

**Challenges in schistosomiasis control in Sergipe, Brazil: from 2013 to 2018**

**Desafios no controle da esquistossomose em Sergipe, Brasil: de 2013 a 2018**

**Desafíos en el control de la esquistosomiasis en Sergipe, Brasil: de 2013 a 2018**

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**Abstract**

This study aimed to analyze the performance of the Schistosomiasis Epidemiological Surveillance System in Sergipe, Brazil. This study used a mixed methodology, with a quantitative approach and the application of semi-structured interviews, directed to professionals of Health Surveillance and Primary Care in seven regional health departments headquarters in Sergipe, as well as information obtained in Sistema de Informação do Programa de Controle da Esquistossomose (SISPCE), Sistema de Informação sobre

Mortalidade (SIM) and Sistema de Informação de Agravos de Notificação (SINAN). Interviews were applied from March to October 2018 and secondary data obtained in the information systems corresponded to the period between 2013 and 2018, when structure and process indicators were compared with result indicators. The main critical point was the lack of implementation of the Schistosomiasis Control Program (PCE) in the entire endemic area, lack of interaction between Epidemiological Surveillance and Primary Care, deficiencies in the management and execution of field actions. Failures in the implantation in the PCE, in the structure and process of the Surveillance System, in addition to the need for greater integration between the professionals of the Epidemiological Surveillance and other health sectors, negatively influence the results of the PCE, and may have similar causes and results in the others endemics of the state.

**Keywords:** Health evaluation; Epidemiological surveillance; Schistosomiasis.

### **Resumo**

Este estudo teve como objetivo analisar o desempenho do Sistema de Vigilância Epidemiológica da Esquistossomose em Sergipe, Brasil. Foi utilizada metodologia mista, com abordagem quantitativa e aplicação de entrevistas semiestruturadas, direcionadas aos profissionais da Vigilância em Saúde e Atenção Básica de sete regionais de saúde sediadas em Sergipe, bem como informações obtidas no Sistema de Informação do Programa de Controle da Esquistossomose (SISPCE), Sistema de Informação sobre Mortalidade (SIM) e Sistema de Informação de Agravos de Notificação (SINAN). As entrevistas foram aplicadas de março a outubro de 2018 e os dados secundários obtidos nos sistemas de informação corresponderam ao período de 2013 a 2018, quando foram comparados indicadores de estrutura e processo com indicadores de resultado. Foi demonstrado como ponto crítico principal, a ausência de implantação do Programa de Controle da Esquistossomose (PCE) na totalidade da área endêmica, falta de interação entre Vigilância Epidemiológica e Atenção Básica, deficiências na gestão e execução de ações de campo. Falhas na implantação no PCE, na estrutura e no processo do Sistema de Vigilância, além da necessidade de uma maior integração entre os profissionais da Vigilância Epidemiológica e demais setores da saúde, influenciam negativamente nos resultados do PCE, podendo ter causas e resultados semelhantes nas demais endemias do estado.

**Palavras-chave:** Avaliação em saúde; Vigilância epidemiológica; Esquistossomose.

## Resúmen

Este estudio tuvo como objetivo analizar el desempeño del Sistema de Vigilancia Epidemiológica de la Esquistosomiasis en el estado de Sergipe. Para ello, se utilizó una metodología mixta, con un enfoque cuantitativo, con la aplicación de entrevistas semiestructuradas, dirigidas a profesionales de Vigilancia en Salud y Atención Primaria (AB) en las sedes de los siete departamentos regionales de salud del estado. De esta manera, se obtuvo información a través del Sistema de Información del Programa de Control de Esquistosomiasis (SISPCE), Sistema de Información de Mortalidad (SIM) y Sistema de Información de Enfermedades Notificables (SINAN). Las entrevistas fueron aplicadas entre los meses de marzo a octubre 2018 y los datos secundarios, obtenidos a partir de estos sistemas de información, corresponden al período de 2013 y 2018 cuando la comparación de los indicadores de estructura y de proceso con los indicadores de resultados se llevó a cabo. Se encontró que los principales puntos críticos: la ausencia de actividades PCE en varios municipios de un área endémica; falta de interacción entre Vigilancia Epidemiológica (VE) y Atención Primaria; y las deficiencias en la gestión y ejecución de acciones de campo.

**Palabras clave:** Evaluación de la salud; Vigilancia epidemiológica; Esquistosomiasis.

## 1. Introduction

Schistosomiasis is the most widespread parasitosis in the world, affecting specially the population from underdeveloped or developing countries. It manifest most often in its most severe form, in individuals living in areas with poor basic sanitation (Andrade Filho, de Queiroz, dos Reis, Amaral, & Brito, 2015; M'Bra et al., 2018; Zoni, Catalá, & Ault, 2016).

Being among the most widespread parasitic diseases in the world, schistosomiasis in Sergipe is highly associated with the population's socioeconomic condition and its high prevalence is of great relevance as a public health issue (S. de V. em S. M. da Saúde, 2018).

The Ministry of Health (MS) attributes to Epidemiological Surveillance (ES) data collection, analysis and processing. Based on this information, some control measures need to implemented, such as the promotion of control actions; efficiency and effectiveness evaluation; and data dissemination (M. da S. (MS). S. de V. em Saúde, 2014). Thus, ES function comes down to an information-decision-action, also involving other determinants in the health-disease process (S. S. B. da S. Santos & Melo, 2008).

ES has, among its main objectives, measures installation and implementation measures to reduce deaths, infections, and diseases expansion and health problems. To achieve such

objectives regarding Schistosomiasis, it is necessary to adopt strategies that involve the entire disease environment: perform parasitological tests, assess the positivity percentage, provide treatment, map risk areas and monitor the hosts (BRASIL, Secretaria de Vigilância em Saúde., & Epidemiológica, 2010).

A study carried out in Amazonian capitals, demonstrated the association between population growth and deficiency in basic sanitation, evidencing a geographical neglect that contributes to the endemicity of several diseases linked to poverty, besides causing a vulnerability in the actions developed in the municipalities (A. P. de Oliveira, de Aguiar, & Pontes, 2020; Marinho, Pontes, & Bichara, 2020).

The decentralization of disease surveillance and control actions, from a federal to a municipal level (Portaria Ministerial No. 1,399 from December 15, 1999), regulated the competences on the subject for the Union, States, Municipalities and the Federal District (BRASIL, 1999). Thus, with some actions from control programs for diseases transmitted by vectors, hosts and reservoirs under municipal competence, it was also necessary to structure all Surveillance Systems (Menezes, Carmo, & Samico, 2012).

Schistosomiasis is currently present in 19 states, with notifications in all Brazilian states. Endemic areas are present in Alagoas, Bahia, Pernambuco, Rio Grande do Norte, Paraíba, Sergipe, Espírito Santo and Minas Gerais. Focal areas can be observed in Pará, Maranhão, Piauí, Ceará, Rio de Janeiro, São Paulo, Santa Catarina, Paraná, Rio Grande do Sul, Goiás and Federal District (Katz, 2018; S. S. B. da S. Santos et al., 2012; M. da S. (MS). S. de V. em Saúde, 2014).

According to the Health Surveillance Secretariat, in 2011 Sergipe state, considered endemic for Schistosomiasis, had the third highest prevalence in the country and the second in the northeast region (BRASIL, 2013). Silva, Melo and Melo (2015) (Silva, de Melo, & Melo, 2015), identified vulnerable areas and occurrences of Schistosomiasis in Sergipe and observed that, between 2010 and 2014, the state's epidemiological profile had not changed compared to that seen in 2011. Currently, Sergipe is the first in the Schistosomiasis prevalence for municipalities with up to 500,000 inhabitants and the third among those municipalities with a population greater than 500,00 inhabitants (Katz, 2018).

The knowledge and practical attitudes about Schistosomiasis have been used as strategies to control and / or reduce this parasitosis prevalence (Folefac et al., 2018). Therefore, it is necessary to use techniques to evaluate this knowledge and to develop actions from control programs within the Health Systems (CDC – Center for Disease Control and Prevention, 2001).

Ministry of Health (Portaria No. 1,271 from June 6, 2017; (Brasil, 2014)), defines the National List of Compulsory Notification of diseases, injuries and public health events, in public and private health services throughout the national territory. It recommends that Schistosomiasis surveillance should be carried out in two ways: passive, in a non-endemic area, with cases notification and investigation in Sistema de Informação de Agravos de Notificação (SINAN); and active, in an endemic area, with census surveys, patients' treatment and monitoring of cases registered in Sistema de Informação do Programa de Controle da Esquistossomose (SISPCE).

Schistosomiasis endemic areas have been extensively studied, especially with researches addressing both the disease and control measures (Barbosa, Gomes, Marcelino, Cavalcante, & Nascimento, 2017; Correia, Padilha, & Vasconcelos, 2014; A. D. dos Santos, Melo, Santos, & Araújo, 2015; Weatherhead, Hotez, & Mejia, 2017). On the other hand, interest has grown regarding the Surveillance Systems, in which researchers have highlighted the evaluation of Public Health Programs as essential supports for public policies elaboration (Ohira, Cordoni Junior, & Nunes, 2014; Viacava et al., 2004; Vieira & Calvo, 2011).

This context shows, in a relevant way, the great impact of schistosomiasis in Public Health, in Brazil and worldwide. Thus, the present study aimed to analyze the performance of the Epidemiological Surveillance System (ESV) of Schistosomiasis in the state of Sergipe, providing important information to help control and prevent this endemic disease.

## **2. Material and Methods**

This study was developed with an evaluative, descriptive, quantitative / qualitative approach, comprising primary and secondary data. The strategy was to analyze components from Epidemiological Surveillance System for Schistosomiasis, using the information from Guidelines for Evaluating Surveillance Systems do CDC/EUA (Center for Disease Control and Prevention) as reference (CDC, 2000). The structure and process analysis of the Schistosomiasis Epidemiological Surveillance was based on the precepts of health quality evaluation recommended by Donabedian (1990) (Donabedian, 1990).

The state of Sergipe has 75 municipalities, administratively divided into seven health regions (Figure 1). Of these, 51 (distributed in six of the health regions) belong to the endemic area for Schistosomiasis and 24 are part of an indemnities area. According to data from the last national prevalence survey, exclusive for Schistosomiasis and carried out from 1977 to

1981, only Regional of Nossa Senhora da Glória had 100% of the component as indemnity municipalities.

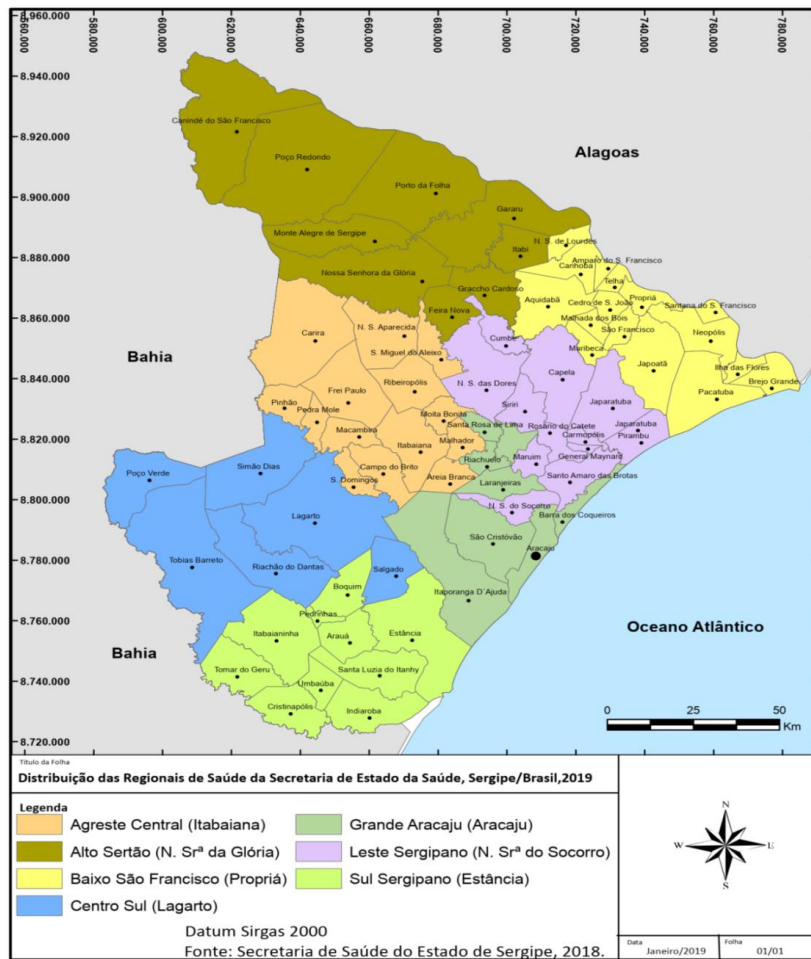
The study scenario comprised all six municipalities that host regional health endemic for Schistosomiasis. For the primary data, they were obtained through interviews with managers, doctors and other patient care professionals. The interviews took place with the application of semi-structured questionnaires, from the second semester of 2017 from the first semester of 2018.

The questionnaires were prepared according to the triad precepts: structure, process and results, proposed by Donabedian (1990) (Donabedian, 1990) for health evaluation, which contained questions regarding some variables related to management and epidemiology.

During health and endemic agents' interviews, other municipalities in the endemic area participated in addition to the regional headquarters. Questionnaires were applied to Municipal Endemic Coordinators, Municipal ES Coordinators, doctors and nurses from the Family Health Program (PSF), endemic supervisors (field supervisors), community health agents and endemic agents. Other health professionals were also interviewed as part of the health surveillance process in Sergipe, totalizing one manager from each of the six endemic regional headquarter, 09 health professionals (including doctors and nurses) and 58 agents (between community health and endemic agents). Community health agents are those who carry out activities related to the PSF and endemic agents are responsible for performing functions with the teams that treat endemic diseases within the Municipal Epidemiological Surveillance.

The inclusion criteria of municipalities were: belonging to different regional health departments in the state; be the headquarters of the regional department or the one with the largest population within the regional health department; and belong to one of the endemic areas for Schistosomiasis.

**Figure 1.** Map showing the administrative division of the regional health departments in Sergipe, Brazil, 2019.



Source: Secretaria de Saúde do Estado de Sergipe (2018).

Secondary data from 2013 and 2018 were obtained from the Sergipe State Department of Health (SES-SE) / Endemic Center, through Information System of the Schistosomiasis Surveillance and Control Program (SISPCE), Information System for Notifiable Diseases (SINAN) and Mortality Information System (SIM). For the search for information in these databases, code B 65.9 of the International Code of Diseases (ICD, version 10) corresponding to Schistosomiasis, was used. Population data were obtained on the Brazilian Institute of Geography and Statistics website (Demográfico, 2010).

To analyze the Schistosomiasis Surveillance System performance, regarding attributes related to quality (simplicity, flexibility, acceptability and stability), questionnaires were applied only to managers and coordinators who directly participated in the activities of Epidemiological Surveillance System in regional health centers and those responsible for Basic Health Units (BHU).



To evaluate the structure, the sum of means found for the System subject and object was performed. The Subject was the interviewee's perception of human resources, material and activity flow in the Surveillance System (SS). In the information about the Process, attributes recommended by the CDC / USA were evaluated, as well as the guidelines suggested by the WHO, which were simplicity, acceptability, flexibility and stability (CDC – Center for Disease Control and Prevention, 2001).

General elements of structure, process and usefulness of the system were assessed by means of a score given to each evaluated attribute. Thus, the following values were assigned: 1) Subject: 0 to 3 (insufficient); 4 to 7 (little enough) and 8 to 11 (sufficient), with a total value of 11 points. 2) Object: 0 to 1 (insufficient), 2 to 4 (little enough) and 5 to 6 (sufficient). The structure had as qualification values: 0 to 9 (insufficient), 10 to 14 (little enough) and 15 to 17 (adequate).

Questionnaires were based on the models applied by Menezes, Carmo and Samico (2012) (Menezes et al., 2012) and three different models were used with specific questions for the interviewee's activity within the ES: Model 1 - Managers (secretaries, managers, coordinators and directors); Model 2 - Doctors, Nurses, Social Workers; and Model 3 - Community Health Agents, Endemic Agents, Laborers, Digitizers and other employees. stages: organization, transcription and tabulation. The content obtained in the interviews, by observation and discussion with the regional professionals and managers, was organized in stages: organization, transcription and tabulation.

Data obtained through the Information Systems and interviews were compiled in a 2010 Microsoft Office Excel Program. Nominal and ordinal qualitative variables were obtained through a uni-varied descriptive analysis, proceeding to an extracted data categorization, obtaining the respective frequencies and percentages of categorical variables. For quantitative variables, data analysis was performed with the calculation of means and standard deviation.

The percentage of stratified patients corresponded to the sum of the infected population observed through active search (Schistosomiasis Control Program – SCP) and spontaneous demand (Primary Care - PC), divided by the total of treatments performed.

To calculate prevalence, the population registered through the AB was excluded due to the absence of a total number of those examined. Regarding structure, items percentages were calculated in accordance with the observed in each questionnaire domains. In all analyzes, missing values were disregarded for the statistical calculation. Computed scores had a maximum score equal to 100 and a minimum score equal to zero.

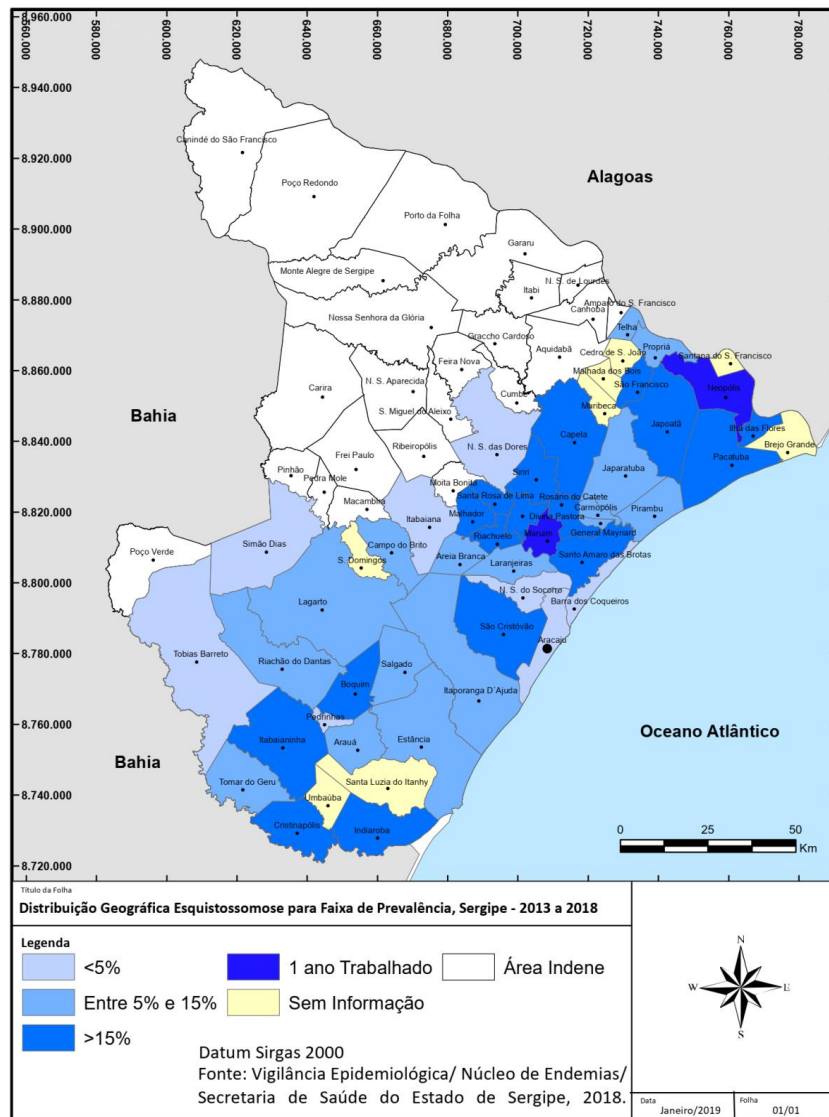


Maps were made by means of digital cartography from Software ArcGIS 10, with data obtained from SCP, SIM and SINAN from 2103 to 2018, as well as from the cartographic base of the Digital Atlas on Water Resources of the State of Sergipe (SRH – Superintendência de Recursos Hídricos, 2016) on the scale of 1: 100,000. The study followed the precepts recommended by Resolution No. 466/2012 from Conselho Nacional de Saúde (CNS) / MS and approved by the Ethics Committee, of Universidade Federal de Sergipe / UFS (Parecer No. 2,771,511).

### **3. Results**

Schistosomiasis transmission from 2013 to 2018 was present in six of the regional health regions of the state, occurring mainly in the coastal area, except in the regional area of Nossa Senhora da Glória, for being harmless (Figure 2).

**Figure 2.** Geographical distribution of Schistosomiasis by average prevalence range and municipality in Sergipe, Brazil, from 2013 to 2018.



Source: Vigilância Epidemiológica/Núcleo de Endemias/Secretaria de Saúde do Estado de Sergipe, 2018.

From 2013 to 2018, Schistosomiasis mean prevalence in Sergipe was 7.5% and an average of 31 municipalities developed active search activities for the disease (Table 1). In the same period, it was observed that in 2014, 2017 and 2018, the number of parasitized patients was higher in spontaneous demand, Primary Care (PC) when compared to active search (SCP).

**Table 1.** Historical series of the population infected with *Schistosoma mansoni* and treatment carried out in Sergipe, Brazil, from 2013 to 2018.

Year	Municipalities observed	Population examined	Infected population		Performed treatment	Prevalence (%)	Treated (%)
			SCP	PC			
			2013	34			
2014	33	47,058	3,248	3,721	2,567	6.8	37
2015	36	61,485	4,721	3,636	6,767	7.4	81
2016	31	29,159	4,257	3,926	6,386	9.6	78
2017	26	39,776	3,043	4,298	6,598	7.0	90
2018	28	27,170	1,839	3,624	4,240	6.4	78
<b>Mean</b>	31	44,569	3,701	3,696	5,114	7.5	69

Source: Secretaria de Estado da Saúde/SE/Núcleo de Endemias/PCE.

The percentage of individuals treated in 2015 (81%) and 2017 (90%), respectively, was obtained by the ratio between the infected population and the total treatment performed in the year. The PCE was inactive in 18 of the 51 endemic municipalities, that is, they were municipalities that had not performed an active search for at least one year (Table 2). In these municipalities, patients came exclusively from Primary Care.

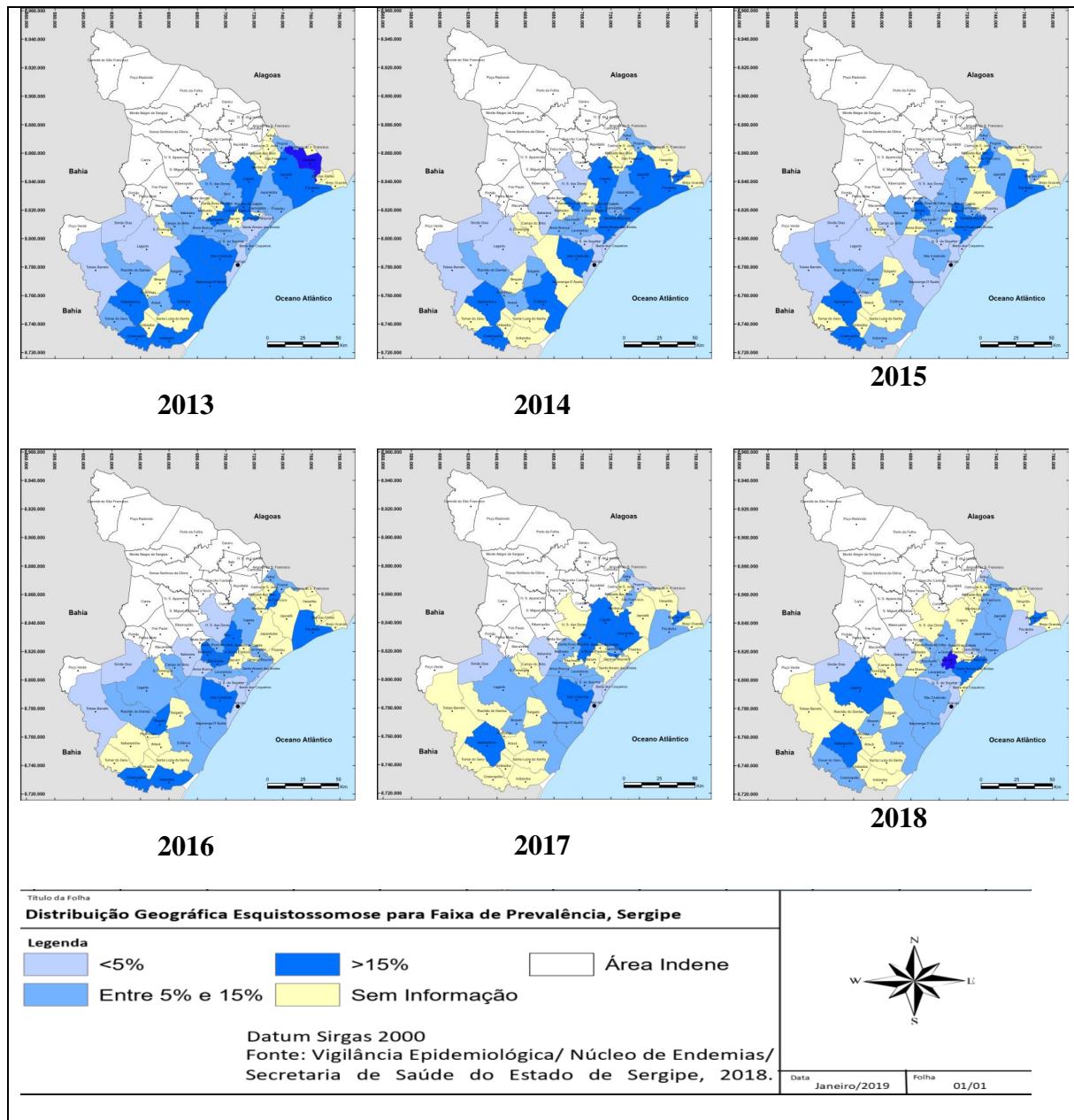
**Table 2.** Representation of endemic municipalities from the Schistosomiasis Control Program (PCE) in Sergipe, Brazil, 2018.

<b>Regional</b>	<b>Number of endemic municipalities</b>	<b>Municipalities without Active search</b>	<b>Year without active search</b>
Itabaiana	5	1	1
Lagarto	5	3	4 e 2
N. Sra do Socorro	11	4	5, 3 e 2
Estância	10	4	6, 4, 3
Propriá	12	6	5 e 6
Aracaju	8	0	0
<b>Total</b>	<b>51</b>	<b>18</b>	<b>-</b>

Source: Secretaria de Estado da Saúde/SE/Núcleo de Endemias/PCE.

Figure 3 represents Schistosomiasis prevalence from 2013 to 2018 in the municipalities, as well as information about those who failed to update data in the Information Systems - SISPCE and SINAN.

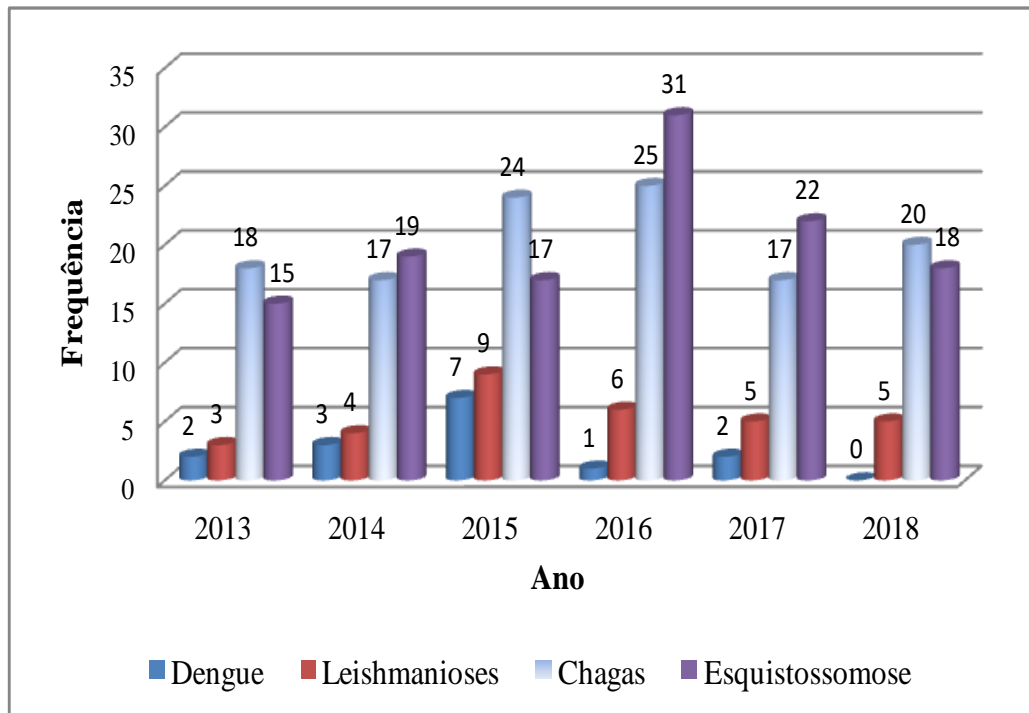
**Figure 3.** Maps representing the distribution of Schistosomiasis prevalence in municipalities from Sergipe, Brazil, from 2013 to 2018.



Source: Secretaria de Saúde do Estado de Sergipe (2018).

Regarding the number of deaths due to endemic diseases in Sergipe (dengue, Leishmaniasis, Chagas disease and Schistosomiasis), there was a predominance of Chagas disease and Schistosomiasis throughout the historical series (Figure 4). During the studied period the mortality rate in Sergipe was 0.86/100,000 inhabitants (Brasil, 2014).

**Figure 4.** Historical series of deaths frequency among endemic diseases caused by vectors in Sergipe, Brazil, from 2013 to 2018.



Source: Authors' source (2020).

In the questionnaires answers regarding structure, the assessment was considered to be insufficient (average 14.2), having as factors that most influenced the interviewees perception: lack of physical and personal organization, especially the turnover of endemic professionals and the lack of integration between the SCP, PC and other health, education and infrastructure sectors in the municipalities.

The elements (human and material resources) and object (population served) were considered insufficient, being reported on open questions: the lack of articulation among several sectors of municipal surveillance; the lack of integration between the teams of community health agents and endemic patients; poor visibility of the endemic disease, especially among managers; and accommodation of health professionals and the population in the face of endemic diseases that affect the cities studied (Table 3).

**Table 3.** Component evaluation: subject and object in the structure of the Epidemiological Surveillance of Schistosomiasis in health regions from Sergipe, Brazil, in 2018.

Regional	Score			Quality evaluation
	Subject	Object	Structure	
	(Max. 11)	(Max. 6)	(Max. 17)	
Aracaju	7.0	3.3	10.3	Little enough
Itabaiana	9.0	5.0	14.0	Little enough
Estância	11.0	6.0	17.0	Adequate
Lagarto	7.5	6.0	13.5	Little enough
Propriá	9.0	6.0	15.0	Adequate
Nossa Senhora do Socorro	10.5	5.0	15.5	Adequate

Source: Authors' source (2020).

Of the attributes analyzed, simplicity and flexibility were those with the lowest evaluation (Table 4). Simplicity referred to the structure in terms of ease in operation, which should be a simple operation system and flexibility to adapt, using strategies to detect cases, active or passive search (spontaneous demand).



**Table 4.** Evaluation of the attributes of the Epidemiological Surveillance system in the health regions of the state of Sergipe, Brazil, 2019.

<b>System attributes</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>Minimum</b>	<b>Maximum</b>
Simplicity	33.57	30.01	0.00	100.00
acceptability	53.85	47.70	0.00	100.00
Flexibility	38.89	27.83	0.00	100.00
Stability	59.62	28.02	25.00	100.00

Source: Authors' source (2020).

The averages obtained corresponded to the percentage of the questionnaires positive responses. The high values in the standard deviation demonstrated the variability of the interviews responses.

Acceptability, defined by the CDC (2001) as the willingness of individuals and organizations to participate in the surveillance system, and stability, as the actions feedback, was the best-rated attribute.

Coordinators, directors and managers in general had a previous level of management experience, but the average number of months in the job was less than one year. Although the answers indicate 100% of the implanted SCP, there was only information from the headquarters (Table 5).

**Table 5.** Descriptive summary of questionnaires applied to coordinators, directors and managers of endemic diseases in the health regions from Sergipe, Brazil, in 2018.

<b>Variable</b>	<b>Category</b>	<b>N</b>	<b>%</b>
Education	High School	4	33.3
	College degree	8	66.6
Received training / course	Yes	7	63.6
Previous experience	Yes	8	66.6
There is work plan	Yes	12	100.0
There are meetings in the municipality	Yes	11	91.6
SCP implanted	Yes	12	100.0
There was a secretary change	Yes	7	58.3
There was a coordinator change	Yes	6	54.5
Municipal resources for endemic diseases	Yes	10	83.3
State / Federal resources	Yes	12	100.0
Joint activities with Primary Care	Yes	9	75.0
Structure for treatment	Yes	9	75.0
Work with other departments	Yes	7	58.3
Municipal council participating in health actions	Yes	8	66.6
<b>Variable</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>Max/Min</b>
Time in the job (months)	7.6	7.4	25 11

Source: Authors' source (2020).

Doctors and other health professionals such as nurses, social workers and veterinarians, reported that some of them were not hired for the Family Health Strategy (FHS) Program. Most of them did not receive information about endemic diseases, as there were no meetings for this purpose. The average number of months in the job, in general, was less than one year (Table 6).

**Table 6.** Descriptive summary of questionnaire applied to doctors and other health professionals in the regions from Sergipe, Brazil, in 2018.

Variable	Category	N	%	
Work for the PSF *	Yes	5	55.6	
Has a graduate degree	Yes	6	66.7	
Previous experience	Yes	8	66.7	
Receive some training	Yes	5	55.6	
Performs notifications	Yes	5	55.6	
Receive information about endemic diseases	Yes	7	77.8	
Participate in meetings about endemic diseases	Yes	7	77.8	
PSF / endemic joint work	Yes	7	77.8	
Have structure for Schistosomiasis treatment	Yes	8	66.7	

Variable	Mean	Standard deviation	Max	Min
Time in the job (months)	8.67	1.97	10	5

\*PSF – Family Health Program. Source: Authors' source (2020).

The consolidation of the answers given by endemics and / or health agents from the FHS showed that the majority had high school education and received training for the function they performed (Table 7). Epidemiological information were provided written and, in the interviews, was reported that they received most of the information during training.

Notifications should be carried out by typists trained for this purpose, within the surveillance sectors from the municipal departments. However, in the questionnaire applied to

endemic diseases agents, the majority replied that they always made the notifications. They also reported that the population's participation in preventive measures was low.

**Table 7.** Descriptive summary of the questionnaire applied to endemic diseases agents from the health regions from Sergipe, Brazil, in 2018.

Variable	Category	N	%
Education	Elementary	1	1.7
	High School	47	81.0
	College	10	17.2
Received training / course	Yes	45	77.5
	No	13	22.4
Received training	Yes	43	74.1
	No	15	25.8
Received epidemiological reports	Yes	41	70.6
	Reports	9	20.4
Form of information	Verbal	3	6.8
	Written, except reports	32	72.7
	No	12	20.6
Meetings attendance	Monthly	3	5.2
	Weekly	5	8.6
	Quarterly	1	1.7
	Irregularly	37	63.8
Perform notification	Always	28	48.3
	Never	13	22.4

Variable	Category	N	%
	Sometimes	17	29.3
Conduct joint activity with PSF	Yes	21	36.2
	No	37	63.8
Population participation	Yes	14	24.1
	No	44	75.9

Variable	Mean	Standard deviation	Max/Min
Time in the job (months)	13,25	5.58	38 5

Source: Authors' source (2020).

#### 4. Discussion

The Epidemiological Surveillance System (ESS) of Schistosomiasis covers priority and periodic actions recommended in the SCP, such as the active search and treatment of parasitized people. In the case of active search, actions take place through teams of municipal endemic diseases (supervisors, coordinators and agents of endemic diseases). Cases arising from spontaneous or passive demand are followed up by primary care professionals through PSF teams, responsible for diagnosis services (doctors and nurses) and treatment of infected individuals (M. da S. (MS). S. de V. em Saúde, 2014).

Regarding ESS dynamics developed in Sergipe, Schistosomiasis surveillance was used as a reference due to the fact that the state has the highest prevalence for the disease in the country, according to the last National Survey concluded in 2018 (Katz, 2018).

In agreement with studies on Schistosomiasis distribution in Sergipe, the occurrence in the coastal strip (A. D. dos Santos, Santos, dos Santos, Barreto, & de Araújo, 2016; C. V. V Rollemberg et al., 2015) is observed especially in the most deprived areas of large cities or regional headquarters (de Melo et al., 2011).

In this study the high prevalence found, with an average of 7.5%, was very close to the data found in the National Survey of Schistosomiasis Mansonii and Geo-helminthiasis

Prevalence. Among states with municipalities up to 500 thousand inhabitants, Sergipe had the highest prevalence (10.67%), followed by Pernambuco (3.77%) and Alagoas (3.35%), much above the 1% national average (Katz, 2018).

From the 51 municipalities endemic for Schistosomiasis, 18 did not carry out SCP activities, not performing an active search or any recommended activity, except the spontaneous demand treatment through Primary Care. Santos et al. (2015) (A. D. dos Santos et al., 2015) found a similar result when analyzing and concluding that SPC had not been implemented in endemic municipalities. They found the lack of malacology actions, although there were reports of positive cases in Sergipe. The authors also reported that the municipality had professionals with inadequate education and training for the function performed, as well as an inadequate fulfillment of the rules and recommendations from the Ministry of Health for an effective control of Schistosomiasis.

The absence of active search in 18 of 51 endemic municipalities, with an annual average of 31 municipalities developing some activity and updating the data, compromises the disease evaluations, not being possible a faithful reality analysis. For Menezes, Carmo, Samico (2012) (Menezes et al., 2012) and Rollemberg et al. (2011) (C. V. V. Rollemberg et al., 2011), the lack of interest in working in the active search could be due to the disease chronic aspect and a great number of asymptomatic cases.

Attributions changes in the control of endemic diseases for municipalities and states, brought by decentralization, aimed at a breakthrough in disease elimination or control (Almeida, 1998; L. G. D. de Oliveira, Natal, Felisberto, Alves, & Santos, 2010). However, the situation observed in Sergipe is the absence of major changes, since Schistosomiasis distribution in the state remains unchanged since the first survey in 1953 (A. D. dos Santos et al., 2016; M. da S. (MS). S. de V. em Saúde, 2014; Souza et al., 2007; Tranquillini et al., 2011).

Between 2016 and 2018, more than 20 municipalities did not report data to the Information Systems (SISPCE and / or SINAN). This hindered all analyzes necessary for epidemiological delimitation. This also reflects a negligence towards this parasitosis, demonstrated in the high number of deaths compared to that found in the other endemic diseases that affect Sergipe.

Through the questionnaires, an overview of the structure, process and results achieved from 2013 to 2018 was observed. The structure may have represented the major cause of the system problems, since it is the basis for all actions execution. This variable, among all the others, is the one with the easiest observation (Quinino, Costa, Aguiar, Wanderley, &

Barbosa, 2009). The process, as the sum of all actions (diagnosis, treatment, prevention and health education), is considered by Donabedian (1990) (Donabedian, 1990) as a dimension equivalent to the quality of care. With health improvement as the focus point, evaluations can be considered as the most important indicator and where all implementations and changes should start.

Preventive and disease control actions are the responsibility of municipal managers from Unified Health System (SUS). They need to carry out actions of Schistosomiasis surveillance and control, in conjunction with other government sectors from the State Department of Health, Department of Infrastructure and Sanitation, Department of Education and Environmental Organizations, so that health education and intervention in the environment provide a better life quality for the population (Lima & de Andrade Spinola, 2020; M. da S. (MS). S. de V. em Saúde, 2014).

In all interviews and direct observations, it was clear that the population was not included in the surveillance process of endemic diseases that affect municipalities. This aspect is somewhat different with regard to Dengue, in which there is a greater mobilization involving the population, although the number of deaths from this disease is lower when compared to Schistosomiasis. This may possibly occur with Dengue due to the imminent risk of an epidemic and rapid evolution to death (Barata, 2013). In endemics schistosomiasis, Leishmaniasis and Chagas disease, there is a general lack of motivation for the inclusion of the population in the process, even though the human being factor is the main component for prevention.

Another striking point observed was the lack of integration of the Family Health Program in Primary Care with the Endemic Teams. The reduced number of human resources aimed at controlling endemic diseases, the lack of material resources such as transportation, laboratories and materials, combined with the manager's lack of effort to integrate health professionals in the performance of activities, contributes to little effectiveness and efficiency in the Control Programs activities. The lack of integration between the sectors hinders the flow of information, damaging the feedback due to the constant inconsistencies such as lack of updated data, delay in obtaining resources, reduction of human resources, especially when there is a need for quick responses in some situations, in addition to information duplication in the systems. Another factor that can negatively interfere in the surveillance actions is the high turnover of professionals (Gonçalves et al., 2014), as the delay in adaptation generates a lack of feedback from the system, failure of data analysis, lack of epidemiological situation disclosure, lack of follow-up patient and lack of actions continuity (Vieira & Calvo, 2011).



An average of 31 (61%) endemic municipalities carrying out SCP activities annually and 18 (35%) without conducting an active search was another factor that possibly justified the disease maintenance and the failure to control it, demonstrating that decentralization has not been showing results satisfactory with regard to endemic diseases in Sergipe. This can be attributed to the lack of material and human resources, as observed, also, in the situation of Chagas' disease without the inclusion of work in actions to control endemic diseases in the municipalities. All of these factors may led to little improvement in control and surveillance actions for the population (Silva et al., 2015). Actions are carried out without planning, especially with Schistosomiasis, as the municipalities work within their limitations, reproducing actions year after year and underestimating the data produced that could better guide control and surveillance activities.

When comparatively analyzing the questionnaires and data obtained in the information systems, it was identified that both managers and other professionals interviewed perceive the dynamics of surveillance as: a supremacy of the medical part, centered almost exclusively in the patient and, in the foreground, in communicable endemic or rapid progression diseases such as dengue; and health promotion centered on treatment, drawing attention to the large number of patients coming from Primary Care as a result of a deficient SCP implantation in endemic areas. These factors were also observed by Santos et al. (2012) (S. S. B. da S. Santos et al., 2012) in an evaluation on the decentralized management capacity in the state of Bahia.

In the Schistosomiasis transmission network, which consists of a sick patient-environment-healthy patient, the treatment has been the most prominent aspect to receive more attention. All other factors are neglected, either due to insufficient human and material resources or to the need for interaction between other areas, mainly infrastructure and education (Barata, 2013). It was also noted that there was little or no interest in the integration between administrative sectors through municipal managers.

In the structure analysis of the six studied regions, half of them had little enough structure and the other half was considered structurally adequate to develop Schistosomiasis surveillance activities. This factor may have been influenced by the public interviewed, since the answers coming from perception, professional training and qualification are of fundamental importance (Almeida, 1998). However, in the subjective questions, it was observed that managers' actions and responses were often softened due to their position fragility, limiting the final process to treatment and underestimating the data produced, even though it was a fundamental source for a good operational quality of endemic control actions.

Regarding the attributes, simplicity and flexibility were the best scored, with both leading to new strategies. System attributes are also subject to perception bias due to professionals training, time in office, relationships between technicians and managers. Underreporting and the large number of municipalities that did not carry out an active search are reflective of the high managers' turnover and little integration among professionals. However, flexibility was the most scored attribute though, according to Aquino (2006) (Aquino, 2006), and flexibility is impaired when there is not a good staff adaptation and integration with the basic network, going against the results of the present study.

The concept of ES, according to the Organic Health Law, indicates that the analysis of a health situation encompasses factors other than just patient and treatment (BRASIL et al., 2010). The foundation is, in a global analysis, involving determinants and conditions, requiring training and articulation between the components of the Surveillance and other sectors from the society (Gomes et al., 2016).

Bastos et al. (2020) (Bastos et al., 2020), studying the municipal regulatory centers, analyzed the obstacles and challenges that managers and health professionals encountered in their professional activities. They concluded that interaction and communication between the health sectors are necessary and the absence of permanent education with adequate professionals' training and updating are the biggest obstacle and challenge in management.

As reported by Moraes Neto et al. (2012) (De Moraes Neto, 2012), the present study demonstrated that a little use of information contained in the Schistosomiasis Information Systems, the high managers, endemic agents and other professionals' turnover, make it difficult to continue the work and disseminate information, generating less knowledge of the general endemic situation in the municipality.

The little knowledge about SCP scope, the lack of control actions planning on the municipal agenda and low priority given to Schistosomiasis may explain the high prevalence and deaths maintenance in the state. The results found showed that, even with the municipalization of endemic control, periodic evaluations of these actions are necessary in order to detect weaknesses in the System, thus finding new strategies for endemic control and surveillance approaches, enabling to achieve a satisfactory result.

According to the SES/SE Endemic Nucleus, an endemic assessment process in Sergipe started in 2016, when this nucleus prepared an assessment questionnaire, in an attempt to obtain more efficient and quick information, to facilitate the analysis of epidemiological situation of the municipalities. However, only the fields related to Dengue were properly filled out and used.

Although health data and indicators are constantly used, analyzed and disseminated, both by state department and research institutions (A. D. dos Santos et al., 2015; Silva et al., 2015), the information obtained has little guidance or is used for the qualification of health surveillance services and actions.

## 5. Conclusion

The evaluation of a Health System is complex and must occur on an ongoing basis, becoming a work routine with the participation of all those involved, initially maintaining a structured and functional database. This study indicated that, even in municipalities and regional health in Sergipe, in which data and indicators were analyzed and disseminated, the information obtained had little guidance or was used in surveillance actions or in services qualification.

PCE, as well as other programs to control endemic diseases, compose a small portion in relation to the range of Surveillance System attributions, and an environment global view, regarding health aspects, is essential. This study suggests the adoption of models containing information from municipality routine or locality.

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