted for judgment and (iii) sources of data specified per indicator. The parameters were defined according to institutional documents or found in literature and, in case they were inexistent, referred by the researchers. The valuation of each selected indicator considered its degree of relevance on a scale from zero to 2, based on a previous study.[8]

Data collection

The indicators listed in the matrix were composed of (i) primary data, through non-participant direct observation, based on a script, and (ii) application of a questionnaire to professionals responsible for the program coordination (1), epidemiological surveillance (1) and health care – physicians, nurses and community health agents (CHA) (78), totalizing 80 professionals surveyed. The professionals with less than six months of work in the Family Health team and those working in units with no report of cases were excluded from the study. The data collection was performed from July to September 2013. The secondary data were extracted from the database of the Information System for Notifiable Diseases (Sinan) in leprosy, in August 2013.

Step 3 – Classification of degree of implementation

To calculate the degree of implementation, data from the normative assessment on structure and process indicators of each component were used. To calculate the degree of implementation of MLPC, maximum expected scores were referred to each of the components, taking into consideration their relevance in the reconstruction of the object study: management (30); health care (40); epidemiological surveillance (20); and health education and communication (10).

Initially, we determined the values observed (Σ of indicators scores) and calculated the degree of implementation, in percentage (Σ observed/Σ of maximum expected value x 100), for each component. The total degree of implementation was based on the sum of the listed indicators. The value obtained was compared with the maximum expected value of each component, obtaining the proportion to be classified as follows: program 'implemented' (90.0 to 100.0%), 'partially implemented' (70.0 to 89.9%), 'incipient'

(50.0 to 69.9%) and 'not implemented' (<50.0%). The ranking, rated by us, had higher level of demand than the traditionally used, due to the strictness of the epidemiological indicators and period of continuous activity of the program evaluated.

Step 4 – Analysis of results (effects) and influence of degree of implementation on the observed effects

The analysis of effects was performed taking into consideration the indicators contained in the matrix of measures of the Leprosy Control Program for the period 2010-2012, last years with information available on Sinan database. All indicators are represented in Figure 2, including the result, and the respective framework for judgment. After the definition of the degree of implementation of each component and the set of MLPC, these degrees were compared to the result indicators, confronting them with the developed model, overlapping each other to identify the aspects that strengthened or undermined the achievement of results.

Ethical aspects

The study project was approved by the Committee of Ethics in Research in Human Beings of the Institute of Comprehensive Medicine Professor Fernando Figueira – Report No. 352,513/2013; Certificate of Ethical Assessment Consideration No. 13430313.3.0000.5201 – on 31st July, 2013.

Results

Figure 3 details the set of indicators of structure and process used to assess the degree of implementation of the Municipal Leprosy Control Program of Camaragibe, the maximum values expected and reached for each component of MLPC, based on the definition of the degree of implementation of the intervention.

Figure 4 shows a summary of expected and reached values for each component and level of implementation of MLPC. The total level of implementation of MLPC of Camaragibe was classified as 'incipient' (58.3%). The degree of implementation by component ranged from 'not implemented' (health education and communication, 48.0%) to 'incipient' (management, 53.3%; health assistance, 57.2%) and 'partially implemented' (epidemiological surveillance, 73.0%).

Figure 5 presents the results of MLPC by component. The indicators related to management showed to be regular (changes in professional practices of technicians and higher education levels after training, respectively, 83.0% and 88.0%) or precarious (annual plan, 50.0%; uniformity of assistance flow, 15.0%; and problems resolution, 44.0%).

The annual detection rate of new cases in 2010 and 2011 was very high (respectively, 33.2 and 22.6/100 thousand inhabitants); and in 2012, high (19.7/100 thousand inhabitants). The same rate in individuals under 15 years old, in all three years, remained very high: from 2010 to 2011, it remained in 9.0/100 thousand inhabitants; and decreased in 2012 to 5.9/100 thousand inhabitants. The proportion of new cases of leprosy with a degree of physical disability assessed by diagnosis varied from 82.8% to 91.0%; the ratio of cure of new cases diagnosed in the years assessed varied between 24.0 and 73.0%. The proportion of dropout cases remained precarious in 2010 (33%), in 2011 (69.5%) and 2012 (34.1%). As for the quality of information, the consistency varied from 81.0 to 91.0%; and the absence of duplicates remained at 100.0% in all three years. For timely closure of cases, it varied from 70.3 to 78.4% (Figure 5).

The result indicators related to health education and communication were classified as precarious (promotion of social mobilization activity, 50.0%; and behavior of users after participation in activities of prevention, 59.0%) (Figure 5).

Discussion

The analysis of the Municipal Leprosy Control Program has exposed operational, technical and administrative obstacles, as already demonstrated in previous studies,[6,7] characterizing its degree of implementation in Camaragibe as 'incipient'. After nearly four decades after the recommendation of multidrug therapy by WHO, almost three after its formalization in Brazil,[13] and nearly two decades since the beginning of the process of decentralization of LCA to the Primary Health Care, it would be expected further progress regarding the implementation actions and the effects observed. Among the main critical points that contributed to the situation found, we should highlight: absence of referral service; low management autonomy and resolution; fragility of the information system;

precariousness of epidemiological surveillance actions and educational activities; and little joint efforts with social and institutional agents.

The methodological approach used – a single case study – is described as having high potential of internal validity, by analyzing in depth a phenomenon, allowing the program's functioning to be described and explained broadly, without sticking to specific issues about the object of evaluation.[9] The quality of theoretical articulation of the model relates to the internal validity of the study.[10] The construct of the Leprosy Control Program is well established, based on biomedical research and interventions applied in large scale.

The limitations of this research, inherent to single-case studies, relate to the excess of indicators in relation to the observation scores. Similarly, in this type of study we question the external validity, although what is sought is not the statistical generalization, but the analytical, based on the Logical Model of the program, that is, the extrapolation of the adopted model and not the empirical results.[10]

The inadequacy of the program's management in the municipal scope relates, among other aspects, to the insufficiency of monitoring process and epidemiological and operational indicators, of systematic evaluation of LCA and teams' supervision, besides the lack of annual planning of actions and dialogue with social control institutions. Similar findings to those highlighted were evidenced in evaluations of the Leprosy Control Program and the performance of Primary Health Care.[14-16]

Also, the weak management preparation, associated with the vertical municipal management and the lack of service integration, influence the program's condition, which becomes improvised, with low resolution of municipal services, as observed in another context.[17] In order to minimize such difficulties, it is suggested an accurate definition of attributions, improvement of communication between the several departments and sharing of responsibilities.[18]

Despite the low investment of management in the promotion of leprosy training among the health professionals, it was observed a change in their practices. Also, during the assessment of the role of training in the quality of LCA, it was found that the positive differential was the teaching/learning process and the commitment of professionals.[19] In a study conducted in Recife, in 2013, the training courses were analyzed from the professionals' perspectives, and it was revealed a need to negotiate the content and methodology from the problematization of the work, aiming at a better performance.[20] In spite of that, there are no guarantees of a proactive professional profile and transformation of the health care model.[21]

The influence of the implementation degree of the effects observed, by component, was convergent and divergent between some indicators, especially among the unsatisfactory: (i) low proportion of contacts examined, (ii) treatment dropout, (iii) limited standardization of patient care flow, and (iv) inadequate resolution of issues with management support. A previous study carried out in the same municipality almost a decade before (2004), showed divergences between the degree of implementation of strategic areas of Primary Health Care and the operational epidemiological indicators of the program,[22] similar to what was observed on the National Program.[7]

The rates of general detection and in individuals under 15 years of age showed very high endemicity, although the diagnostic activities were adequate, pointing out not only the increase of coverage of the health care system and diagnostic speed, but also – and mainly – expansion of the disease, reflecting a higher incidence of new cases.[23,24] However, the high indicator in individuals under 15 years shows a persistence of transmission and precocity of exposure to active sites, suggesting a deficiency in surveillance and disease control.[24] Most part of structure indicators of MLPC were deficient, which is a bottleneck and compromises the quality of assistance. Furthermore, when there is suspicion of the case, the referral to another service is frequent, which hampers early diagnosis and timely treatment. Reports about the lack of physicians in Primary Health Care, low professional commitment, deficient technical and scientific quality and inadequate performance are re-incident, overwhelming nurses, in addition to the transfer of responsibilities and blurring of roles.[25,26]

There are frequent reports about users in treatment or discharged from MLPC, who have not been evaluated for their degree of physical disability, perhaps due to the unfamiliarity, for many professionals, of the classification technique and its importance as a strategy to prevent disabilities.[27] The analysis of degree of implementation of health assistance in the current study

showed to be incipient. However, the indicators related to the level of physical disability in diagnosis ranged from regular to good during the three years studied, probably because some patients were evaluated according to State references, leaving the primary care in charge of notifying and starting treatment.

There was good evaluation regarding the active search for household contacts and dropout patients. Nonetheless, these procedures were not enough to ensure the high proportion of contacts examined and reverse the abandonment of treatment among newly diagnosed cases. The examination of contacts is essential to early discover new cases, guide about the signs of the disease and break of the chain of transmission.[24] Similarly, other authors observed that a reduced number of contacts have received such measure, whilst the intake of medication for several months and the appearance of leprosy reactions are possible explanations to dropouts or irregularity in treatment.[28]

In spite of the highlighted results, it is important to consider the quality of information of Sinan related to the consistency and existence of duplicity, because it could compromise the analysis of indicators.[14] The precarious conduction of these procedures by the municipality was not detected in the indicators due to the implementation, by the State Health Department, of emergency actions aiming to improve the quality of information from the public Sinan.

As the reference unit was not working the users were referred to other specialized services, located in other municipalities, adding barriers to access, such as cost and difficulties to schedule medical visits.[28] Finally, the promotion actions, such as health education and communication, are effective strategies for a good performance of programs related to neglected diseases, though they are demoted, according to findings of this study. When these actions take place, they are predominantly vertical and unilateral, emphasizing campaigns and production of educational material[29] in detriment to social and pedagogical practices developed by the team in partnership with social and institutional agents.[21,28] This practice must be focused on community participation, allied to experience with the disease and its' inclusion in the planning, execution and evaluation of actions. Thus, it is possible to favor changes in behavior, individual and collective health promotion and improve the community quality of life.[30]

In 2013, the Camaragibe MLPC presented an incipient degree of implementation in the municipality, with repercussions on the results achieved and here analyzed. The activities of health education and communication, as well as the program's management and health assistance, are more problematic, whereas the epidemiological surveillance is better structured. For the effective control of leprosy, it is necessary to overcome such difficulties, with greater mobilization of resources and enough investments to qualify municipal health care network, the reorganization of services and strengthening of the health information system.

Authors' contribution

Souza MF contributed to the conception and design of the study, collection, processing, analysis, and interpretation of results, writing and critical review of the intellectual content of the manuscript. Vanderlei LCM and Frias PG participated in the conception and design of the study, analysis, and interpretation of results, writing and critical review of the intellectual content of the manuscript. All the authors are responsible for all aspects of the study, ensuring its accuracy and integrity.

Acronyms: FHS, Family Health Strategy; LCA, Leprosy Control Actions; LCP, Leprosy Control Program; and Sinan, Information System for Notifiable Diseases.

Figure 1 – Summary of the Logical Model of the Leprosy Control Program in Camaragibe, Pernambuco, 2013

Indicator	Parameter	Technique	Respondent	Score
MANAGEMENT				
Structure				
Existence of Municipal Coordinator	Yes	Application of questionnaire	Coordinator of LCP	Yes=2.0;[a] No=0.0
Existence of technicians, being one from Sinan	Yes	Application of questionnaire	Coordinator of LCP	Yes=1.0;[a] No=0.0
Existence of rooms exclusive to the Leprosy Control Program and Epidemiological Surveillance	Yes, for the existence of both rooms (for the LCP and ES)	Direct observation and application of questionnaire	Coordinator of the LCP/ES	Yes for both =1.0;[a] Yes for one =0.5; No=0.0
Existence of a dermato-neurological complete kit (mono-filaments, 2 test tubes, clamps, Bunsen burner)	Yes	Direct observation and application of questionnaire	Coordinator of LCP	Yes=1.5;[a] No=0.0
Existence of inputs for self-care	Yes	Direct observation and application of questionnaire	Coordinator of LCP	Yes=1.0;[a] No=0.0
Existence of MDT MB (Rifampicin, Dapsone, Clofazimine) and PB (Rifampicin, Dapsone) and medicines for leprosy reactions (Prednisone, Thalidomide)	3 types of medicines	Application of questionnaire	Coordinator of LCP	Three = 2.0;[a] Two = 1.5; One = 1.0; None = 0.0
Existence of BCG vaccine	Yes	Application of questionnaire	Coordinator of LCP	Yes=1.0;[a] No=0.0
Existence of a vehicle	Yes	Application of questionnaire	Coordinator of LCP	Yes=1.0;[a] No=0.0
Existence of printed standardized kit of LCP (File B for leprosy monitoring, schedule card, referral and counter-referral form, book of records and follow-up of cases)	4 types of printed materials	Direct observation and application of questionnaire	Coordinator of LCP	Four =1.0;[a] Three=0.75; Two=0.5; One=0.25; None=0.0
Computers, printers, telephone and fax devices for the activities	4 types of equipment	Direct observation and application of questionnaire	Coordinator of LCP	Four = 1.0;[a] Three = 0.75; Two = 0.5; One = 0.25; None = 0.0
Sinan software installed	Yes	Direct observation and application of questionnaire	Coordinator of LCP	Yes=1.0;[a] No=0.0
Availability of technical assistance guidance	Yes	Direct observation and application of questionnaire	Coordinator of LCP	Yes=1.0;[a] No=0.0
Availability of internal regulations	Yes	Direct observation and application of questionnaire	Coordinator of LCP	Yes=0.5;[a] No=0.0
Process				
Existence of referral and counter-referral flow	Yes	Application of questionnaire	Coordinator of LCP	Yes=2.0;[a] No=0.0
Conduction of annual planning of LCP/ES actions	Yes for actions for LCP and ES	Application of questionnaire	Coordinator of the LCP/ES	Yes to two (PCH e VE) =1.5;[a] Yes to one (PCH ou VE) =1.0; No=0.0
Use of epidemiological and operational indicators for planning LCP/ES actions	Yes for actions for LCP and ES	Application of questionnaire	Coordinator of the LCP/ES	Yes for both (PCH e VE) =1.5;[a] Yes for one (PCH ou VE) =1.0; No=0.0
Monitoring of actions of LCP/ES	Yes for actions for LCP and ES	Application of questionnaire	Coordinator of the LCP/ES	Yes for both (PCH e VE) =1.5;[a] Yes for one (PCH ou VE) =1.0; No=0.0
Conduction of quarterly supervision	Yes, quarterly	Application of questionnaire	Coordinator of LCP	Quarterly=1.0;[a] Semi-annual=0.75; Annual =0.5; No=0.0
Discussion of the plan of action for leprosy control in the Municipal Health Council	Yes	Application of questionnaire	Coordinator of LCP	Yes=1.0;[a] No=0.0
Promotion of training on leprosy for the professionals in the previous five years	Yes	Application of questionnaire	Coordinator of the LCP and physician/nurse	Yes=1.5;[a] No=0.0

Figure 2 – Matrix of Measures of the Leprosy Control Program in Camaragibe, Pernambuco, 2013

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Indicator	Parameter	Technique	Respondent	Score
Promotion of training on leprosy for the professionals of the LCP/ES in the previous two years	Yes for LCP and ES	Application of questionnaire	Coordinator of the LCP/ES	Yes for both (PCH e VE); =1.5;[a] Yes for one (PCH ou VE) =1.0; No=0.0
Promotion of training on Sinan/Leprosy for the professionals of the LCP/ES in the previous two years	Yes for LCP and ES	Application of questionnaire	Coordinator of the LCP/ES	Yes for both (PCH e VE) =1.5;[a] Yes for one (PCH ou VE) =1.0; No=0.0
Development of integrated actions of LCP/ES with other technical areas	Yes, for actions of LCP and ES	Application of questionnaire	Coordinator of the LCP/ES	Yes for both (PCH e VE); =1.5;[a] Yes for one (PCH ou VE) =1.0; No=0.0
Result				
Elaboration of the annual management plan	Yes	Application of questionnaire	Coordinator of LCP	Yes=1.0;[a] No=0.0
Change in professional practice (technician level) post-training in leprosy	Yes	Application of questionnaire	Community Health Agent	Yes=1.0;[a] No=0.0
Change in professional practice (graduate level) post-training in leprosy	Yes	Application of questionnaire	Physician/nurse	Yes=1.0;[a] No=0.0
Change in solving problems related to LCA due to the management support	Yes	Application of questionnaire	Physician/nurse	Yes=1.0;[a] No=0.0
Standardization of patient care flow	Yes	Application of questionnaire	Physician/nurse	Yes=1.0;[a] No=0.0
HEALTH CARE				
Structure				
Physical structure adequate to the development of LCA in the FHS/CHAP (waiting room with chairs and space for users; meeting room; adequate number, size, lighting, ventilation of medical offices)	6 or more compartments	Direct observation and application of questionnaire	Physician/nurse	six or more=2.0;[a] four to five=1.5; three to two=1.0; less than 2=0.0
Physical structure adequate to the development of LCA in the reference unit (waiting room with chairs and space for users; meeting room; adequate number, size, lighting, ventilation of medical offices; space for rehabilitation and procedures)	6 or more compartments	Direct observation and application of questionnaire	Physician/nurse	six or more=2.0;[a] four to five=1.5; three to two=1.0; less than 2=0.0
Team to develop LCA in health units (physician, nurse, nursing technician, minimum of 5 CHA)	4 or more categories	Application of questionnaire	Physician/nurse	four or more=2.0;[a] three=1.5; two=1.0; a or 0=0.0
Team to develop the LCA in the reference unit (physician, nurse, nursing technician, physical therapist, occupational therapist)	4 or more categories	Application of questionnaire	Physician/nurse	four or more=2.0;[a] three=1.5; two=1.0; a or 0=0.0
Existence of MDT MB (Rifampicin, Dapsone, Clofazimine) and PB (Rifampicin, Dapsone) and medication for leprosy reactions (Prednisone, Thalidomide)	3 types of medicines	Application of questionnaire	Physician/nurse	three=2.0;[a] two=1.5; one=1.0; No=0.0
Existence of BCG to household contacts in the health care unit	Yes	Direct observation and application of questionnaire	Physician/nurse	Yes=1.0;[a] No=0.0
Existence of dermato-neurological complete kit in the health care unit	Yes	Direct observation and application of questionnaire	Physician/nurse	Yes=1.5;[a] No=0.0
Existence of inputs to self-care in the health care unit	Yes	Direct observation and application of questionnaire	Physician/nurse	Yes=1.0;[a] No=0.0
Process				
Diagnosis of cases in the health care service	Yes, always	Application of questionnaire	Physician/nurse	always=2.0;[a] often=1.5; sometimes=1.0; No=0.0
Conduction of dermato-neurological examination in the health care service	Yes, always	Application of questionnaire	Physician/nurse	always=2.0;[a] often=1.5; sometimes=1.0; No=0.0

Figure 2 – Matrix of Measures of the Leprosy Control Program in Camaragibe, Pernambuco, 2013

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Indicator	Parameter	Technique	Respondent	Score
Clinical and complementary examinations requested by the health care service	Yes	Application of questionnaire	Physician/nurse	Yes=1.0;[a] No=0.0
Identification of suspected cases by CHA and referral to health care units	Yes	Application of questionnaire	CHA	Yes=2.0;[a] No = 0.0
Evaluation of the DPD of the new cases of leprosy in the health care service	Yes, always	Application of questionnaire	Physician/nurse	always=1.5;[a] often=1.0; sometimes=0.5; No=0.0
Evaluation of the DPD of cured leprosy cases in the health service	Yes, always	Application of questionnaire	Physician/nurse	always=1.5;[a] often=1.0; sometimes=0.5; No=0.0
Guidance on self-care and prevention of disability, by the health care service	Yes, always	Application of questionnaire	Physician/nurse	always=1.5;[a] often=1.0; sometimes=0.5; No=0.0
Supervision of monthly dose intake by the health care service	Yes, any case	Application of questionnaire	Physician/nurse	always=1.5;[a] often=1.0; sometimes=0.5; No=0.0
Monthly follow-up of patients by CHA in health care units	Yes	Application of questionnaire	CHA	always=1.5;[a] often=1.0; sometimes=0.5; No=0.0
Supervision of monthly dose intake by the health care service	Yes, any case	Application of questionnaire	Physician/nurse	in all=1.5;[a] in some=1.0; No=0.0
Monthly follow-up of patients by CHA in health care units	Yes	Application of questionnaire	CHA	Yes=1.5;[a] No=0.0
Treatment of cases conducted in the health care service	Yes	Application of questionnaire	Physician/nurse	Yes=2.0;[a] No=0.0
Discussion on the conduction of cases in health care units, twice a month	Yes, always	Application of questionnaire	Physician/nurse	always=1.0;[a] often=0.75; sometimes=0.5; No=0.0
Use of protocols in health care service	Yes, always	Application of questionnaire	Physician/nurse	always=1.0;[a] often=0.75; sometimes=0.5; No=0.0
Conduction of exams in household contacts in health care units	Yes, in all	Application of questionnaire	Physician/nurse	in all =2.0[a] in some=1.0 No=0.0
Follow-up of cases for FHS/reference unit, when necessary	Yes	Application of questionnaire	Physician/nurse	Yes=1.0;[a] No=0.0
Validation of the diagnosis of recurrence by the reference unit	Yes	Application of questionnaire	Physician/nurse	Yes=1.0;[a] No=0.0
Treatment for leprosy reactions by the reference unit	Yes	Application of questionnaire	Physician/nurse	Yes=2.0;[a] No=0.0
Conduction of activities for physical rehabilitation at the reference unit	Yes	Application of questionnaire	Physician/nurse	Yes=2.0;[a] No=0.0
Results				
Annual detection rate for new cases (per 100 thousand inhabitants)	low	Sinan	Database	hyperendemic≥40.00; very high=20.00 to 39.99; high=10.00 to 19.99; medium=2.00 to 9.99; low<2.00[a]
Annual detection rate for new cases in children under 15 years of age (per 100 thousand inhabitants)	Low	Sinan	Database	hyperendemic≥10.00; very high=5.00 to 9.99; high=2.50 to 4.99; medium=0.50 to 2.49; low<0.50[a]
% of new cases with DPD evaluated during diagnosis	Good	Sinan	Database	good≥90.0%;[a] regular=75.0 to 89.9%; precarious<75.0%
% of leprosy cases assessed to DPD in discharge for cure	Good	Sinan	Database	good≥90.0%;[a] regular=75.0 to 89.9%; precarious<75.0%
% of cure of leprosy among new cases diagnosed in the cohort years	Good	Sinan	Database	good≥90.0%;[a] regular=75.0 to 89.9%; precarious<75.0%
EPIDEMIOLOGICAL SURVEILLANCE				
Structure				
Existence of graduate level technician	Yes	Application of questionnaire	Coordinator of ES	Yes=1.0;[a] No=0.0

Figure 2 – Matrix of Measures of the Leprosy Control Program in Camaragibe, Pernambuco, 2013

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Indicator	Parameter	Technique	Respondent	Score
Existence of vehicle	Yes	Application of questionnaire	Coordinator of ES	Yes=0.5;[a] No=0.0
Existence of complete printed kit for network distribution (Sinan notification/ investigation form, form for diagnostic investigation for under 15 years old, surveillance form for household contacts, form for DPD/ neurological simplified evaluation and form for investigation of possible recurrence)	4 types of printed forms	Direct observation and application of questionnaire	Coordinator of ES	four or more=1.0;[a] three=0.75; two=0.5; one or 0=0.0
Number of computers, printers, telephone and fax devices for the activities	4 types of equipment	Direct observation and application of questionnaire	Coordinator of ES	four or more=1.0;[a] three=0.75; two=0.5; one or 0=0.0
Sinan software installed	Yes	Direct observation and application of questionnaire	Coordinator of ES	Yes=1.0;[a] No=0.0
Availability of internal regulations	Yes	Direct observation and application of questionnaire	Coordinator of ES	Yes=0.5;[a] No=0.0
Availability of technical norms for network distribution	Yes	Direct observation and application of questionnaire	Coordinator of ES	Yes=0.5;[a] No=0.0
Process				
Monthly flow of notification of leprosy cases in the municipality	Yes	Application of questionnaire	Coordinator of ES	Yes=1.0;[a] No=0.0
Monthly issuance of FUR in leprosy to health care service	Yes	Application of questionnaire	Coordinator of ES	Yes=0.5;[a] No=0.0
Monthly monitoring of feedback of the FUR in leprosy by the health care service	Yes	Application of questionnaire	Coordinator of ES	Yes=0.5;[a] No=0.0
Routine of reviewing the reports before typing	Yes, always	Application of questionnaire	Coordinator of ES	always=1.0;[a] often=0.75; sometimes=0.5; No=0.0
Routine of analysis for duplicity	Yes, always	Application of questionnaire	Coordinator of ES	always=1.0[a] often=0.75; sometimes=0.5; No=0.0
Routine of information consistency analysis	Yes, always	Application of questionnaire	Coordinator of ES	always=1.0[a] often=0.75; sometimes=0.5; No=0.0
Data consolidation	Yes	Application of questionnaire	Coordinator of ES	Yes=1.0;[a] No=0.0
Quarterly discussion of indicators of leprosy with the health care service	Yes, quarterly	Application of questionnaire	Coordinator of ES	monthly/quarterly=0.75[a] quarterly/biannual=0.5; annual=0.25; No=0.0
Biannual elaboration and disclosure of epidemiological reports	Yes to both activities	Application of questionnaire	Coordinator of ES	Yes to both=0.5;[a] Yes to one=0.25; No=0.0
Active search for dropout cases with the teams	Yes	Application of questionnaire	Coordinator of ES	Yes=0.75;[a] No=0.0
Monitoring of cases report in individuals under 15 years old	Yes	Application of questionnaire	Coordinator of ES	Yes=0.5;[a] No=0.0
Monitoring of case closure at Sinan	Yes	Application of questionnaire	Coordinator of ES	Yes=1.0;[a] No=0.0
Filling in records book and follow-up of cases by health care units	Yes	Direct observation and application of questionnaire	Physician/ nurse	Yes=0.5;[a] No=0.0
Routine of notification of cases in the health care service	Yes	Application of questionnaire	Physician/ nurse	Yes=1.0;[a] No=0.0
Filling in the FUR in the health care service	Yes	Application of questionnaire	Physician/ nurse	Yes=0.5;[a] No=0.0

Figure 2 – Matrix of Measures of the Leprosy Control Program in Camaragibe, Pernambuco, 2013

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Indicator	Parameter	Technique	Respondent	Score
Active search for new cases by the health care service	Yes, always	Application of questionnaire	Physician/nurse and CHA	always=1.0;[a] often=0.75; sometimes=0.5; No=0.0
Active search for dropouts by the health care service	Yes, always	Application of questionnaire	Physician/nurse and CHA	always=1.0;[a] often=0.75; sometimes=0.5; No=0.0
Active search of household contacts by the health care service	Yes, always	Application of questionnaire	Physician/nurse and CHA	always=1.0;[a] often=0.75; sometimes=0.5; No=0.0
Results				
% of contacts examined among new cases diagnosed during the year	Good	Sinan	Database	good≥75.0%;[a] regular=50.0 to 74.9%; precarious<50.0%
% of leprosy cases who abandoned treatment among new cases	Good	Sinan	Database	good<10.0%;[a] regular=10.0 to 24.9%; precarious≥25.0%
Quality of information – Consistency	Good	Sinan	Database	good≥90.0%;[a] regular=70.0 to 89.9%; precarious<70.0%
Quality of information – Absence of duplicates	Good	Sinan	Database	good≥90.0%;[a] regular=70.0 to 89.9%; precarious<70.0%
Timely closure of cases	Good	Sinan	Database	good≥90.0%;[a] regular=70.0 to 89.9%; precarious<70.0%
HEALTH EDUCATION AND COMMUNICATION				
Structure				
Existence of room for educational activities	Yes	Direct observation and application of questionnaire	Physician/nurse	Yes=1.0;[a] No=0.0
Availability of audiovisual resources for activities	Yes	Direct observation and application of questionnaire	Physician/nurse	Yes=1.0;[a] No=0.0
Availability of resources for the development of educational activities in the health care service	Yes	Direct observation and application of questionnaire	Physician/nurse	Yes=1.0[a]; No=0.0
Process				
Joint partnership with the several social agents and institutions	Yes, always	Application of questionnaire	Physician/nurse and coordinator of LCP	always=2.0;[a] often=1.5; sometimes=1.0; No=0.0
Promotion of biannual actions by the LCP/ES with the health care service	Yes, for the promotion of actions by LCP and ES	Application of questionnaire	Coordinator of the LCP/ES	Yes for both (PCH e VE) =2.0;[a] Yes for one (PCH ou VE)=1.0; No=0.0
Organization of municipal campaign to increase early diagnosis	Yes	Application of questionnaire	Coordinator of LCP	Yes=1.0;[a] No=0.0
Monthly development of educational activities in the health care service	Yes, monthly	Application of questionnaire	Physician/nurse	monthly=2.0[a] bi-monthly/ quarterly=1.5; biannual/annual=1.0; No=0.0
Results				
Opinion of physicians and nurses about the behavioral changes of users after participation in educational activities	Yes	Application of questionnaire	Physician/nurse	Yes=1.0;[a] No=0.0
Promotion of social mobilization activities	Yes	Application of questionnaire	Coordinator of the LCP/ES	Yes=0.5;[a] No=0.0

a) Maximum value expected.
Acronyms: LCP, Leprosy Control Program; Sinan, Information System for Notifiable Diseases; ES, epidemiological surveillance; MDT, multidrug therapy; MC, multibacillary; PB, paucibacillary; BCG, Bacillus Calmette-Guérin; LCA, leprosy control actions; FHS, Family Health Strategy; CHAP, Community Health Agents Program; CHA, community health agent; DPD, degree of physical disability; and FUR, follow-up report.
(based on Leal et al.[8]).

Figure 2 – Matrix of Measures of the Leprosy Control Program in Camaragibe, Pernambuco, 2013

Indicator	Maximum score	Reached value	Proportion, by indicator (%)
MANAGEMENT			
Structure			
Existence of Municipal Coordinator	2.0	2.0	100.0
Existence of technicians, being one from Sinan	1.5	1.5	100.0
Existence of rooms exclusive to the Leprosy Control Program and Epidemiological Surveillance	1.0	–	–
Existence of a dermato-neurological complete kit (mono-filaments, 2 test tubes, clamps, Bunsen burner)	1.5	–	–
Existence of inputs for self-care	1.0	–	–
Existence of MDT MB (Rifampicin, Dapsone, Clofazimine) and PB (Rifampicin, Dapsone) and medicines for leprosy reactions (Prednisone, Thalidomide)	2.0	2.0	100.0
Existence of BCG vaccine	1.0	1.0	100.0
Existence of a vehicle	1.0	–	–
Existence of printed standardized kit of LCP (File B for leprosy monitoring, schedule card, referral and counter-referral form, book of records and follow-up of cases)	1.0	0.5	50.0
Computers, printers, telephone and fax devices for the activities	1.0	1.0	100.0
Sinan software installed	1.0	–	–
Availability of technical assistance guidance	1.0	1.0	100.0
Availability of internal regulations	0.5	–	–
Process			
Existence of referral and counter-referral flow	2.0	–	–
Conduction of annual planning of LCP/ES actions	1.5	1.0	67.0
Use of epidemiological and operational indicators for planning LCP/ES actions	1.5	–	–
Monitoring of actions of LCP/ES	1.5	1.0	67.0
Conduction of quarterly supervision	1.0	–	–
Discussion of the plan of action for leprosy control in the Municipal Health Council	1.0	–	–
Promotion of training on leprosy for the professionals in the previous five years	1.5	0.98	65.0
Promotion of training on leprosy for the professionals of the LCP/ES in the previous two years	1.5	1.5	100.0
Promotion of training on Sinan/Leprosy for the professionals of the LCP/ES in the previous two years	1.5	1.0	67.0
Development of integrated actions of LCP/ES with other technical areas	1.5	1.5	100.0
Management subtotal	30.0	16.0	53.3
HEALTH CARE			
Structure			
Physical structure adequate to the development of LCA in the FHS/CHAP	2.0	1.35	67.5
Physical structure adequate to the development of LCA in the reference unit	2.0	–	–
Team to develop LCA in health units	2.0	1.86	93.0
Team to develop the LCA in the reference unit	2.0	–	–
Existence of enough MDT MB and PB and medication for leprosy reactions in health care service	2.0	1.67	83.5
Existence of enough BCG to household contacts in the health care unit	1.0	0.85	85.0
Existence of dermato-neurological complete kit in the health care unit	1.5	0.04	2.5
Existence of inputs to self-care in the health care unit	1.0	–	–
Process			
Diagnosis of cases in the health care service	2.0	1.4	70.0
Conduction of dermato-neurological examination in the health care service	2.0	1.74	87.2

Figure 3 – Score of indicators used in the assessment of the degree of implementation of the Leprosy Control Program, according to the Logical Model component, in Camaragibe, Pernambuco, 2013

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Indicator	Maximum score	Reached value	Proportion, by indicator (%)
Clinical and complementary examinations requested by the health care service	1.0	0.88	88.0
Identification of suspected cases by CHA and referral to health care units	2.0	1.80	89.8
Evaluation of the DPD of the new cases of leprosy in the health care service	1.5	0.89	59.3
Evaluation of the DPD of cured leprosy cases in the health service	1.5	1.21	80.5
Guidance on self-care and prevention of disability, by the health care service	1.5	1.28	85.3
Supervision of monthly dose intake by the health care service	1.5	1.40	93.3
Monthly follow-up of patients by CHA in health care units	2.0	1.85	92.5
Treatment of cases conducted in the health care service	1.0	0.58	58.0
Discussion on the conduction of cases in health care units, twice a month	1.0	0.68	68.0
Use of protocols in health care service	2.0	1.66	83.0
Conduction of exams in household contacts in health care units	1.0	0.79	79.0
Follow-up of cases for FHS/reference unit, when necessary	1.0	–	–
Validation of the diagnosis of recurrence by the reference unit	2.0	–	–
Treatment for leprosy reactions by the reference unit	2.0	–	–
Healthcare subtotal	40.0	22.9	57.2
EPIDEMIOLOGICAL SURVEILLANCE			
Structure			
Existence of graduate level technician shared with other endemies	1.0	1.0	100.0
Existence of vehicle shared with other sectors	0.5	0.5	100.0
Existence of complete printed kit for network distribution	1.0	0.75	75.0
Number of computers, printers, telephone and fax devices for the activities of ES in leprosy	1.0	0.5	50.0
Sinan software installed for actions of ES in leprosy	1.0	1.0	100.0
Availability of internal regulations	0.5	0.5	100.0
Availability of technical norms of ES for network distribution	0.5	–	–
Process			
Monthly flow of notification of leprosy cases in the municipality	1.0	1.0	100.0
Monthly issuance of FUR in leprosy to health care service	0.5	–	–
Monthly monitoring of feedback of the FUR in leprosy by the health care service	0.5	–	–
Routine of reviewing the reports before typing	1.0	0.5	50.0
Routine of analysis for duplicity	1.0	0.5	50.0
Routine of information consistency analysis	1.0	0.5	50.0
Data consolidation	1.0	1.0	100.0
Quarterly discussion of indicators of leprosy with the health care service	0.75	0.5	66.7
Biannual elaboration and disclosure of epidemiological reports	0.5	0.5	100.0
Active search for dropout cases with the teams	0.75	–	–
Monitoring of cases report in individuals under 15 years old	0.5	0.5	100.0
Monitoring of case closure at Sinan	1.0	1.0	100.0
Filling in records book and follow-up of cases by health care units	0.5	0.4	80.0
Routine of notification of cases in the health care service	1.0	0.9	90.0
Filling in the FUR in the health care service	0.5	0.35	70.0
Active search for new cases by the health care service	1.0	0.9	90.0
Active search for dropouts by the health care service	1.0	0.88	88.0
Active search of household contacts by the health care service	1.0	0.88	88.0
Epidemiological surveillance subtotal	20.0	14.6	73.0

Figure 3 – Score of indicators used in the assessment of the degree of implementation of the Leprosy Control Program, according to the Logical Model component, in Camaragibe, Pernambuco, 2013

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Indicator	Maximum score	Reached value	Proportion, by indicator (%)
HEALTH EDUCATION AND COMMUNICATION			
Structure			
Existence of room for educational activities in the health care service	1.0	0.41	41.0
Availability of audiovisual resources for educational activities	1.0	0.05	5.0
Availability of resources for the development of educational activities in the health care service	1.0	0.29	29.0
Process			
Joint partnership with the several social agents and institutions	2.0	1.07	53.0
Promotion of biannual actions by the LCP/ES with the health care service	2.0	1.0	50.0
Organization of municipal campaign to increase early diagnosis	1.0	1.0	100.0
Monthly development of educational activities in the health care service	2.0	0.98	49.0
Subtotal da educação em saúde e comunicação	10.0	4.8	48.0

Acronyms: LCP, Leprosy Control Program; Sinan, Information System for Notiafible Diseases; ES, epidemiological surveillance; MDT, multidrug therapy-; MC, multibacillary; PB, paucibacillary; BCG, Bacillus Calmette-Guérin; LCA, leprosy control actions; FHS, Family Health Strategy; CHAP, Community Health Agents Program; CHA, community health agent; DPD, degree of physical disability; and FUR, follow-up report.

Figure 3 – Score of indicators used in the assessment of the degree of implementation of the Leprosy Control Program, according to the Logical Model component, in Camaragibe, Pernambuco, 2013

Components	Maximum value expected	Reached value	Degree of Implementation (%)
Management	30.0	16.0	53.3
Health care	40.0	22.9	57.2
Epidemiological Surveillance	20.0	14.6	73.0
Health Education and Communication	10.0	4.8	48.0
Degree of Implementation TOTAL	100.0	58.3	58.3

Degree of Implementation

Implemented 100 to 90% | Partially implemented 89 to 70% | Incipient 69 to 50% | Not implemented <50%

Figure 4 – Degree of implementation of the Leprosy Control Program, Camaragibe, Pernambuco, 2013

Indicators	Parameters	Sinan indicators			Score achieved (%)
		2010	2011	2012	
MANAGEMENT					
Annual management plan developed and implemented	Good: ≥90,0% Regular: 70,0 to 89,9% Precarious: <70,0%	–	–	–	50.0
Change in professional practices (graduate level) post-training in leprosy		–	–	–	88.0
Change in professional practices (technician level) post-training in leprosy		–	–	–	83.0
Change in addressing the obstacles about LCA by the support of management		–	–	–	44.0
Standardization of patient care flow		–	–	–	15.0
HEALTH CARE					
Annual detection rate of new cases (per 100 thousand inhabitants)	Hyperendemic: ≥40,00/100 mil hab. Very high: 20,00 to 39,99/100 mil hab. High: 10,00 to 19,99/100 mil hab. Medium: 2,00 to 9,99 /100 mil hab. Low: <2,00 /100 mil hab.	33.2	22.6	19.7	–

Figure 5 – Results of the Leprosy Control Program, Camaragibe, Pernambuco, 2013

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Indicators	Parameters	Sinan indicators			Score achieved (%)
		2010	2011	2012	
Annual detection rate of new cases in individuals under 15 years old (per 100 thousand inhabitants)	□ Hyperendemic: ≥10,00/100 mil hab. □ Very high: 5,00 to 9,99/100 mil hab. □ High: 2,50 to 4,99/100 mil hab. □ Medium: 0,50 to 2,49/100 mil hab. □ Low: <0,50/100 mil hab.	9.0	9.0	5.9	–
Proportion of new cases with DPD evaluated during diagnosis	□ Good: ≥90,0% □ Regular: 75,0 to 89,9% □ Precarious: <75,0%	87.5	91.0	82.8	–
Proportion of leprosy cases assessed by DPD in the moment of high cure percentage		29.0	0.0	81.0	–
Proportion of leprosy treatment among new cases diagnosed in cohorts		73.0	24.0	68.8	–
EPIDEMIOLOGICAL SURVEILLANCE					
Proportion of contacts examined among contacts registered of new cases diagnosed in the year	□ Good: ≥75,0% □ Regular: 50,0 to 74,9% □ Precarious: <50,0%	57.0	12.2	28.4	–
Proportion of dropout leprosy cases among new cases diagnosed	□ Good: <10,0% □ Regular: 10,0 to 24,9% □ Precarious: ≥25,0%	33.0	69.5	34.1	–
Quality of information - Consistency	□ Good: ≥90,0% □ Regular: 70,0 to 89,9% □ Precarious: <70,0%	91.0	84.0	81.0	–
Quality of information - Absence of Duplicates		100.0	100.0	100.0	–
Timely closure of cases		74.5	78.4	70.3	–
HEALTH EDUCATION AND COMMUNICATION					
Opinion of physicians and nurses about the behavioral changes of users after participation in educational activities	□ Good: ≥90% □ Regular: 70 to 89,9% □ Precarious: <70%	–	–	–	59.0
Promotion of social mobilization activities		–	–	–	50.0

Acronyms: Sinan, Information System for Notifiable Diseases; LCA, leprosy control actions; and DPD, degree of physical disability.

Figure 5 – Results of the Leprosy Control Program, Camaragibe, Pernambuco, 2013

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