

Identification of priority Health Regions in the State of Rio Grande do Sul, Brazil, for Health Surveillance actions

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Abstract *This paper aimed to identify the priority Health Regions of Rio Grande do Sul (RS) to implement Health Surveillance strengthening actions. This is a descriptive study with data from time series of 11 (eleven) Health Surveillance indicators of the Ministry of Health's 2016 Guidelines, Objectives, Targets and Indicators Journal agreed by the Bipartite Interagency Committee/RS. The selected indicators are synthesized to produce a Composite Health Surveillance Assessment Indicator (ICAVES) for each of the 30 Health Regions of the state, creating values ranging from zero (worst) to 1 (best), using the Human Development Index (HDI) construction calculation method. The lowest rates of the composite indicator are found in the Health Regions "20-Rota da Produção" and "19-Região do Botucaraí". These two Health Regions are priorities for the strengthening of collective Health Surveillance actions and the management of health risks and diseases, considering horizontal equity as guideline of the Unified Health System.*

Key words *Public Health Surveillance, Regional health planning, Health status indicators, Health priorities, Health equity*

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Introduction

In 2012, in Rio Grande do Sul, the Unified Health System (SUS) regionalization process established thirty (30) Health Regions with a view to integrating the organization, planning and execution of actions and health services¹. Thus, management planning in Rio Grande do Sul is based on the territory organization by Health Regions¹⁻³.

Ministry of Health's (MS) 2016 Guidelines, Objectives, Targets and Indicators Journal is one of SUS management tools used for health planning, aiming to guide the national process of interfederative agreement. The document shows the qualification cards of 29 health indicators established for the year 2016, divided into universal of common and compulsory agreement, and specific, of compulsory agreement according to territory specifics⁴.

The Ministry of Health recommends, for each of the 29 indicators, national benchmarks for the agreement of objectives. Among them, in 2016, the Bipartite Interagency Committee of Rio Grande do Sul (CIB/RS) agreed eleven Health Surveillance indicators⁵. Thus, technicians from the State Health Surveillance Center (CEVS) published the time series of the eleven indicators, of which five had their objectives agreed with values below the benchmark recommended by the MS, and one with value above benchmark^{5,6}.

The health indicators seen together and regularly in a dynamic system provide the basis for the epidemiological evaluation of the health situation and, consequently, for the priority interventions in the health reality of the territories⁷. Based on the Human Development Index (HDI) calculation, Silva Junior⁸ constructed a Composite Health Surveillance Assessment Indicator (ICAVES) that synthesizes a given list of indicators in a single value.

In the context of the heterogeneous organization of the health system between the regions, this study aims to evaluate the performance of Health Surveillance in Rio Grande do Sul and its Health Regions, based on the 11 (eleven) Health Surveillance indicators agreed in the CIB/RS for 2016. Thus, it seeks to identify the most vulnerable Health Regions that require greater institutional support, aiming to promote equity in health^{3,9-11}.

Methodology

This is an applied, descriptive and quantitative approach carried out with secondary data available on the website of the State Health Secretariat of Rio Grande do Sul^{6,12}. The study was constructed with the time series of 11 (eleven) Health Surveillance indicators by Health Region contained in the 2016 Guidelines, Objectives, Targets and Indicators Journal of the Ministry of Health agreed by the Bipartite Interagency Committee/RS for 2016^{4,5}. This list includes environmental, epidemiological, health and Worker's Surveillance indicators⁴.

The time series cover a period of 7 years (2009-2015), however, four indicators have shorter time series. Three criteria were used to select the indicators, namely: included in the 2016 Guidelines, Objectives, Targets and Indicators Journal; agreed by the Bipartite Interagency Committee/RS for 2016; and Health Surveillance-related.

Chart 1 shows the selected indicators, the surveillance sector to which they belong, data sources and the periods used to calculate time series.

A Composite Health Surveillance Assessment Indicator (ICAVES) was constructed from the selection of the indicators, which synthesizes in a single value – Partial Index – the Health Surveillance performance for the state of Rio Grande de Sul and for its 30 Health Regions⁶.

The methodology for the construction of the ICAVES described in literature is based on the Human Development Index (HDI), since it is a widely used composite indicator that synthesizes in a single index⁶ the partial indices of longevity, education and income that vary between zero (worst) and 1 (best).

Initially, in order to build the ICAVES, it was necessary to establish parameters, according to the State's reality, for the values of variables used in the calculation formula of the Partial Index, namely: observed value, minimum value and maximum value. The Partial Index is the ratio of the observed value minus the minimum value and maximum value minus the minimum value.

In the "observed value" variable, the time series of each indicator was used for each of the 30 Health Regions. Thus, each Health Region has 11

Chart 1. Selection of Health Surveillance indicators agreed in the CIB/RS, data source used to calculate the historical series.

Surveillance, Indicator, Source, Time series / Period - Years
Epidemiological – Premature mortality rate (30-69 years) for the set of the four main chronic noncommunicable diseases (CNCD – disease of the circulatory system, cancer, diabetes and chronic respiratory diseases)
Epidemiological – Proportion of vaccines of the Basic Immunization Schedule for Children with vaccine coverage achieved
Epidemiological – Proportion of cure for new cases of laboratory-confirmed pulmonary TB
Epidemiological – Proportion of HIV tests performed among TB cases
Worker's health – Proportion of municipalities with cases of notified work-related diseases or illnesses
Epidemiological – Proportion of cure of new cases of leprosy diagnosed in the years of the cohorts
Epidemiological – Proportion of contacts tested in new cases of leprosy
Epidemiological – Absolute number of deaths by dengue
Environmental – Proportion of properties visited in at least four cycles of household visits for dengue control
Environmental – Proportion of analyses performed in drinking water samples for total coliform parameters, free chlorine residual and turbidity
Health – Proportion of municipalities performing at least six Health Surveillance actions groups, necessary for all the municipalities

Note: Abbreviations: SIM – Mortality Information System; SIPNI – National Immunization Program Information System; SINAM – Compulsory Reporting Disease Information System; SISPNCD – National Dengue Control Program System; SIA/SUS – SUS Outpatient Information System.

means – making a total of 330 means (30 Health Regions x 11 Indicators).

The value assigned to the “minimum value” variable is the mean of the time series of the Health Region with lower performance in each indicator.

As for the “maximum value” variable, three parameters were adopted, namely: (1) Target recommended by the Ministry of Health to agree the 2016 indicator, (2) Target agreed in the CIB/RS for the 2016 indicator and (3) mean of the Health Region with the highest performance in the indicator. Table 1 shows the values used for the “minimum value” and “maximum value” variables in the three parameters.

The purpose of using three parameters is to verify the differences and similarities between results and avoid parameter bias.

The next step is the calculation of the Composite Health Surveillance Assessment Indicator (ICAVES) index, which consists of the mean of the 11 partial indices of each Health Region. Thus, each of the 30 Health Regions has a single index.

The calculation of the partial indexes and ICAVES was performed for the three parameters defined for the maximum value variable: (1) Tar-

get recommended by the Ministry of Health to agree the 2016 indicator, (2) Target agreed in the CIB/RS for the 2016 indicator and (3) the mean of the Health Region with the highest performance in the indicator. Thus, state ICAVES was calculated through the mean of the indexes of the 30 Health Regions.

Results

Rio Grande do Sul is divided into 30 Health Regions comprised in seven Health Macro-Regions. Health Regions 19 (Região do Botucaraí) and 20 (Rota da Produção) showed the lowest ICAVES in the three Parameters used in the calculation: (1) National Parameter, (2) Agreement in CIB/RS and (3) Best mean of the thirty time series calculated for each indicator. These two Health Regions are located in the Northern Macro-Region. The Rota da Produção has the lowest ICAVES: (1) 0.42, (2) 0.51 (3) 0.36. The Região do Botucaraí shows the following results: (1) 0.44, (2) 0.55 (3) 0.39. ICAVES for Rio Grande do Sul for Parameters 1, 2 e 3 is, respectively, 0.57, 0.72 and 0.52. Table 2 shows a map of the State and results of ICAVES.

Table 1. Values established for the variable: minimum and maximum value.

Indicators	Minimum value		Maximum value	
	Lowest performance	Highest performance	Ministry of Health Target	Target agreed CIB/RS
Premature mortality rate (30-69 years) for the set of the four main chronic noncommunicable diseases (CNCD – diseases of the circulatory system, cancer, diabetes and chronic respiratory diseases)	499,55	270,44	296,51	374,16
Proportion of vaccines of the Basic Immunization Schedule for Children with vaccine coverage achieved	22,15	60,54	75,00	50,00
Proportion of cure for new cases of laboratory-confirmed pulmonary TB	35,86	79,25	85,00	65,00
Proportion of HIV tests performed among TB cases	47,63	89,93	100,00	86,90
Proportion of municipalities with cases of notified work-related diseases or illnesses	11,85	93,33	83,00	70,00
Proportion of cure of new cases of leprosy diagnosed in the years of the cohorts	45,83	100,00	88,00	88,00
Proportion of contacts tested in new cases of leprosy	23,77	100,00	80,00	84,00
Absolute number of deaths by dengue	0,14	0,00	0,00	0,00
Proportion of properties visited in at least four cycles of household visits for dengue control	0,00	59,00	80,00	45,00
Proportion of analyses performed in drinking water samples for total coliform parameters, free chlorine residual and turbidity	29,99	110,47	100,00	80,00
Proportion of municipalities performing at least six Health Surveillance actions groups, necessary for all the municipalities	7,69	62,50	45,00	45,00

Note: Some issues observed throughout the course of the study deserve to be described:

1. The national reference parameter for the agreement of the indicator's target: premature mortality rate (from 30 to 69 years) for the set of the four main noncommunicable chronic diseases (CNCD - diseases of the circulatory system, cancer, diabetes and chronic respiratory diseases) is the reduction of 2% compared to the previous year. Thus, the World Health Organization's recommended rate for the Americas for 2019 (280/100,000 inhabitants) was used as the maximum value in Parameter (1), applying a 2% reduction per year to estimate the value for 2016 (296.51/100,000 inhabitants).¹³

2. To calculate the mean of the indicator's time series – Proportion of properties visited in at least four cycles of household visits for dengue control – used only the years in which the Health Region was infested. Three Health Regions – R24-Campos de Cima da Serra, R29-Vales e Montanhas and R30-Vale da Luz were not considered infested areas in any year. For these Health Regions, this indicator was not considered in the calculation of the ICAVES, which was done using the mean of 10 indicators.³

Graphic 1 shows the results in a bar chart with increasing values of ICAVES, signaling the location of the first, second and third quartiles (Q1, Q2 and Q3). Health Regions 19 and 20 are below the first quartile in all three parameters, suggesting that these should be prioritized to strengthen Health Surveillance actions.

Discussion

The SUS Planning System (PlanejaSUS) considers the State Health Plan, in each sphere, the main management tool, and is the basis for the definition and implementation of health actions and services^{14,15}. Thus, this study sought to be compatible with the 2016-2019 State Health Plan

(PES) of Rio Grande do Sul, since its first guideline (Qualification of the Health Care Network consolidating health regionalization) addresses regionalization and includes the following objective: “To strengthen collective Health Surveil-

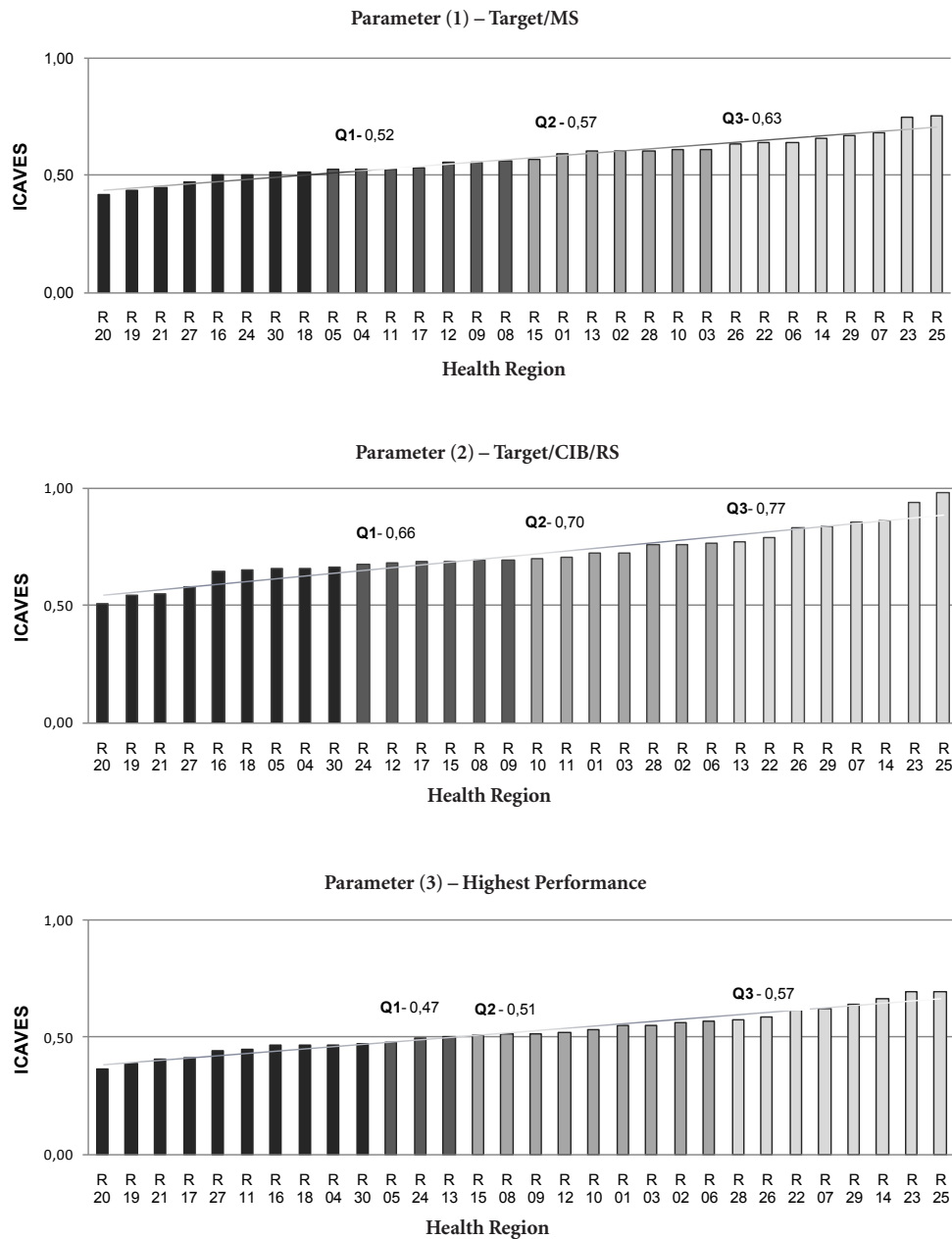
lance actions and health risk and disease management”².

To strengthen Health Surveillance actions, it is necessary to identify priority areas to ensure equity. Thus, the evaluation of a set of indicators



Health Macro-Regions	Health Region	Parameter		
		(1) Target/MS	(2) Target/CIB/RS	(3) Highest Performance
Midwest	R 01 - Verdes Campos	0,59	0,72	0,55
	R 02 - Entre-Rios	0,60	0,76	0,56
	R 03 - Fronteira Oeste	0,61	0,73	0,55
Metropolitan	R 04 - Belas Praias	0,53	0,66	0,47
	R 05 - Bons Ventos	0,52	0,66	0,48
	R 06 - Vale do Paranhana Costa da Serra	0,64	0,76	0,57
	R 07 - Vale dos Sinos	0,68	0,86	0,62
	R 08 - Vale do Caí Metropolitana	0,56	0,69	0,51
	R 09 - Carbonífera/Costa Doce	0,55	0,69	0,52
	R 10 - CapitalVale do Gravataí	0,61	0,70	0,53
Missionary	R 11 - Sete Povos das Missões	0,53	0,70	0,45
	R 12 - Portal das Missões	0,55	0,68	0,52
	R 13 - Região da Diversidade	0,60	0,77	0,50
	R 14 - Fronteira Noroeste	0,66	0,86	0,66
North	R 15 - Caminho das Águas	0,57	0,69	0,51
	R 16 - Alto Uruguai Gaúcho	0,50	0,65	0,46
	R 17 - Região do Planalto	0,54	0,69	0,41
	R 18 - Região das Araucárias	0,51	0,65	0,46
	R 19 - Região do Botucarái	0,44	0,55	0,39
South	R 20 - Rota da Produção	0,42	0,51	0,36
	R 21 - Região Sul	0,45	0,55	0,41
Mountainous region	R 22 - Pampa	0,64	0,79	0,62
	R 23 - Caxias e Hortências	0,75	0,94	0,69
	R 24 - Campos de Cima da Serra	0,50	0,68	0,50
	R 25 - Vinhedos e Basalto	0,75	0,98	0,70
Valleys	R 26 - Uva e Vale	0,63	0,83	0,59
	R 27 - Jacuí Centro	0,47	0,58	0,44
	R 28 - Vinte e Oito	0,61	0,76	0,57
	R 29 - Vales e Montanhas	0,67	0,84	0,64
		0,51	0,66	0,47

Figure 1. Map of the Health Macro-Regions and Health Regions of Rio Grande do Sul and Composite Indicator of Health Surveillance values in parameters (1), (2) and (3)



Graphic 1. Composite Health Surveillance Indicator by performance considering parameters (1), (2) and (3).

Abbreviations: Q1 = quartile 1, Q2 = quartile 2, Q3 = quartile 3.

produces evidence about the health situation and its trends, facilitating the identification of the populations and territories with the greatest health needs, epidemiological risk stratification and identification of critical areas.

The evaluation of Health Surveillance indicators in the 2016 Guidelines, Objectives, Targets and Indicators Journal guided this study and proved to be consistent in that it contained information supported by valid and reliable data,

as well as indicators of the four environmental, epidemiological, health and worker's surveillance sectors (Graphic 2)⁴.

Health Surveillance proposes to work on the logic of an articulated and integrated set of actions. However, these are still fragmented in divisions of environmental, epidemiological, health and Worker's Surveillance, each of which acts for its objective of care¹⁶. The proposed Composite Health Surveillance Assessment Indicator allows a dialogue between surveillance sectors, providing a more integrated view of management¹⁶.

Evaluating the performance of Health Surveillance in 30 Health Regions through the individual evaluation of the historical series of 11 indicators is a task that involves a large number of values. Thus, the composite indicator is an alternative that seeks to facilitate the evaluation and comparison between the 30 Health Regions. However, it is not intended to replace the individual evaluation of indicators, but rather to complement it.⁶

The best performances in Health Surveillance are those with an ICAVES closer to the ideal (1.0). The State's ICAVES mean shows different values in the three parameters: (1) Target recommended by the Ministry of Health to agree on the 2016 indicator; (2) Target agreed in the CIB/RS for the

2016 indicator and (3) Mean of the Health Region with the highest indicator's performance, as can be seen in Graphic 2.

Some targets agreed in the CIB/RS are lower than recommended by the Ministry of Health and, thus, the Parameter (2) ICAVES has a higher index value than Parameter (1). However, ICAVES of Parameters (1) and (3) are similar, which shows that the evaluation from the target recommended by the Ministry of Health is consistent with the actual performance of the Health Regions.

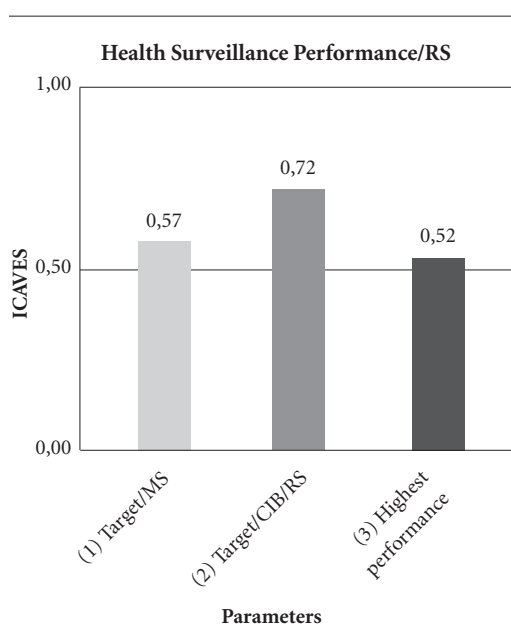
The result indicates that Health Surveillance indicators time series data calculated by technicians from the State Health Surveillance Center of Rio Grande do Sul (CEVS/RS) subsidized the agreement of the CIB/RS. Thus, the role of planning in the health sector is noted, including monitoring and evaluation of indicators, which appears as a relevant management mechanism orienting the decision-making process¹⁵⁻¹⁷.

In Parameter (3), the 30 State's Health Regions are compared from their actual performance, leading us to infer, without there being an individual analysis of the 11 indicators, that there is a large gap between highest and lowest mean of the time series. This result points to inequality in Health Surveillance performance among the 30 Health Regions.

The result of the calculation of the Composite Health Surveillance Assessment Indicator (ICAVES), in the three Parameters used, points to the Health Region 20 – Rota da Produção as a priority for the strengthening of Health Surveillance actions, followed by Health Region 19 – Botucaraí, both located in the Northern Macro-Region. Bordering the latter, we have the Serra Macro-Region that encompasses the Regions with the best results: Health Region 25 – Vinhedos e Basalto, followed by Health Region 23 – Caxias e Hortências (Chart 4).

In the context of the results shown above, matrix support can be a strategy of action in search of equity. Health Regions that stand out for their performance in the area of Health Surveillance can share their knowledge, skills, responsibilities and actions with the Health Regions experiencing greater difficulty^{11,18}. And in a complementary way, the geographical proximity between the Macro-Regions and/or Health Regions can be considered in the construction of the support's methodology.

This study considers that the ICAVES enables, through an accessible methodology, the synthesis of a set of indicators, facilitating the analysis of



Graphic 2. Health Surveillance Performance in Rio Grande do Sul in parameters (1), (2) and (3).

a large amount of data. It is a robust instrument with potential to contribute to the construction of public health policies with priorities better tailored to the needs of the population.

The cross-sectional Health Surveillance actions in the Health Care Network are integrated with all levels of care, and the focus is to prevent illness by detecting, preventing and controlling determinants and conditionants of health.

The identification of priority areas supports timely actions and induces equity. Therefore, it is important to highlight the relevance of the evaluation of health indicators in the surveillance of health conditions in a regionalized way, since it allows intervening in moments in which health risks can be avoided or minimized, directly affecting the Health Care Network^{3,22}.

Collaborations

RP Mondini worked on the design, outline and writing of the paper; IA Menegolla in the design, outline and critical review; EV Silva in the design, critical review and final writing.

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