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Evaluation of Health Surveillance in the Zona da Mata Mineira: from standards to practice

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Abstract *Health Surveillance is of paramount importance when confronted with the current Brazilian epidemiological setting. This study aims to evaluate the level of Health Surveillance in the Zona da Mata Mineira region. This is an evaluative study, and data were collected in the first half of 2016. The research universe consisted of seven municipalities in the Zona da Mata Mineira complex. Municipalities were selected with reference to available operational epidemiological, environmental and sanitary surveillance. The subjects under analysis were the Surveillance coordinators (n = 21), Health Surveillance coordinators (n = 7) and Health secretaries (n = 7). We conducted interviews using a semi-structured and elaborated questionnaire based on the Donabedian triad: Structure, Process and Outcome. A score system was established in order to obtain the classification of performance, realm and subrealms, in which a score was assigned for each criterion. We used incipient, intermediate or advanced cutoff points to classify the level of Health Surveillance of scores were below 5.99 points, between 6.0 and 7.99 points and between 8 and 10 points, respectively. The level of regional Health Surveillance performance level was classified as an intermediate.*

Key words *Health assessment, Health Surveillance, Health management and health services*

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Introduction

The epidemiological and demographic transition experienced by Brazil in the last decades, with reduced mortality and birth rates and increased life expectancy of the population[1,2] reconfigured a new model recognized as an incomplete and extensive transition. In this context, the overlapping of stages and coexistence of infectious and parasitic and chronic degenerative diseases, as well as the lack of a clear expectation of solving this process is accompanied by an exacerbation of inequalities within the country[1,3].

In this setting, emerging, reemerging and neglected diseases introduce new profiles to the country's morbidity and mortality profile, specifying the emergency of reformulating Brazilian health care[2,4]. However, while prevailing in conditions of poverty, contributing to the upkeepof social inequality[5,6] and accounting for 10% of the global burden of diseases, neglected diseases are still not well covered by public policies[7].

Dengue is classified as a neglected and endemic disease in the country and is one of the main national and global public health problems. Its reemergence has contributed significantly to changes in the Brazilian morbimortality profile, due to the ascending tendency of its hemorrhagic form and shift to lower age groups[8]. The World Health Organization (WHO) estimates that about 390 million cases of the disease are recorded annually. Thus, surveillance actions have become the core of epidemics monitoring, acting on the understanding and manifestations of this arbovirus[9,10] in Brazil.

Notwithstanding this, the triple epidemic Dengue-Zika-Chikungunya experienced by Brazil in the year 2016[11] evidences the failure of actions to fight against the *Aedesaegypti*. The proposed reorganization of the Brazilian health system through the 2006 Health Pact, with decentralization of basic surveillance actions[12] was limited by the weak municipal capacity for Health Surveillance planning and management capacity[13].

Therefore, it is important to evaluate Health Surveillance actions with the primary purpose of assessing the production of decisions that trigger the process of intermediation and implementation of actions and policies that directly affect society. From this perspective, this study aimed to evaluate the level of Health Surveillance performance in seven municipalities of the Zona da Mata Mineira region, Brazil.

Methods

This is an exploratory evaluative study that incorporates the normative assessment in its components of Structure, Process and Outcome, whose research universe consisted of seven municipalities in the Zona da Mata Mineira region, namely: Manhuaçu, Cataguases, Muriaé, Ponte Nova, Viçosa, Juiz de Fora and Ubá, randomly identified as A, B, C, D, E, F, and G. Together, they cover more than 1 million people and have socioeconomic and cultural characteristics that enable to portray the performance of Health Surveillance health practices in the territory under study. The selection also prioritized the availability and performance of epidemiological, environmental and Sanitary Surveillance. The subjects under review were Health Surveillance coordinators (n=7), environmental (n=7), epidemiological (n=7) and sanitary (n = 7) coordinators of each municipality and local health managers (n=7), totaling 35 individuals. In the specific case of coordinators, due to the lack of specific posts, subjects under analysis were key informants, who were temporarily responsible for this role.

The *Instructions for implementing and evaluating Health Surveillance actions: a project to strengthen Health Surveillance in Minas Gerais*[14] was used for the construction of the Logical Model of Health Surveillance by the team of researchers, in addition to studies by Felisberto et al.[15] and Bezerra et al.[16]. In the Logical Model of Health Surveillance we identified two main levels of action: management and implementation of actions. Realms were established from each level. At the management level, two realms were included: Health Surveillance managers and coordinators, while at the level of implementation of actions, three realms were included: sanitary, environmental and Epidemiological Surveillance coordinators. In order to generate the subrealms, each realm was further divided by attributions of each stakeholder involved, defining responsibilities and compulsory activities to be implemented according to the normative document[14]. Subsequently, activities, intermediate and final outcomes were delineated (Figure 1).

The Matrix of Criteria and Indicators was elaborated (Chart 1) from the Logical Model (Figure 1). Both were built by the research team with the participation of seven experts on the subject, according to studies by Felisberto et al.[15] and Bezerra et al.[16] and underpinned the elaboration of specific semi-structured questionnaires for each of the four components of Health Sur-

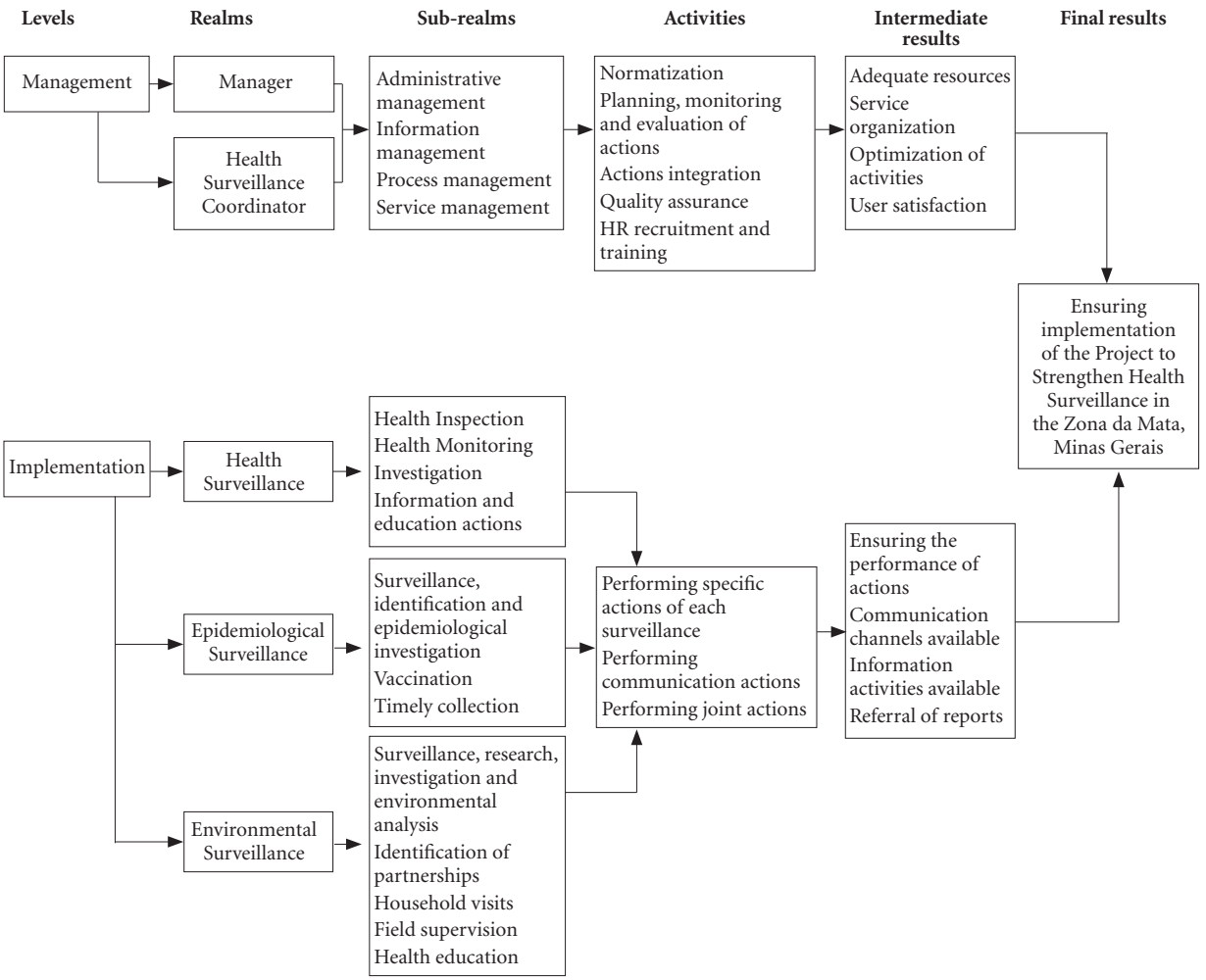

Figure 1. Logical Model of Health Surveillance, Zona da Mata, Minas Gerais, Brazil, 2016.

Source: Donateli (2016).

veillance (Health Surveillance, Epidemiological Surveillance, Sanitary Surveillance and Environmental Surveillance coordinators) and managers. The questions formulated to identify the realms of analysis and evaluation of surveillance practices were based on the Donabedian Triad, namely Structure – Process – Outcome[17].

For the construction of the Matrix of Criteria and Indicators (Chart 1), considering the Donadebian triad, we considered the following Structure criteria: human resources, infrastructure, material resources, technological resources and administrative management. In Process, we considered continuing education, information management, implementation of actions, process monitoring and management. In Results, we included criteria professional satisfaction and resolubility. We conducted individual interviews at respondents' workplaces in the first half of 2016.

The pilot study was carried out prior to the field survey in a municipality of the Zona da Mata Mineira region, unrelated to the study and with similar characteristics to the municipalities selected, in order to adjust questionnaires and train researchers.

To determine the level of performance, outcomes were compared with the Logical Model (Figure 1). Thus, values were arrived at by arithmetic mean, using Microsoft Excel (2010), and scores were obtained for the sub-realms, to which 10 points were assigned, divided among the criteria of each sub-realm (Chart 1).

Chart 1. Matrix of criteria and indicators scoring by realms and sub-realms of the logical model of Health Surveillance, agreed by experts. Zona da Mata, Minas Gerais, Brazil, 2016.

Realms	Sub-realms	Criteria	Surveillance sectors maximum score				
			Manager	Health Surveillance Coordinator	HS	EnvS	EpiS
Structure	Human Resources (10,0)	a) Adequacy of number of professionals - Inadequacy (0)	1,42	1,66	1,42	1,42	1,42
		b) Adequacy of professional education to the position held b1-Postgraduate in the area of health or management b2-Higher Education in the area of health b3-Higher Education b4-Technical b5-Secondary school	b1 – 1,42 b2 – 1,42 b3 – 1,1 b4 – 0	b1 – 1,66 b2 – 1,66 b3 – 1,06 b4 – 0	b1 – 1,42 b2 – 1,42 b3 – 0,82 b4 – 0,22 b5 – 0	b1 – 1,42 b2 – 1,42 b3 – 0,82 b4 – 0,22 b5 – 0	b1 – 1,42 b2 – 1,42 b3 – 0,82 b4 – 0,22 b5 – 0
		c) Duration of position held c1-Over 5 years c2-Between 1 and 5 years c3-Below 1 year	c1 – 1,42 c2 – 1,1 c3 – 0	c1 – 1,66 c2 – 1,36 c3 – 0	c1 – 1,42 c2 – 1,1 c3 – 0	c1 – 1,42 c2 – 1,1 c3 – 0	c1 – 1,42 c2 – 1,1 c3 – 0
		d) Professional relationship d1-Employee with position of trust or approved in public examination d2-Hired appointed in committee d3-Other	d1 – 1,42 d2 – 0,82 d3 – 0,22	d1 – 1,66 d2 – 1,06 d3 – 0,46	d1- 1,42 d2–0,82 d3–0,22	d1 – 1,42 d2 – 0,82 d3 – 0,22	d1 – 1,42 d2 – 0,82 d3 – 0,22
		e) Works in a 40-hour weekly workload - Lower workload (0)	1,42	1,66	1,42	1,42	1,42
		f) Defining and recognizing positions of team members - No (0)	1,42	*	1,42	1,42	1,42
		g) Recognizing targets - No (0)	1,42	1,66	1,42	1,42	1,42
	Infrastructure (10,0)	a) Adequacy of physical structure - No (0)	*	*	2,0	2,0	2,0
		b) Accessibility of physical structure - No (0)	*	*	2,0	2,0	2,0
		c) Hygiene of physical structure - No (0)	*	*	2,0	2,0	2,0
		d) Safety of surroundings of physical structure - No (0)	*	*	2,0	2,0	2,0
		e) Accommodation of surveillance sectors in the same physical structure - No (0)	*	*	2,0	2,0	2,0

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Chart 1. continuation

Realms	Sub-realms	Criteria	Surveillance sectors maximum score				
			Manager	Health Surveillance Coordinator	HS	EnvS	EpiS
Structure	Material resources (10,0)	a) Vehicles a1-Own, exclusive use a2-Own, shared use a3-Other sector, shared use	*	*	a1 – 1.66 a2 – 1.04 a3 – 0.64	a1 – 1.66 a2 – 1.04 a3 – 0.64	a1 – 1.66 a2 – 1.04 a3 – 0.64
		b) Sufficient material for administrative work - Insufficient (0)	*	*	1.66	1.66	1.66
		c) Sufficient field material - Insufficient (0)	*	*	1.66	1.66	1.66
		d) Adequacy of work material quality - No (0)	*	*	1.66	1.66	1.66
		e) Adequacy of work material quantity - No (0)	*	*	1.66	1.66	1.66
		f) Adequacy of work material availability - No (0)	*	*	1.66	1.66	1.66
	Technological resources (10,0)	a) Availability of technological resources for information organization and sharing - Poor (0)	*	*	2.0	2.0	2.0
		b) Municipal surveillance service database availability - No (0)	*	*	2.0	2.0	2.0
		c) Access to Information Systems - No (0)	*	3.33	2.0	2.0	2.0
		d) Adequate functioning of information systems - Inadequate (0)	*	3.33	2.0	2.0	2.0
		e) Instrument for standardization of actions (Instructions) e1 - Agrees and implements e2 - Agrees and does not implement		e1 – 3.33 e2 – 0	e1 – 2.0 e2 – 0	e1 – 2.0 e2 – 0	e1 – 2.0 e2 – 0
		e3 - Disagrees and implements e4 - Disagrees and does not implement		e3 – 3.33 e4 – 0	e3 – 2.0 e4 – 0	e3 – 2.0 e4 – 0	e3 – 2.0 e4 – 0

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In order to obtain the classification of the local surveillance activity in its realms and sub-realms, scores were assigned for each criterion, taking into account the responses of each informant[15,16]. Thus, the arithmetic mean of all the criteria for each realm was created, creating a sub-total, which later provided the basis for the construction of the level of municipal and regional performance (Table 1).

Health Surveillance's score in the seven municipalities studied was determined by the arithmetic mean of each realm (Structure, Process,

Chart 1. continuation

Realms	Sub-realms	Criteria	Surveillance sectors maximum score				
			Manager	**Health Surveillance Coordinator**	**HS**	**EnvS**	**EpiS**
Structure	Administrative management (10,0)	a) SMS Action Plan available - No (0)	* 3.33		*	*	*
		b) Targets working at local reality - No (0)	10.0	3.33	5.0	5.0	5.0
		c) All surveillance areas operating c1 – All 6 c2 - Only 3 c3 - No	*	c1 – 3.33 c2 – 1.7 c3 – 0	c1 – 5.0 c2 – 3.37 c3 – 0	c1 – 5.0 c2 – 3.37 c3 – 0	c1 – 5.0 c2 – 3.37 c3 – 0
Process	Continuing education (10,0)	a) Training to work in the position after incorporation in the team - No (0)	*	*	2.0	2.0	2.0
		b) Adequacy of training themes and adequacy to professional demands - Inadequate (0)	3.33	3.33	2.0	2.0	2.0
		c) Responsible for the training c1-GRS c2-Professional from another institution c3-Professional from the municipal surveillance team	c1 – 3.33 c2 – 3.33 c3 – 2.83	c1 – 3.33 c2 – 3.33 c3 – 2.83	c1 – 2.0 c2 – 2.0 c3 – 1.5	c1 – 2.0 c2 – 2.0 c3 – 1.5	c1 – 2.0 c2 – 2.0 c3 – 1.5
		d) Training frequency d1- According to the planning as per prerogatives of Instructions d2- Calling the GRS d3-According to work possibilities	d1 – 3.33 d2 – 1.66 d3 – 1.26	d1 – 3.33 d2 – 1.66 d3 – 1.26	d1 – 2.0 d2 – 1.0 d3 – 0.6	d1 – 2.0 d2 – 1.0 d3 – 0.6	d1 – 2.0 d2 – 1.0 d3 – 0.6
		e) Training to use information systems - No (0)	*	*	2.0	2.0	2.0

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Outcome), considering that these are equally important for evaluating the performance of the Regional Health Surveillance actions.

To classify the level of Health Surveillance practice performance in the realms of Structure, Process, Outcome, cutoff points were established as follows: under 5.99 points (incipient: simplified performance); from 6.0 to 7.99 points (intermediate: shows progress, but care is still fragmented); and from 8 to 10 points (advanced: reorganization enabling changes in the hegemonic health care model). The system of scores and cutoff points were adapted from Felisberto et al.[15] and Bezerra et al.[16], based also on the outcomes of consensus verification.

The Human Research Ethics Committee of the Federal University of Viçosa (UFV) approved this study, respecting ethical aspects, according

Chart 1. continuation

Realms	Sub-realms	Criteria	Surveillance sectors maximum score				
			Manager	Health Surveillance Coordinator	HS	EnvS	EpiS
Process	Information management (10,0)	a) Feeding information systems a1- Timely as per prerogatives of Instructions a2- According to work possibilities	*	 a1 – 3.33 a2 – 2.53	*	*	*
		b) Information systems feeding frequency b1- Daily b2- Weekly b3- Monthly	*	 b1 – 3.33 b2 – 2.83 b3 – 2.33	*	*	*
		c) Sending of information systems spreadsheets c1 – Four-monthly c2 - Monthly c3 - Irregular	*	*	 c1 – 3.33 c2 – 2.83 c3 – 0	 c1 – 3.33 c2 – 2.83 c3 – 0	 c1 – 3.33 c2 – 2.83 c3 – 0
		d) Database is used for the following purposes d1- Planning actions and feeding information systems d2- Planning actions d3- Feeding information systems d4- Local database not available	*	*	 d1 – 3.33 d2 – 2.83 d3 – 2.53 d4 – 0	 d1 – 3.33 d2 – 2.83 d3 – 2.53 d4 – 0	 d1 – 3.33 d2 – 2.83 d3 – 2.53 d4 – 0
		e) Communication channels with the population available - No (0)	*	 3.33	 3.33	 3.33	 3.33

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to Resolution Nº 466/12 of the National Health Council and is part of a larger project entitled "Health Surveillance: evaluation of the practices of disease prevention and health promotion in the Zona da Mata Mineira region".

Results

Assessments of the surveillance of municipalities under study show important gaps between realms and individuals (Table 2). The municipal level of performance for Sanitary Surveillance and Epidemiological Surveillance was intermediate (7.16 and 6.46, respectively), while Environmental Surveillance obtained an advanced level of performance (8.10).This difference is due to the fact that, in Environmental Surveillance, Structure and Process obtained advanced scores (8.34 and 8.71, respectively), while Sanitary Surveillance only achieved an advanced score in Structure (8.05) and Epidemiological Surveillance only obtained an advanced score in Process (8,42).

The Outcome realm did not achieve advanced scores for any of the surveillance areas of municipality A, obtaining a level of intermediate

Chart 1. continuation

Realms	Sub-realms	Criteria	Surveillance sectors maximum score				
			Manager	Health Surveillance Coordinator	HS	EnvS	EpiS
Process	Implementation of actions (10,0)	a) Compulsory actions developed by each surveillance area with - Inadequate (0)	*	*	1.42	1.42	1.42
		b) Frequency of compulsory actions b1- Four-monthly targets b2- According to work conditions	*	*	b1 – 1.42 b2 – 0.8	b1 – 1.42 b2 – 0.8	b1 – 1.42 b2 – 0.8
		c) Performing health promotion actions - No (0)	*	*	1.42	1.42	1.42
		d) Frequency of health promotion actions d1- Four-monthly targets d2- According to work conditions	*	*	d1 – 1.42 d2 – 0.8	d1 – 1.42 d2 – 0.8	d1 – 1.42 d2 – 0.8
		e) Performing actions integrated with other surveillance areas e1- Health promotion e2- Vector control e3- Inspections e4- Environmental analysis e5- Investigation of outbreaks and diseases e6- No	*	*	e1 – 0.284 e2 – 0.284 e3 – 0.284 e4 – 0.284 e5 – 0.284 e6 – 0	e1 – 0.284 e2 – 0.284 e3 – 0.284 e4 – 0.284 e5 – 0.284 e6 – 0	e1 – 0.284 e2 – 0.284 e3 – 0.284 e4 – 0.284 e5 – 0.284 e6 – 0
		f) Performing actions in coordination with PHC - No (0)	*	*	1.42	1.42	1.42
		g) Performing actions in coordination with other bodies/institutions g1- Yes, working properly g2- Yes, but with restrictions g3- Yes, as a formality g4- No	*	*	g1 – 1.42 g2 – 1.0 g3 – 0 g4 – 0	g1 – 1.42 g2 – 1.0 g3 – 0 g4 – 0	g1 – 1.42 g2 – 1.0 g3 – 0 g4 – 0

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performance for the surveillance areas (7.24), where the questions not covered were inherent to the criterion of resolubility (Table 3).

In municipality B, according to Table 2, Epidemiological Surveillance obtained an incipient level score (5.05), Sanitary Surveillance achieved an intermediate level score (6.45) and Environmental Surveillance ranked as advanced (8.00). Thus, the level of performance of municipality B was intermediate (Table 3), emphasizing the realm of Structure, which achieved an advanced level score in this municipality.

In municipality C, both Sanitary Surveillance and Epidemiological Surveillance obtained an

Chart 1. continuation

Realms	Sub-realms	Criteria	Surveillance sectors maximum score				
			Manager	Health Surveillance Coordinator	HS	EnvS	EpiS
Process	Monitoring (10,0)	a) Performing external evaluation - No (0)	*	5.0	1.42	1.42	1.42
		b) Types of external evaluation b1- Quantitative targets normative instrument + qualitative analysis of actions b2- Quantitative targets normative instrument	*	*	b1 – 1.42 b2 – 1.22	b1 – 1.42 b2 – 1.22	b1 – 1.42 b2 – 1.22
		c) External evaluation with four-monthly frequency, according to normative instrument - Other (0)	*	*	1.42	1.42	1.42
		d) Performing internal evaluation - No (0)	*	5.0	1.42	1.42	1.42
		e) Internal evaluation protocol available - No (0)	*	*	1.42	1.42	1.42
		f)Types of internal evaluation f1- Quantitative targets according to planning + qualitative analysis of actions f2- Quantitative targets according to planning f3- Qualitative analysis of actions f4- None	*	*	f1 – 1.42 f2 – 1.22 f3 – 0.42 f4 – 0	f1 – 1.42 f2 – 1.22 f3 – 0.42 f4 – 0	f1 – 1.42 f2 – 1.22 f3 – 0.42 f4 – 0
		g) Frequency of internal evaluations g1- Monthly g2- Four-monthly g3- Annual g4- Other	*	*	g1 – 1.42 g2 – 1.42 g3 – 0.71 g4 – 0	g1 – 1.42 g2 – 1.42 g3 – 0.71 g4 – 0	g1 – 1.42 g2 – 1.42 g3 – 0.71 g4 – 0
	Process management (10,00)	a) Management of work processes carried out according to main diseases and strategies - No (0)	*	10	10	10	10

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intermediate level score (7.54 and 7.56, respectively), whereas Environmental Surveillance achieved an advanced level score (8.16). Structure of the three surveillance areas was classified as intermediate, and Process of the three surveillance areas achieved an advanced level score, with emphasis on the information management subrealm, where the criteria evaluated are related to the use of the database and information system, besides availability of channels of communication with the population, as well as implementation, integration, articulation and frequency of

Chart 1. continuation

Realms	Sub-realms	Criteria	Surveillance sectors maximum score				
			Manager	Health Surveillance Coordinator	HS	EnvS	EpiS
Outcome	Professional satisfaction (10,0)	a) Personal a1- Completely satisfied a2- Little satisfied a3- Satisfied a4- Very dissatisfied a5- Completely dissatisfied	 a1 - 5.0 a2 - 3.75 a3 - 2.5 a4 - 1.25 a5 - 0	 a1 - 5,0 a2 - 3.75 a3 - 2.5 a4 - 1.25 a5 - 0	 a1 - 5.0 a2 - 3.75 a3 - 2.5 a4 - 1.25 a5 - 0	 a1 - 5.0 a2 - 3.75 a3 - 2.5 a4 - 1.25 a5 - 0	 a1 - 5.0 a2 - 3.75 a3 - 2.5 a4 - 1.25 a5 - 0
		b) With regard to work b1- Completely satisfied b2- Little satisfied b3- Satisfied b4- Very dissatisfied b5- Completely dissatisfied	 b1 - 5.0 b2 - 3.75 b3 - 2.5 b4 - 1.25 b5 - 0	 b1 - 5.0 b2 - 3.75 b3 - 2.5 b4 - 1.25 b5 - 0	 b1 - 5.0 b2 - 3.75 b3 - 2.5 b4 - 1.25 b5 - 0	 b1 - 5.0 b2 - 3.75 b3 - 2.5 b4 -1.25 b5 - 0	 b1 - 5.0 b2 - 3.75 b3 - 2.5 b4 - 1.25 b5 - 0
	Resolubility by targets for Health Surveillance * (10,00)	a) Achieving targets of the normative instrument for Health Surveillance (items 1 to 6)	*	*	a1 a a6 - 1,66	*	*
	Resolubility by targets for Environmental Surveillance * (10,00)	a) Achieving targets of the normative instrument for Environmental Surveillance (items 1 to 10)	*	*	*	a1 a a10 - 1,0	*
	Resolubility by targets for Epidemiological Surveillance (10,0)	a) Achieving targets of the normative instrument for Epidemiological Surveillance (items 1 to 22)	*	*	*	*	a1 a a22 - 0.45

EnvS = Environmental Surveillance; EpiS = Epidemiological Surveillance; HS = Health Surveillance.

* Level of analysis not addressed by criterion in question.

Source: Donateli (2016).

actions (Table 2). Based on these data, municipality C scored an intermediate performance level (7.76) for the surveillance activities (Table 3).

In municipality D, the level of surveillance performance was intermediate (6.78) (Table 3). Analyzing the data in Table 2, it can be observed that Sanitary Surveillance achieved an incipient level score (5.23), and the main factor for this classification is the low resolubility of the Outcome realm, due to the low compliance with the normalized targets. Epidemiological and Environmental Surveillance obtained an intermediate level score (7.46 and 7.66, respectively).

In municipality E, Environmental and Sanitary Surveillance achieved an incipient level score (5.76 and 5.32, respectively), and Epidemiological Surveillance obtained an intermediate level score (7.25) (Table 2). These data arise due to inadequacies found in the Structure realm of these surveillance areas, achieving an incipient score in all of them. This is due to the sub-realms of material and technological resources and administrative management, in which criteria such as availability and adequate work materials, technological resources for information sharing, adequate functioning of the systems and adequacy of the recommended targets were evaluated. Thus, municipality E obtained an intermediate level performance score (6.11), and this municipality was the worse among those evaluated in the study (Table 3).

Municipality F achieved an intermediate level score (6.37), and was the second worse municipality evaluated in the study (Table 3). Sanitary

Table 1. Scoring criteria and indicators. Zona da Mata, Minas Gerais, Brazil, 2016.

		Structure					Process			Outcome	
Municipalities	Work level	HR	INF	REC TECNO MAT.	ADM MANA-GEMENT	CONT EDUC	INF MANA-GEMENT	IMPL. OF ACTIONS	PROC MANA-GEMENT AND MONIT	PROF SATISF	RESOLUB
A	MANAGER	3.94	*	*	0	9.99	*	*	*	10	*
	COORD	8.3	*	4.99	5.03	8.32	9.19	*	7.5	7.5	*
	HS	6.18	10	7.64	8.37	4.6	9.19	7.1	7.03	6.25	6.64
	ENVS	7.32	8	9.67	8.37	9	9.99	8.8	7.03	7.5	7
	EPIS	9.94	4	6.15	3.37	7	9.19	8.8	8.7	7.5	2.7
	Sub-total	35.68	22	28.45	25.14	38.91	37.56	24.7	30.26	38.75	16.34
B	MANAGER	8.2	*	*	0	9.99	*	*	*	10	*
	COORD	7.4	*	3.33	6.66	9.99	8.69	*	10	10	*
	HS	7.32	10	9.98	10	8	9.99	3.12	9.06	6.25	6.64
	ENVS	7	10	7.47	5	7	6.66	5.96	7.03	10	6
	EPIS	8.42	10	7.98	5	7	6.66	8.18	8.7	8.75	1.35
	Sub-total	38.34	30	28.76	26.66	41.98	32	17.26	34.79	45	13.99
C	MANAGER	6.78	*	*	0	7.92	*	*	*	5	*
	COORD	8	*	4.99	1.7	8.32	9.19	*	7.5	8.75	*
	HS	7.1	8	4.52	8.37	9	9.19	8.18	7.03	6.25	8.3
	ENVS	6.5	6	5.66	10	9	9.99	8.8	9.97	10	6
	EPIS	7.1	6	9.15	8.37	7	9.19	8.8	7.03	10	4.05
	Sub-total	35.48	20	24.32	28.44	41.24	37.56	25.78	31.53	40	18.35
D	MANAGER	8.2	*	*	0	9.99	*	*	*	10	*
	COORD	8	*	3.33	3.33	8.32	9.99	*	7.5	8.75	*
	HS	6.5	6	4.83	5	5	9.99	6.764	7.03	2.5	3.32
	ENVS	5.9	6	4.66	5	7	9.49	8.8	9.06	10	8
	EPIS	7.1	8	5.66	5	9	9.19	8.8	8.7	10	4.05
	Sub-total	35.7	20	18.48	18.33	39.31	38.66	24.364	32.29	41.25	15.37
E	MANAGER	7.6	*	*	0		7.92	*	*	10	*
	COORD	8	*	4.99	5.03	9.99	9.99	*	7.5	10	*
	HS	7	0	4.15	3.37	7	9.19	6.96	7.03	6.25	3.32
	ENVS	6.18	2	4.32	3.37	7	9.19	8.18	8.35	6.25	4
	EPIS	6.78	6	7.01	3.37	9	9.19	8.8	8.7	10	4.05
	Sub-total	35.56	8	20.47	15.14	40.91	37.56	23.94	31.58	42.5	11.37
F	MANAGER	7.92	*	*	0	6.66	*	*	*	10	*
	COORD	7.4	*	4.99	1.7	8.32	9.99	*	7.5	8.75	*
	HS	7.1	0	8.98	8.37	5	9.99	8.18	7.03	10	4.98
	ENVS	9.62	2	7.49	3.37	9	9.19	5.96	8.35	7.5	0
	EPIS	9.94	4	6.49	3.37	7	9.49	5.96	8.7	6.25	3.6
	Sub-total	41.98	6	27.95	16.81	35.98	38.66	20.1	31.58	42.5	8.58
G	MANAGER	6.5	*	*	0	9.99	*	*	*	10	*
	COORD	7.4	*	4.99	9.99	8.32	9.99	*	7.5	8.75	*
	HS	7.6	6	9.67	10	5	9.19	6.76	7.03	7.5	4.98
	ENVS	7.1	4	6.18	5	7	9.19	7.38	9.06	10	5
	EPIS	7.1	2	5.18	5	5	9.19	8.8	9.06	10	3.6
	Sub-total	35.7	12	26.02	29.99	35.31	37.56	22.94	32.65	46.25	13.58

COORD = Health Surveillance Coordinator; ENVS = Environmental Surveillance; EPIS = Epidemiological Surveillance; HS = Health Surveillance. * Level of analysis not addressed by criterion in question.
Source: Donateli (2016).

surveillance and Epidemiological Surveillance obtained an intermediate score (7.05 and 6.22, respectively) and Environmental Surveillance achieved an incipient performance level score

Table 2. Scores according to performance levels, realms and municipalities of Health Surveillance. Zona da Mata, Minas Gerais, Brazil, 2016.

Surveillance areas	Municipalities	Structure	Process	Outcome	Realm performance score by municipality	Surveillance performance score in the seven municipalities	Regional surveillance performance score[1]
HS	A	8.05	6.98	6.45	7.16[b]	6.75[b]	**6.93[b]**
	B	9.33	7.54	6.45	7.77[b]		
	C	7.00	8.35	7.28	7.54[b]		
	D	5.58	7.20	2.91	5.23[a]		
	E	3.63	7.55	4.79	5.32[a]		
	F	6.11	7.55	7.49	7.05[b]		
	G	8.32	7.00	6.24	7.18[b]		
EnvS	A	8.34	8.71	7.25	8.10[c]	7.13[b]	
	B	7.37	6.66	8.00	7.34[b]		
	C	7.04	9.44	8.00	8.16[c]		
	D	5.39	8.59	9.00	7.66[b]		
	E	3.97	8.18	5.13	5.76[a]		
	F	5.62	8.13	3.75	5.83[a]		
	G	5.57	8.16	7.50	7.08[b]		
EpiS	A	5.87	8.42	5.1	6.46[b]	6.91[b]	
	B	7.85	7.64	5.05	6.85[b]		
	C	7.66	8.01	7.03	7.56[b]		
	D	6.44	8.92	7.03	7.46[b]		
	E	5.79	8.92	7.03	7.25[b]		
	F	5.95	7.79	4.93	6.22[b]		
	G	4.82	8.01	6.80	6.54[b]		

HS = Health Surveillance; EnvS = Environmental Surveillance; EpiS = Epidemiological Surveillance. [1] Level of regional Health Surveillance performance based on the three surveillance areas evaluated. [a] Incipient performance level. [b] Intermediate performance level. [c] Advanced performance level.
Source: Donateli (2016).

Table 3. Scores by realms and municipalities of Health Surveillance. Zona da Mata by municipality and regional, Minas Gerais, Brazil, 2016.

Municipalities	Structure	Process	Outcome	Performance score by municipality
A	7.42[b]	8.04[c]	6.27[b]	7.24[b]
B	8.18[c]	7.28[b]	6.50[b]	7.32[b]
C	7.23[b]	8.60[c]	7.44[b]	7.76[b]
D	5.80[a]	8.24[c]	6.31[b]	6.78[b]
E	4.46[a]	8.22[c]	5.65[a]	6.11[b]
F	5.89[a]	7.82[b]	5.39[a]	6.37[b]
G	6.24[b]	7.72[b]	6.85[b]	6.94[b]
Performance score by regional realm	6.46[b]	7.99[b]	6.34[b]	**6.93[b]**

[a] Incipient; [b] Intermediate; [c] Advanced.
Source: Donateli (2016).

(5.83) (Table 2). For this outcome of performance level score of municipality F, worth highlighting as critical factor are Structure and Outcome realms, both obtaining an incipient performance level score under the study.

In municipality G, according to Table 2, all three surveillance areas achieved an intermediate performance level score, and the surveillance with the lowest mean was Epidemiological Surveillance (6.54). Thus, we can highlight the Structure realm of Sanitary Surveillance (8.32) and the Process realm of environmental and Epidemiological Surveillance, both of which obtained advanced performance level scores (8.16 and 8.01, respectively). As a critical node, the Structure realm is described, whose performance level score was incipient for Environmental (5.57) and Epidemiological Surveillance (4.82).

When performing the general evaluation of the realms of each municipality (Table 3), the Structure realm of municipalities D, E and F obtained an incipient performance level score, while municipalities A, C and G achieved an intermediate performance level score. Only municipality B obtained an advanced performance level score for that realm. The main reason for such findings lies in the sub-realm of administrative management, in which questions are assessed on the targets set by the action's guiding instrument versus the local reality, in addition to the availability of all the recommended surveillance[18]. Thus, this item was the one that received the lowest means.

In the Process realm, municipalities A, C, D and E achieved an advanced performance level scores, and municipalities B, F and G obtained intermediate performance level scores. We did not achieve incipient performance level scores in the specified realm, since the evaluated criteria are mainly training, feeding information systems and implementing actions, and these criteria are monitored four-monthly. Among these subrealms, information management was positively highlighted, and is an item in which the information systems were fed, their frequency and the sending frequency of these data, as well as the availability of channels of communication with the population. In this sub-realm, all the municipalities obtained advanced performance level scores.

In the Result realm, municipalities A, B, C, D and G achieved intermediate performance level scores, while municipalities E and F obtained incipient performance level scores. The sub-realm professional satisfaction achieved advanced performance scores for most municipalities, except in municipality A, which obtained an intermediate performance level score. In the sub-realm of resolubility, most municipalities achieved incipient performance level scores, except for municipality C, which obtained an intermediate performance level score.

When analyzing the performance of each surveillance area in the seven municipalities located in Zona da Mata Mineira region evaluated, we noted that three surveillance areas achieved an intermediate performance level score, with a mean of 6.75 for Sanitary Surveillance, 7.13 for Environmental Surveillance and 6.91 for Epidemiological Surveillance (Table 2).

The performance score obtained by the three surveys, based on the three realms, was classified as intermediate in all seven municipalities. The values of municipalities A, B, C, D, E, F and G were respectively: 7.24; 7.32; 7.76; 6.78; 6.11; 6.37; 6.94 (Table 3). Based on the assessment of the three realms, the performance level of Regional Health Surveillance is intermediate. The Structure realm obtained a mean score of 6.46, whereas the Process realm achieved the mean of 7.99 and the Outcome realm a mean of 6.34 (Table 3).

Thus, the level of performance score of Regional Health Surveillance was 6.93 according to this study, which intermediate.

Discussion

The assessment of the realms of Sanitary Surveillance, epidemiological and Environmental Surveillance in the Zona da Mata Mineira region indicates challenges that must be tackled, since municipal surveillance areas had an overall intermediate performance, with a fragmented health care provision, albeit with some advances.

We noticed that the weak link is located in the sub-realm administrative management, underpinning Structure, which in turn influences the realm Outcome, specifically in the sub-realm resolubility. The achievement of targets proposed by the state government in most municipalities is hampered by the local reality, especially due to fragmented and little resolutive actions, hindering their efforts to achieve an advanced performance level score.

The lack of integration among surveillance areas can partly explain this setting. In several municipalities, this integration does not occur even in terms of physical structure, which favors work fragmentation at different levels of

health care[19]. Santos[20] affirms that integrating networked services in public health is, in fact, the only way to ensure to the citizen and the community comprehensive health care, as defined in art. 7, II, of Law Nº 8.080 of 1990.

Aggravating the lack of integration, the absence of a flowchart of actions, as well as a plan of action, also hinders horizontality between the bodies, so there is a need for a reformulation of methodological approaches, since joint and comprehensive actions capable of generating performance of all surveillance are required. The inadequate human, material, technological and infrastructure resources also contribute to the incipient performance of Health Surveillance areas in the Zona da Mata Mineira region.

Gil[21] emphasizes that this situation is a great challenge for small municipalities, which, in addition to suffering from the shortage of qualified professionals, evidence a late onset of the decentralization process of actions. Considering the importance of the integrality of actions, the lack of material resources negatively affects the quality of service[22]. In addition, a successful material management relies mainly on the appropriate use by the professionals involved, requiring adequate control and use, in order to reduce waste and improve efficiency[23].

The sub-realm of technological resources also evidences an ineffective use of available technology, below the roles of programs. If, on the one hand, different information systems are available, on the other hand, it is perceived that these functions underperform, largely due to the lack of adequate training of those responsible for their management[24]. Data are collected, processed into systems, but not always used for decision-making and troubleshooting.

For some authors[21,25], difficulties relevant to the implementation of the instructions guiding state Health Surveillance actions[14] are related to factors such as inadequate human, material and financial resources, which leads to discontinuous actions and confirms the findings of this study. Actually, what happens is the prioritization of some actions to the detriment of others, directly affecting their resolubility[26], as in the case of actions aimed at controlling *Aedes aegypti* due to the Dengue-Zika-Chikungunya epidemic, which occurred during the study, to the detriment of other actions, by disregarding local realities.

While there are important limitations in the Structure realm, still considering the Donabedian triad to evaluate the actions of regional Health Surveillance actions, the Process realm evidences an advanced performance, in which issues were investigated about the existence of channels of communication with the population and database use (sub-realm information management), as well as aspects related to the implementation of mandatory surveillance actions and their frequency and health promotion actions and the implementation of articulated and integrated actions between surveillance areas, partner bodies and Primary Health Care - PHC (sub-realm implementation of actions).

Specifically when analyzing the sub-realms implementation of actions, the questions about the implementation of the compulsory actions and frequency of actions were positively weighted among the three surveillance areas and in all seven municipalities evaluated, unlike the criteria related to the execution of articulated and integrated actions with other surveillance areas and with PHC, still inadequate in the municipalities evaluated. This fact reminds us of the verticality of actions, since municipalities have to achieve targets, which are the mandatory actions in a specific period (every four-monthly), so they have this concern to obtain the resource from the plan to strengthen Health Surveillance, not considering articulation and integration with other sectors. Thus, they are failures in the process of reorganizing health promotion and disease prevention practices.

However, one aspect of fundamental importance to be described is the fragmented actions, possibly overcome in cases of the need for joint interventions between surveillance areas, such as the recent dengue epidemic experienced in the region, which involved the mobilization and implementation of integrated actions between surveillance areas, albeit in timely fashion, since integrated intervention practices do not occur in the daily routine and were not registered.

In addition, it can be seen that training plays an important role as a process of communication and dialogue in the process of health promotion and disease prevention. This type of action is essential not only for the selection of adequate human resources but, above all, in the routine of the professionals to recognize their role and the work process as a whole, which must occur in a decentralized and transdisciplinary way, that is, in all locations and from each reality, involving various knowledge and articulating management and care[27].

The sub-realm process management and monitoring revealed that municipalities undergo evaluation by the State Health Secretariat (SES), through the Regional Health Management (GRS),

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every four-monthly. However, most municipalities do not carry out internal evaluation. In addition, both external evaluation and internal evaluation, when performed, have a quantitative approach to actions through the targets defined by the government of Minas Gerais in the *Instructions for the Implementation and Evaluation of Health Surveillance Actions, the Strengthening Health Surveillance in Minas Gerais Project*[14], not considering the qualitative aspects to achieve the objectives[28]. Thus, internal evaluations conducted in the municipal contexts could be important tools for complementing the established evaluation processes, aiding the quality of work processes.

The Result realm was classified as intermediate performance. A dualism found in data was the high mean of the sub-realm professional satisfaction and the low resolubility, another subrealm evaluated. Based on the answers about professional satisfaction, we can see potentialities such as self-valuation, satisfactory professional experience and adequate performance favorable to the resolubility of their area of performance. However, work overload and inadequate payment may favor stressors found in the work dynamics and hamper the development of new professional practices that allow the restructuring of the Health Surveillance model.

Sub-realm resolubility was evaluated as incipient in the Epidemiological Surveillance of municipalities A, B, C, D, E, F and G, in Sanitary Surveillance of municipalities D, E, F and G, in Environmental Surveillance of municipalities E and G. This fact is related to the inadequacy of targets to the municipal reality. As examples, we can mention the natural lack of cases of certain diseases or illnesses, although laboratory sample collection of cases is required for Epidemiological Surveillance; lack of material for analysis, such as in the case of canine surveys for environmental monitoring; and scarce qualified professionals to evaluate Sanitary Surveillance architectural projects. Each surveillance has its targets and seeks to comply within the stipulated time, but always acting in cases of emergency and separately.

The synthesis of realms evaluated in this study constitutes a setting of intermediate performance, dominating limits rather than autonomy space, perpetuating an excess of verticality in programs and decisions, which hinders changes towards integration of Health Surveillance actions[20].

In the face of what is found in this study, it can be seen that attention of Health Surveillance in the seven municipalities of the Zona da Mata Mineira region is fragmented in the process of reorganization of practices, but with some advances in the perspective of the questioning work processes in order to enable the intervention of the entire multidisciplinary team, increasing accountability of health professionals and elevating the coefficients of bond and trust.

Decentralization associated with the integration of Health Surveillance actions is in the process of incipient implementation for all municipalities. Because of a potential positive impact on the local morbimortality profile, it is necessary to strengthen the qualitative monitoring of the actions and improve the capacity of analyzing the epidemiological data generated, as well as the promotion of the continuing education of professionals.

Thus, this study indicates the different levels of Health Surveillance and classifies them. This demonstrates the need to follow-up and restructure healthcare actions and reveals the need to restructure surveillance areas, the recommended targets and joint actions on a regular basis, in order to overcome the main challenges of the current health-disease process, outlining ways of controlling, monitoring and preventing diseases. Therefore, this study provided an overview of surveillance activities in order to foster new studies and research for the validation and elaboration of new regional information and analysis tools, awakening in local and regional authorities a new vision on health needs and problems and building inter-municipal integration links that will benefit municipalities in the control and prevention of current and growing diseases in the country.

Conclusion

The findings of this study point to a fragmented performance of Health Surveillance in the Zona da Mata Mineira region in the process of reorganization of health practices. While some advances have been identified, the need to follow up and restructure actions to effectively control emerging and reemerging disease outbreaks that are identified in Brazil and worldwide causes a stir.

Thus, it is worth emphasizing the strategic and paramount importance of investment by local, state and national managers in the training and continuing education of the subjects responsible for the coordination, management and implementation of Health Surveillance actions, with focus in the municipalities, but with eyes on the country as a whole.

Collaborations

CP Donateli contributed with design, outline and data review and interpretation, as well as paper writing. PS Avelar contributed with the outline and data review, as well as paper critical review. ABN Einloft and RMM Cotta contributed with data outline, as well as paper critical review. GD Costa contributed with the design and outline of the study, as well as paper critical reviewand approval of version to be published.

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References

1. Luna EJA, Silva JR. Doenças transmissíveis, endemias, epidemias e pandemias. In: Fundação Oswaldo Cruz (Fiocruz). *A saúde no Brasil em 2030 - prospecção estratégica do sistema de saúde brasileiro: população e perfil sanitário*. Rio de Janeiro: Fiocruz; 2013. p. 123-176.
2. Ponte CMM, Gurgel MHC, Ponte GA, Ramos AVA, Montenegro Júnior RM. Distúrbios metabólicos em doenças infecciosas emergentes e negligenciadas. *Arq Bras Endocrinol Metab* 2010; 54(9):785-792.
3. Mendes EV. As redes de atenção à saúde. *Cien Saude Colet* 2010; 15(5):2297-2305.
4. Luna EJA. A emergência das doenças emergentes e as doenças infecciosas emergentes e reemergentes no Brasil. *Rev. Bras. Epidemiol*. 2002; 5(3):229-243.
5. Lindoso JAL, Lindoso AABP. Neglected tropical diseases in Brazil. *Rev. Inst. Med. trop*. 2009; 51(5):247-253.
6. Brasil. Ministério da Saúde (MS). Doenças negligenciadas: estratégias do Ministério da Saúde. *Rev Saude Publica* 2010; 44(1):200-202.
7. Yamey G. The world's most neglected diseases: ignored by the pharmaceutical industry and by public-private partnerships. *BMJ* 2002; 325(7357):176-177.
8. Teixeira MG, Costa MCN, Barreto F, Barreto ML. Dengue: twenty-five years since reemergence in Brazil. *Cad Saude Publica* 2009; 25(1):7-18.
9. Guimarães MCS, Silva CH, Lins RA, Mattos MC, Cendón BV. Produção científica em Dengue: um olhar a partir da coleção Brasil da Scielo. *Tendências da Pesquisa Brasileira em Ciência da Informação* 2014; 7(2):5336-5354.
10. Garcia LP, Duarte E. Evidências da vigilância epidemiológica para o avanço do conhecimento sobre a epidemia do vírus Zika. *Epidemiol. Serv. Saúde* 2016; 25(4):679-681.
11. Santos DN, Aquino EML, Menezes GMS, Paim JS, Silva LMV, Souza LEPF, Teixeira MG, Barreto ML. *Documento de posição sobre a tríplice epidemia de Zika-Dengue-Chikungunya*; 2016 [acessado 2016 set 30]. Disponível em: https://goo.gl/9wlT44.
12. Oliveira CM, Cruz MM. Sistema de Vigilância em Saúde no Brasil: avanços e desafios. *Saúde Debate* 2015; 39(104):255-267.
13. Costa NR. Os desafios atuais da política pública para a Dengue. *Valor Econômico*. 2011. [acessado 2016 set 23]. Disponível em: https://goo.gl/Jmt9Vf
14. Laguardia FC, Quintino ND, Gusmão RB, Moraes CAL, Oliveira PBB. *Instrutivo para execução e avaliação das ações de Vigilância em Saúde: projeto fortalecimento da Vigilância em Saúde em Minas Gerais*. Belo Horizonte: SES-MG; 2014.
15. Felisberto E, Carvalho EF, Maggi RS, Samico I. Avaliação do processo de atuação da estratégia da Atenção Integrada às Doenças Prevalentes da Infância no Programa Saúde da Família, no Estado de Pernambuco, Brasil. Cad *Saude Publica* 2002; 18(6):1737-1745.
16. Bezerra LCA, Freese E, Frias PG, Samico I, Almeida CKA. A vigilância epidemiológica no âmbito municipal: avaliação do grau de atuação das ações. *Cad Saude Publica* 2009; 25(4):827-839.
17. Donabedian A. The quality of care - How can it be assessed? *JAMA* 1988; 260(174):3-8.
18. Brasil. Ministério da Saúde (MS). *Guia de Vigilância em Saúde*. Brasília: MS; 2014.
19. Dias EC, Lacerda E, Silva T, Almeida MHC. Desafios para a construção cotidiana da Vigilância em Saúde Ambiental e em Saúde do Trabalhador na Atenção Primária à Saúde. *Cad. Saúde Colet*. 2012; 20(1):15-24.
20. Santos L. Integração das ações e serviços de saúde descentralizados em rede de atenção à saúde. *Blog Direito Sanitário: Saúde e Cidadania*. 2013. [acessado 2016 out 24]. Disponível em: http://blogs.bvsalud.org/ds/
21. Gil CRR. Formação de recursos humanos em saúde da família: paradoxos e perspectivas. *Cad Saude Publica* 2005; 21(2):490-498.
22. Brasil. Ministério da Saúde (MS). *Diretrizes Nacionais da Vigilância em Saúde*. Brasília: MS; 2010.
23. Gil Chaves LA. Gerenciamento de recursos materiais com enfoque na queixa técnica. *Rev. Eletr. Enf*. 2015; 17(1):100-107.
24. Arretche MTS. Políticas sociais no Brasil: descentralização em um Estado federativo. *Revista Brasileira de Ciências Sociais* 1999; 14:111-141.
25. Tanaka OU, Melo C. Reflexões sobre a avaliação em serviços de saúde e a adoção das abordagens qualitativa e quantitativa. In: Bosi MLM, Mercado FJ, organizadores. Pesquisa qualitativa de serviços de saúde. Petrópolis: Vozes; 2004. p. 121-136.
26. Vonzuben BA, Donalísio M. Dificuldades na execução das diretrizes do Programa de Vigilância e Controle da Leishmaniose Visceral em grandes municípios brasileiros. *Cad Saude Publica* 2016; 32(6):e00087415.
27. Hergesel L. *A importância da capacitação do profissional da sala de vacina para um atendimento eficiente e seguro*. São Paulo: Universidade Federal de São Paulo; 2014.
28. Brasil. Ministério da Saúde (MS). *Manual de gestão da Vigilância em Saúde*. Brasília: MS; 2009.

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