

Health surveillance: proposal for a tool to evaluate technological arrangements in local health systems

Vigilância em saúde: proposta de ferramenta para avaliar arranjos tecnológicos em sistemas locais de saúde

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Abstract

In order to identify the various meanings ascribed to health surveillance, the authors conducted a systematic review of articles published from January 1990 to August 2005 in the following databases: LILACS, SciELO, CAPES, MEDLINE, and Web of Science. A total of 144 abstracts were read and 18 full texts of Brazilian articles were selected for in-depth analysis, leading to the design of a typology for technological arrangements related to the various meanings: (i) traditional epidemiological surveillance, with communicable diseases as the main object; (ii) public health surveillance, as the municipal component of the national health surveillance system; and (iii) health surveillance, a technological mode of organizing health practices in a given territory. The proposed typology can contribute to research on surveillance practices in local health systems. It can also serve as a template for data collection and analysis. The meanings ascribed to the three types are discussed in light of public health's historical development as a field.

Local Health Systems; Health Surveillance; Evaluation

Introduction

"...It seems you don't understand that words are the labels we stick on things, not the things themselves, you'll never know what the things are really like, nor even what their real names are, because the names you gave them are just that, the names you gave them..." ¹ (p. 76).

The nature of health problems and the ways to deal with them in each specific country and historical period are related to the prevailing political, economic, and social conditions ², as are the various concepts and practices related to the field of public or collective health ³.

Morbidity and mortality data have been used as the basis for public health actions since the 14th century ². However, one of the first examples of surveillance, defined as the systematic recording of information on morbidity and mortality to orient control measures, occurred in London in the 17th century during an epidemic of the bubonic plague ⁴. In 1776, one component of the German medical system was the systematic analysis of health problems in order to deal with them ⁴. During the same period, the United States passed legislation on the reporting of contagious diseases like smallpox, yellow fever, and cholera ⁵. Still, it was not until the 19th century that this practice became fully developed, with William Farr (1807-1883) widely acknowledged as founder of the modern concept of surveillance ⁶.

The use of this concept expanded in the 20th century, when various surveillance systems were developed⁴. Until 1950, the term surveillance was used mostly to define the act of observing individuals, especially contacts with serious infectious diseases like the plague, smallpox, typhus, and syphilis, in order to detect the first symptoms and to implement quarantine measures⁷. With the development of the Surveillance Program under the Communicable Disease Center in the United States in the 1950s (now the Centers for Disease Control and Prevention, or CDC), Langmuir began to publicize the concept of surveillance as monitoring the occurrence of diseases in populations⁸, corresponding to: “*continuous observation of the distribution and incidence trend of the disease, through the systematic collection, consolidation, analysis, and dissemination of morbidity and mortality data*”⁹ (pp. 182-3). According to Langmuir, there is a clear separation between the roles of surveillance and intervention, whereby the concept of surveillance does not incorporate direct responsibility for control activities. In his understanding, although disease control is the purpose of surveillance, state and local health authorities should make the decisions and implement control operations.

In the early 1960s, Karel Raska further qualified surveillance with the addition of the term “epidemiological”¹⁰. The Division of Communicable Diseases of the World Health Organization (WHO) used the expression to refer to the unit created in 1965 to coordinate surveillance activities. In 1968, during its 21st Assembly, WHO discussed the theme of national systems and the global surveillance system for communicable diseases. Since then, the expression “epidemiological surveillance” has been used internationally⁴, adopting the definition by Raska¹¹ (p. 316): “*the epidemiological study of a disease considered as a dynamic process that includes the ecology of the infectious agents, the host, the reservoirs and vectors, as well as the complex mechanisms that intervene in the spread of infection and the extent to which this spread occurs*”.

In addition to incorporating epidemiological research activities, the term has also come to be used by various authors as a synonym for monitoring and auditing, with the Malaria and Smallpox Eradication Programs adding the responsibility for control measures to that of surveillance in the 1960s. Langmuir⁷ contended that such expansion of the meanings of surveillance, which became confused with the administration of control programs and even epidemiology itself, was not only etymologically incorrect, but obscured the meaning of a useful and specific concept.

In the 1970s, WHO and the Pan-American Health Organization (PAHO) encouraged the creation of epidemiological surveillance systems in the dependent developing countries. These systems, focused on infectious diseases, were associated with proposals for improving the performance of the Expanded Program on Immunization, once again linking surveillance to control activities¹². Depending on the conditions in the structuring and development of health services, they also encouraged surveillance agencies to assume responsibility for (or participate in) control activities¹³. However, unlike the WHO and PAHO approach, in several countries, especially in North America and Europe, surveillance did not include control measures in its design or practice^{4,5}.

Surveillance practices originally assumed infectious diseases as their object, but they gradually encompassed a wider variety of conditions, both in the United States and in other countries^{4,5,7}. In the late 1980s, the expression “epidemiological surveillance” was challenged on the grounds that it hampered an understanding of the scope of surveillance as a public health practice, allowing confusion in relation to epidemiology as a discipline and the use of epidemiological logic in health services⁵. The Anglo-Saxon literature began replacing the term “epidemiological surveillance” with “public health surveillance”⁴. Although epidemiological surveillance was used in articles focusing on risk factors, living conditions, and environmental variables, the gradual replacement of epidemiological surveillance with public health surveillance appears to have occurred simultaneously with the expansion of the surveillance concept and practices^{4,14,15,16,17,18}. However, the expression epidemiological surveillance was still frequently used in countries outside North America, including in Brazil, as reported by Waldman¹⁹.

In Brazil, modern surveillance concepts and practices were adopted by the Center for Epidemiological Research (CIE), created in 1968 at the Foundation for Public Health Services, which established the first national disease notification system in 1969²⁰.

In 1975, Law 6.259 established Brazil's National Epidemiological Surveillance System (SNVE). Article 2 of the law defined epidemiological surveillance as “*the information, investigations, and surveys needed to program and evaluate measures to control diseases and situations involving harm to health*”²¹, excluding control activities. However, the following year, Decree 78.231²², regulating the previous law, provided explicitly that the special health services network in charge of epidemiological surveillance activities, in addi-

tion to gathering and publishing its own data, was to implement the appropriate control measures. The SNVE focused its action on diseases of compulsory notification, as in other countries²³.

The definition of epidemiological surveillance assumed by Brazil's 1990 *Health Act*²⁴ was not limited to communicable diseases, and according to Barata²⁵, by incorporating health determinants and conditioning factors and extending beyond disease as its object, the term came to designate another set of practices. However, until recently, the agencies responsible for these actions continued to concentrate their work on the surveillance of communicable diseases.

In Brazil, in the 1990s, proposals referred to as "health surveillance" emerged with distinct theoretical approaches²⁶. One of them, "surveillance in health", related to a healthcare model focused on the control of causes and risks and targeted to health problems managed continuously in a given territory, combining actions aimed at overcoming the dichotomy between collective and individual practices²⁷. The other proposal conceived "surveillance of health" as the expansion of the sphere of activity of SNVE beyond communicable diseases, maintaining the specificity as to the object and intervention method²⁵. Meanwhile, the terms "surveillance in health" and "surveillance of health" were used by state and municipal health departments to refer to the units in charge of epidemiological surveillance, sanitary surveillance, and workers' health surveillance, combined in a single sector through administrative reforms²⁸.

There is important variation in the content and sphere of activity referred to by the term "health surveillance". One can also find different terms according to the author and/or text: surveillance of health, surveillance in health, public health surveillance. Since the surveillance concept is central to contemporary Collective Health theory and practice, and in light of the prevailing myriad of definitions in both academic texts and official documents, an analysis of the use of distinct expressions in scientific publications becomes both a theoretical and practical necessity.

To achieve consensus on the concepts initially requires an explicit description of their different meanings. Therefore, the current article proposes to contribute to this undertaking, seeking to identify how the various terms for "health surveillance" or "public health surveillance" have been used in the Brazilian and international scientific literature, in addition to the various senses and meanings ascribed to them. Subsequently, based on the above synthesis, the authors systematize a matrix with the characterization of ideal types of possible technological arrangements in the orga-

nization of surveillance practices in local health systems, to be used as a methodological tool in conducting evaluative research.

Methodology

In 2005, the authors conducted a review of the specialized literature from January 1990 to August 2005 in LILACS (Latin-American and Caribbean Health Sciences Literature), SciELO (Scientific Electronic Library Online), and the thesis/dissertation database of CAPES (Coordinating Body for Graduate Education). The Portuguese-language key words were: *vigilância*, *vigilância à saúde*, *vigilância em saúde*, *vigilância da saúde*, and *vigilância em saúde pública*. The article search in journals indexed in MEDLINE and Web of Science adopted the descriptors *health surveillance* and *public health surveillance*. The quotation marks (" ") proximity operator was used to limit the search to articles in which the terms were adjacent in the text. Based on the initial list, the study included the articles with available abstracts that allowed understanding the definition used. The review excluded abstracts referring to the numerous papers and experiences presented at public health congresses and meetings and published in the respective proceedings.

Given the wide range of terms with varying adjectives and prepositions (surveillance in health, surveillance of health, public health surveillance) and concepts, the articles in Portuguese were classified according to: (i) term employed; (ii) type of text; (iii) theme; and (iv) year of publication. In all, 144 abstracts and 13 full articles were analyzed. Based on this review, a matrix was elaborated with the description of ideal types²⁹ of technological arrangements for surveillance practices in local health systems, based on full texts of articles and documents that were considered exemplary or seminal (Table 1). The selection of dimensions and criteria for constructing the matrix was based on studies on the technological organization of health work^{30,31} and evaluation of the effects of health management decentralization³².

Results and discussion

The search in the LILACS, SciELO, and CAPES databases identified 144 abstracts of studies published in Brazil, with 12 (8.3%) adopting the expression surveillance of health, 24 (16.7%) surveillance in health, 12 (8.3%) health surveillance, 8 (5.6%) workers' health surveillance, 4 (2.8%) public health surveillance, and 13 (9%) environ-

mental health surveillance (or environmental surveillance, environmental epidemiological surveillance, or health environmental surveillance). Surveillance unqualified by adjectives was present in 21 (14.6%) of the abstracts and epidemiological surveillance in 50 (34.7%), reiterating the expression's common use in the country.

The search in the MEDLINE and Web of Science databases identified 552 abstracts with the terms *health surveillance* or *public health surveillance*. Of this total, 79 (14.3%) were excluded from the study because they dealt with *child health surveillance* with a clinical and individual approach to disease prevention and health promotion. Among the 473 abstracts that were selected and analyzed, in 145 (30.7%) the term *health surveillance* referred to the surveillance of workers' health and its relationship to the workplace, a field known in Brazil as Workers' Health, dealing with themes related to workers' assistance and the surveillance of diseases and injuries related to the workplace and work processes. The underlying definition of the term *health surveillance* in nearly all of the 328 (69.3%) remaining articles was, as expounded by Langmuir⁹, the systematic collection, analysis, and interpretation of health data in populations, essential to public health practice, integrated with the timely dissemination of information for intervention/action.

The analysis of abstracts and full texts confirmed the various meanings of the expressions for "health surveillance". Unlike the international literature, in Brazilian scientific publications the predominant form is not health surveillance as a continuous analysis of the health situation for selected events. In addition to the concepts reported by Teixeira et al.²⁶, i.e., of a technological mode of reorganization of health practices and integration among epidemiological, sanitary, and environmental surveillances, in Brazil, health surveillance is also viewed as a public health practice that incorporates the implementation of measures to deal with the events under surveillance.

Of the 144 articles produced in Brazil and selected here, 69 (47.9%) used the terms surveillance "in" or "of" health to refer to health surveillance. Of these, the underlying notion of a technological mode of organizing health practices was present in 33 (47.8%) abstracts, with a predominance of those adopting the terms surveillance "in" health or surveillance "of" health. Meanwhile, surveillance as a public health practice provided the basis for 27 (39.1%), with a stronger presence of those that referred to surveillance without specific adjectives. Among the other abstracts, 6 (8.7%) related to programs for monitoring the health of

high-risk newborns and infants, 1 (1.4%) referred to workers' health, and 1 (1.4%) to family health. One abstract (1.4%) referred to health surveillance as the integration of epidemiological, environmental, and sanitary surveillance.

As mentioned above, in the international literature the surveillance concept does not incorporate control measures, despite clear links to interventions or public health programs^{33,34,35,36,37,38,39}. More recently, the search for a closer link between surveillance practices and responses to the problems detected by it raises a concern that appeared in various articles^{40,41}. In addition, proposals for health sector reform in developing countries treat surveillance and public health action as interdependent processes⁴².

In Brazil, the debate in the 1990s revived the issue over the incorporation of intervention into the definition of surveillance and its scope, whether limited to prevention and damage control measures or expanded to include the control of risks and determinants, with actions to protect and promote health, as well as those involving individual attention²³.

Waldman¹⁹ made a clear distinction between surveillance and control instruments, even considering that at the local level these attributions could be exercised by the same professional or group of professionals. For Silva Júnior²⁰, the dilemma between *information for action* and *information and action* does not exist, and this is not the relevant point of the debate. In his understanding, the actual practice of surveillance in Brazil has occurred with the inclusion of control activities and one should thus not seek to compare these practices with standards from other contexts or historical periods. To distinguish surveillance from other public health practices, Silva Júnior returns to the following elements: a continuously performed activity; a focus on obtaining specific results; use of data directly related to public health practices; and the utilitarian sense of achieving disease control.

As a public health practice, the objective of health surveillance is the systematic description of patterns in the occurrence of diseases and health-related events to guide the planning, execution, and evaluation of the necessary interventions for their control or prevention. Surveillance of communicable diseases involves the search to identify cases in order to avoid spread of diseases, while in the cases of non-communicable diseases and injuries the goal is to monitor the behavior of their prevalence and risk factors, seeking to recommend health promotion measures⁴³. Public health surveillance also contributes to the study of the natural history of diseases and the epidemiology of health-related events⁴.

One point that deserves comment and that can help clarify the concepts discussed in the current article is the use of the terms “surveillance” and “monitoring”. Since the two concepts have routine, systematic data recording in common, surveillance and monitoring are frequently used as synonyms in both the Brazilian and international literature^{4,44}. The difference between surveillance and monitoring lies in the fact that the former, by definition, deals with health-related events in populations⁴, while monitoring is the process of analyzing and accompanying changes resulting from a given intervention or action^{4,44}. However, in Brazil it is also common to use monitoring to refer to the follow-up of health-related, demographic, economic, social, and environmental quality indicators and to analyze the prevailing health situation⁴⁵. Currently, monitoring as the systematic follow-up of indicators has come to be viewed as a public health surveillance tool, principally for the surveillance of non-communicable diseases and injuries and environmental surveillance, with the purpose of analyzing spatial/temporal changes in the selected indicators.

The objects and work resources of surveillance practices

In the selected articles, the events considered under surveillance were: communicable diseases^{46,47}, non-communicable diseases^{48,49}, birth defects^{50,51}, violence⁵², and a wide variety of environmental risks^{53,54,55,56,57}. Recent years have witnessed an effort by WHO, PAHO, national governments (including Brazil), and non-governmental organizations in the search to establish and development surveillance capability for chronic non-communicable diseases, and many countries have already designed systems for the surveillance of chronic disease risk factors⁵⁸. Emerging and reemerging diseases and the risk of use of biological weapons for terrorist acts has stimulated the production of articles focused on improving surveillance of acute infectious diseases and early detection of outbreaks^{59,60,61}. Other objects have also been proposed, including drug prescription and syndromic surveillance⁶².

Meanwhile, authors that analyze health surveillance from the perspective of technological organization of health work have focused on the control of causes and risks; linked to a project for health sector reform, they identify their object as selected health problems for continuous management in a given territory^{63,64}. According to this concept, to take final health problems as the object of practices would mean considering their

spatial distribution, in addition to the relations between the ways of life of distinct population groups and the diverse expressions of the health-disease process^{26,65}.

The different concepts of surveillance can also be differentiated on the basis of an analysis of the means used to achieve the expected objectives and purposes.

Health surveillance understood as a technological mode of organizing health practices requires the use of epidemiological knowledge as an immaterial technology for the organization of work processes and health services and systems, viewing it as a fundamental tool for health planning and management⁶⁵. The grasp of health problems' collective dimension based on epidemiology, according to those who work with this approach, contributes to shaping practices (health promotion and protection; prevention of risks and injuries; collective and individual care) that are appropriate for the population's health needs and problems. In addition to epidemiology and clinical medicine, the social sciences and critical geography have been highlighted as important resources for explaining the emergence of health problems, and urban planning and strategic administration are used to organize interventions to deal with them.

Meanwhile, health surveillance as a public health practice can be considered one of the possible uses of epidemiology in health services^{19,20,66}. By analyzing health-related events in populations, health surveillance necessarily draws on epidemiology, statistics⁶⁷, demography, and information systems⁶⁸ as essential tools. In Brazil, when interventions are included as part of public health surveillance, various medical and health technologies become part of the work resources.

Various authors have discussed the limits set by available scientific and technological knowledge on possibilities for intervention in the real world⁶⁹ or for structuring health promotion practices⁷⁰. Such reflections should be considered when analyzing the roles played by epidemiological knowledge (as well as by strategic planning techniques) in shaping local health system practices. Another key point is the relationship between technological knowledge and practical knowledge⁷¹ in health services' daily routine.

Organizational modes in surveillance practices

The material conditions in each country establish the limits and possibilities between regulation exercised at the system's central level and the degree of local autonomy and responsibility

and thus condition the space for shaping surveillance practices.

In the United States, the Federal government's role in setting standards for surveillance systems has only been strengthened recently^{72,73}. This form of organization expresses respect for the autonomy of states and counties and the resulting low normative and coordinating capacity of the U.S. Federal administration²⁰.

Brazil's long history of centralized power at the Federal level is reflected in the health field. Historically, the Federal administration assumes the role of coordinating and standardizing national surveillance systems^{20,74,75}. In the process of decentralization and establishment of the national health surveillance system, the model adopted in Brazil sets limits on state autonomy, and the municipalities (counties) are basically responsible for implementing the actions. Silva Júnior provides a summary of this recent history²⁰.

Some municipalities have adopted a format where they use the same structure (personnel, equipment, information system) to conduct surveillance and respond to various health problems. In a sense, there appears to be an organization based on two subsystems, as reported by Waldman¹⁹: the "*subsystem of information to implement quick and timely control measures*", situated in the local health systems, and the "*subsystem of epidemiological intelligence*", situated at the national level, the objectives of which are the elaboration of the technical basis for control programs and the identification of gaps in scientific and technological knowledge. Still, contrary to Waldman, there appears not to be a connection between the surveillance subsystems and the planning and program areas for the elaboration of standards and norms for local use.

However, according to the concept that treats health surveillance as a proposal for reorienting health practices at the local level, the authors contend that thinking and acting to deal with health problems are local management's responsibility^{26,65}. This highlights the need to establish government capability, based on training local teams in epidemiology and planning in order to conduct more adequate health situation analyses, with the identification and explanation of problems and decision-making to adopt the appropriate measures. In this approach, interventions in both health-sector problems and those that require inter-sector collaboration are thus organized as operations. Another key point is that health surveillance, by expanding the object of its work, proposes new protagonists, with new ideologies, concepts, and values – not only health professionals and workers, but also those from other sectors of government plus involve-

ment by the organized population⁷⁶. However, empirical studies in municipal health systems have not identified health surveillance as a technological mode of organization for practices, despite the incorporation of this model's proposal in official documents^{28,77}.

Surveillance practices at the local level: a proposal for systematization of possible technological arrangements as a tool for evaluative studies

Based on the above review, the authors elaborated a matrix of ideal types of technological arrangements for the organization of surveillance practices in municipal health systems. The levels, dimensions, and criteria were selected as the basis for defining patterns, with the characterization of three ideal types (Table 1):

- **Health surveillance: a technological mode for reorganization of health practices at the local level**

"*Health surveillance*" can be understood as a given technological organization of health work, a technological mode⁶⁵ characterized by health practices whose object is health problems selected for continuous management, linking a set of actions^{63,64}. As a health promotion strategy, it points to the improvement of living and health conditions for population groups in a given territory.

The above-mentioned model⁶⁵ proposes linkage between technologies from epidemiological knowledge and planning for the selection of problems to be managed continuously in the territory, and distinguishes various levels of action (causes, risk, and harm) for dealing with them. The perspective is to shift the emphasis from harm to risks and causes, seeking to overcome the dichotomy between so-called "collective" and "individual" health practices, in addition to proposing inter-sector actions as an instrument for linking public policies. According to this concept, public health surveillance and sanitary surveillance, like other medical and health practices, are technologies to be used in accordance with the given problem.

- **Public health surveillance: municipal component in the national health surveillance system**

The ideal type "*public health surveillance*" was based on the definition proposed by Silva Júnior²⁰, incorporating into the content of surveillance both the collection, consolidation,

Table 1

Matrix with the systematization of ideal types of surveillance practices at the municipal level in Brazil, based on a literature review.

Dimensions	Criteria	Health Surveillance ^{26,27,28,63,64,65}	Public Health Surveillance ^{20,75}	Traditional Epidemiological Surveillance ^{78,79}
Concept of surveillance	<ul style="list-style-type: none"> • Purpose of surveillance practices • Forms of organization of surveillance practices 	<ul style="list-style-type: none"> • Technological mode of health intervention with redefinition of practices, health organizations, and health culture • Purpose of work: improvement of living conditions for population groups within a given territory • Organization of a heterogeneous set of policies shaped according to the population's health situation in the municipality (or local territory) • Presence of organized actions by the various actors, targeting selected problems using continuous management • Adoption of inter-sector action as an instrument for public policy linkage 	<ul style="list-style-type: none"> • Surveillance consists of monitoring and predicting changes in any health event or determinant by means of systematic data collection, consolidation, and interpretation • Purpose of work: disseminate information, formulate recommendations and measures for the prevention and control of diseases/injuries or health promotion • Adoption of programmed health actions in relation to events under surveillance • Inter-sector linkage as a strategy to deal with priority problems 	<ul style="list-style-type: none"> • Surveillance includes notification, investigation, and surveys or inquiries as needed for programming communicable disease control measures • Adoption of the special programs model for prevention and control interventions
Agents in charge of practices	<ul style="list-style-type: none"> • Type of agents involved in surveillance and their position in the health system 	<ul style="list-style-type: none"> • Municipal health team (central level, basic, medium, and high-complexity network) • Presence of commission/collegiate body to coordinate inter-sector action • Population shares responsibility in the municipality's health surveillance project 	<ul style="list-style-type: none"> • Specific team at the central level coordinates and executes actions involving greater complexity or to complement the local level • Teams from units in the basic network report, investigate, and adopt measures with the use of specific protocols • Incentive for participation by the population in dealing with priority problems 	<ul style="list-style-type: none"> • Epidemiological surveillance team at the central level • Basic health network teams report communicable diseases
Object of work	<ul style="list-style-type: none"> • Questions that the set of activities considers relevant for exercising its intervention 	<ul style="list-style-type: none"> • Health problems of population groups that require continuous attention and follow-up in a given territory 	<ul style="list-style-type: none"> • Health problems selected as priorities by the Federal level of the National Health Surveillance System • Health problems prioritized at the municipal level 	<ul style="list-style-type: none"> • Communicable diseases
Means of work	<ul style="list-style-type: none"> • Technologies used in the work 	<ul style="list-style-type: none"> • Knowledge from epidemiology, clinical medicine, social sciences, and geography, linked by a management level that uses local health planning and programming as a tool 	<ul style="list-style-type: none"> • Epidemiological knowledge as the basis for analyzing the situation with health-related events under surveillance • Health technologies based on adjustment to the local reality of technical guidelines from programs drafted by the Federal level 	<ul style="list-style-type: none"> • Basic work instrument, technical guidelines for the communicable disease control programs elaborated by the Federal level

(continues)

Table 1 (continued)

Dimensions	Criteria	Health Surveillance ^{26,27,28,63,64,65}	Public Health Surveillance ^{20,75}	Traditional Epidemiological Surveillance ^{78,79}
		<ul style="list-style-type: none"> • Operations with the use of medical technologies, among others • Social communications technologies for the mobilization, organization, and action of various groups in the promotion and defense of living and health conditions 	<ul style="list-style-type: none"> • Individual care as a measure of communicable disease control 	
Activities/Actions implemented	<ul style="list-style-type: none"> • Health promotion actions • Surveillance of health risks • Surveillance of harm • Risk control • Harm control 	<ul style="list-style-type: none"> • Public policies focused on health promotion • Use of social communications technologies to empower communities technically and politically • Monitoring of local health situation to identify problems for continuous management • Decision-making at the local level and structuring of operations for dealing with the selected problems • Integration of actions in prevention, control, and recovery for problems involving continuous management • Programmed actions in the health units according to the selected problems • Existence of inter-sector actions with a common budget and plan 	<ul style="list-style-type: none"> • Recommendation of design of public policies focused on health promotion • Use of communications technologies to promote changes in unhealthy habits • Management of official epidemiological information systems at the municipal level • Monitoring of the epidemiological situation in relation to priority problems, using tools for the integration of risk and harm surveillance • Entomological surveillance actions • Surveillance of infant and maternal mortality • Monitoring of environmental health risks • Elaboration of epidemiological analyses • Programmed actions for prevention and/or control of selected risks and harm • Action in education and social mobilization within the territory covered by basic units and teams under the Family Health Program • Inter-sector actions with a focus on prevention and control of diseases and other health-related problems under surveillance 	<ul style="list-style-type: none"> • Centered on the prevention paradigm • The indicators referring to communicable diseases are analyzed by demand from another management level • Lack of linkage in the surveillance of risks and harm • Special programs for the prevention and control of communicable diseases • Vector control measures with emphasis on use of chemical products • Health education activities with the use of traditional instruments
Outputs	<ul style="list-style-type: none"> • Expected outputs of surveillance practices 	<ul style="list-style-type: none"> • Reduction in the magnitude of problems selected for continuous management • Increased technical and political power of communities and individuals 	<ul style="list-style-type: none"> • Elaboration and publication of reports on the epidemiological situation of health-related events under surveillance • Recommendations and/or adoption of measures to reduce the magnitude of health-related events under surveillance 	<ul style="list-style-type: none"> • Elaboration and publication of reports with analysis of data on the epidemiological situation of communicable diseases • Reduction of the magnitude of communicable diseases

(continues)

Table 1 (continued)

Dimensions	Criteria	Health Surveillance 26,27,28,63,64,65	Public Health Surveillance 20,75	Traditional Epidemiological Surveillance 78,79
Social relations	<ul style="list-style-type: none"> • Technical relations • Work relations 	<ul style="list-style-type: none"> • Municipal team with high technical capability and room for negotiation to define interventions (sector-based and inter-sector) • General guidelines defined democratically, with autonomy for the various levels in the health system to adapt them 	<ul style="list-style-type: none"> • Recommendations for health promotion actions • Normative power and coordination at the Federal level, but with possibilities at the municipal level to adapt the norms to local reality • Surveillance staff establishes agreements and links actions with the various areas in the municipal health department, basic health teams, and other sectors of the municipal administration 	<ul style="list-style-type: none"> • Strong normative power and coordination at the Federal level • Limited capacity by the surveillance team to link and/or propose actions related to the events under surveillance with other technical areas in the municipal health department

analysis, interpretation, and dissemination of data and information, plus the implementation of prevention and control measures and recommendation of health promotion actions. As the above-mentioned author contends, although this was not the model adopted in other countries, it was the basis for the historical development of these practices in Brazil.

Based on this definition, the authors elaborated their matrix of ideal types based on the components established under the government's Ruling 1.172 of June 15, 2004⁷⁵, specifying the various competencies and jurisdictions under the National Health Surveillance System: (i) surveillance of communicable diseases; (ii) surveillance of non-communicable diseases and injuries and their risk factors; (iii) environmental health surveillance; and (iv) health situation surveillance. In relation to attributions, the Federal government was responsible for coordinating surveillance of communicable diseases and environmental surveillance, in addition to conducting activities in the surveillance of non-communicable diseases and injuries and their risk factors, principally by conducting national surveys, in addition to surveillance of the general health situation nationwide. The state health departments were in charge of coordinating the state component and complementing or supplementing action in cases where the municipal health departments failed to act. Finally, the municipalities were in charge of coordinating the municipal component and implementing the respective measures within their territories.

As explained by Waldman¹² and Silva Júnior²⁰, since the central focus of sanitary sur-

veillance involves activities in regulation, control, and inspection of production, distribution, and consumption of products and services that entail potential harm to health, rather than the surveillance of health-related events per se, they were not considered part of public health surveillance.

- **Traditional epidemiological surveillance: non-surveillance and the major challenge of daily practice**

The ideal type referred to as "*traditional epidemiological surveillance*" corresponds to surveillance practices identified in the daily routine of health services, historically set apart from the conceptual debate: reporting, investigation, data consolidation, and the adoption of prevention and control measures for communicable diseases^{78,79}.

Based on the way surveillance was incorporated in Brazil, without clearly demarcating the scope of surveillance and control activities, the teams in charge accumulated (and were absorbed by) the coordination and execution of activities in the programs for the control of communicable diseases. According to Waldman⁴⁵, this turned surveillance systems into one more bureaucratic routine, or a mere information system, rather than acting as technical support tools for health services.

Final remarks

The various terms and concepts found in the literature converge into three main approaches

to the theme: (i) epidemiological surveillance of communicable diseases; (ii) public health surveillance; and (iii) health surveillance. The first is situated in the bureaucratic field, in the sense ascribed by Bourdieu⁸⁰ to institutions and agents linked to the state, and relates to the historical constitution of the public health component focused on the control of epidemics, with infectious diseases and their control as its object. The second corresponds to a modernizing watershed that expanded its object, as a technology employed in public health/collective health to support decision-making on measures for the prevention and control of health-related events (risks and harm), or to recommend health promotion measures. The third relates to social medicine and studies on the social determinants of disease (with its Brazilian watershed informing the Health Reform movement), representing a technological mode of organization for health practices in a given territory, incorporating a set of actions for dealing with selected problems,

including the control of socio-environmental determinants through public policies linked by inter-sector action.

The three ideal types systematized here do not exist in a pure state, but can be used to evaluate and characterize the type of organization of surveillance practices in actual, real-life situations. A validation drawing on expert consensus techniques (of the Delphi or similar type) could expand the possibilities for using the matrix developed here in empirical studies on the implementation of surveillance practices, thereby helping orient data collection and the comparison of the observed empirical types, with a view towards either establishing common ground among the various formulations or identifying singularities.

Case studies could also help identify the potentialities and obstacles involved in shaping technological arrangements for surveillance that could contribute to disease prevention and control and could be useful for health promotion.

Resumo

Com o objetivo de identificar os significados dos diversos termos empregados acerca da vigilância em saúde, realizou-se uma revisão sistemática da bibliografia especializada sobre o tema, no período compreendido entre janeiro de 1990 a agosto de 2005, nas bases de dados do LILACS, SciELO, banco de teses da CAPES, MEDLINE e Web of Science. A análise de 144 resumos e de 18 textos exemplares selecionados na literatura nacional permitiu a elaboração de uma matriz com a caracterização de três tipos ideais de arranjos tecnológicos possíveis em sistemas municipais de saúde: (i) vigilância epidemiológica tradicional, com as doenças transmissíveis como objeto; (ii) vigilância em saúde pública, componente municipal do sistema nacional de vigilância em saúde; e (iii) vigilância da saúde, um modo tecnológico de organização das práticas de saúde em um dado território. A matriz proposta poderá contribuir para a realização de investigações sobre a implantação de práticas de vigilância em sistemas locais de saúde, norteando a coleta e análise dos dados. São discutidos os significados dos três tipos encontrados frente à constituição histórica do campo da saúde coletiva e da vigilância em particular.

Sistemas Locais de Saúde; Vigilância Sanitária; Avaliação

Contributors

G. A. P. Silva participated in the theoretical design of the research project and the data collection, analysis, and interpretation, and wrote the article. L. M. Vieira-da-Silva oriented the work, contributed to the theoretical and methodological design, discussion, and interpretation of the results, and reviewed the manuscript.

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