

Modeling of Food and Nutrition Surveillance in Primary Health Care

Modelização da Vigilância Alimentar e Nutricional na Atenção Primária em Saúde

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ABSTRACT

Objective

To describe the modeling stages of food and nutrition surveillance in the Primary Health Care of the Unified Health Care System, considering its activities, objectives, and goals.

Methods

Document analysis and semi-structured interviews were used for identifying the components, describe the intervention, and identify potential assessment users.

Results

The results include identification of the objectives and goals of the intervention, the required inputs, activities, and expected effects. The intervention was then modeled based on these data. The use of the theoretical logic model optimizes times, resources, definition of the indicators that require monitoring, and the aspects that require assessment, identifying more clearly the contribution of the intervention to the results.

Conclusion

Modeling enabled the description of food and nutrition surveillance based on its components and may guide the development of viable plans to monitor food and nutrition surveillance actions so that modeling can be established as a local intersectoral planning instrument.

Keywords: Health planning. Models theoretical. Monitoring. Nutritional surveillance. Primary health care.

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RESUMO

Objetivo

Descrever as etapas de modelização da vigilância alimentar e nutricional na Atenção Primária em Saúde no Sistema Único de Saúde, considerando suas atividades, objetivos e metas.

Métodos

Foram utilizadas as técnicas de análise documental e entrevistas semi-estruturadas para identificar os componentes, descrever a intervenção e identificar os potenciais usuários da avaliação.

Resultados

Foram identificados os objetivos e metas da intervenção, os insumos necessários, as atividades e os efeitos esperados. A partir dessas informações, a intervenção foi modelizada. A utilização do modelo lógico teórico otimiza tempo, recursos, definição de indicadores a serem monitorados e aspectos a serem avaliados, identificando com mais clareza qual a contribuição da intervenção para o alcance dos resultados.

Conclusão

A modelização possibilitou descrever a vigilância alimentar e nutricional a partir de seus componentes e poderá orientar a elaboração de planos viáveis de monitoramento das ações da vigilância alimentar e nutricional para sua efetivação como um instrumento de planejamento intersetorial em nível local.

Palavras-chave: Planejamento em saúde. Modelos teóricos. Monitoramento. Vigilância alimentar e nutricional. Atenção primária à saúde.

INTRODUCTION

Given the everlasting and intense social and regional inequalities in Brazil, many public policies of different sectors and governmental spheres target social inclusion. Historically, Brazilian social policies aimed at individuals and families, in a focused and assistive manner, intervening little on structural aspects and effectively ensuring social rights by universal policies. Moreover, management instances lack consistent information to support their structuring, implementation, and development processes^{1,2}.

Despite the significant advances achieved by the universalization and decentralization of the *Sistema Único de Saúde* (SUS, Unified Health Care System) in 1990, some interventions still fail because consistent information to support decision making is scarce^{3,4}.

The effective implementation of the sanitary model of health surveillance, which recommends evidence-based planning and management to solve the most common and important health problems in population groups, faces numerous challenges. These problems,

identified in the routine of local health services, should feed the database of the National Health Surveillance Systems, which contribute to consolidate SUS administrative decentralization^{5,6}.

In this context, food and nutrition surveillance stands out as one of the guidelines of the *Política Nacional de Alimentação e Nutrição* (PNAN, National Food and Nutrition Policy), an important instrument for monitoring and assessing social policies, especially those related to the Human Right to Adequate Food, Food and Nutrition Security (FNS), and health sector policies, such as the *Política Nacional de Atenção Básica* (National Primary Health Care Policy) and the *Política Nacional de Promoção da Saúde* (National Health Promotion Policy)⁷⁻¹⁰.

The food and nutrition surveillance configuration adopted by Brazil was similar to that adopted by other developing countries, where the monitoring of the nutritional status of groups of higher biological (mother-child dyad) and social (the poor) vulnerability was prioritized in detriment of the monitoring of economic indicators of food intake, production, and supply for the areas of agriculture and economy¹¹.

By monitoring the population's food intake and nutritional status to provide "continuous data about the food and nutrition conditions and its determinants"⁹ food and nutrition surveillance aims to provide data to help the decision making of the individuals responsible for creating policies, planning, and managing programs that aim to improve the population's food intake patterns and nutritional status⁷⁻¹⁰. Timely, quality, and representative monitoring of the population's food and nutrition profile would allow identifying the scope of these policies to improve their execution, establish courses of action, and provide an account, to the society, of the huge resources invested towards social participation and accountability⁶⁻¹³.

Food and nutrition surveillance was operationalized in SUS Primary Health Care (PHC) through the routine activities of the Family Health Strategy. It should cover all the population treated at this level of care, which includes all age groups, from pregnancy to senility⁷⁻⁹. The information about individuals' eating behavior and nutrition status should feed the electronic database of the *Sistema de Vigilância Alimentar e Nutricional* (Sisvan, Food and Nutrition Surveillance System), consisting of one nutritional and one food surveillance subsystems, whose expansion and optimization were defined as priorities by PNaN^{7-10,13,14}.

From its implementation, Sisvan has presented problems that hinder its operationalization and use, that is, its ability to provide quality and timely information for the creation of effective public policies. The most visible problems regard structural aspects, such as inappropriate human and material resources: few professionals and high turnover, inappropriate professional qualification to obtain reliable data, and inadequate number of anthropometric, information technology, and Internet devices^{13,15-19}. Consequently, Sisvan has low population coverage, being limited to mother-child dyads and beneficiaries of social programs^{13,20-22}.

The need to expand food and nutrition surveillance coverage and improve the quality of the generated data reinforce the importance of institutionalizing assessment and monitoring as essential stages of public policies' cycle and justify studies that assess the different stages of an intervention^{4,6}.

However, it is only possible to choose a stage to assess after modeling the intervention, which is the first stage of a theory-based assessment study²³, since the approaches and methods used for each assessment will depend on the complexity of the intervention, the questions that the study aims to answer, and the maturation stage of the intervention²⁴.

The modeling of an intervention attempts to briefly and schematically describe how a complex system of actions intends to reach its objectives. For this purpose, it exposes the links between the expected effects of an intervention and its relationship with the employed resources and activities, thereby guiding the assessment and monitoring process in any intervention phase, from planning to result achievement, passing through the implementation process²⁴.

Given the aforementioned information, this article aims to describe the food and nutrition surveillance modeling in PHC by creating Theoretical Logic Models (TLM) that expose the relationships of causality between the structure, processes, and results expected by the regulatory instruments defined at the federal level to produce timely and quality information continuously for intersectoral decision making in the health sector from the FNS perspective^{3,4,6,24-26}.

METHODS

Description of the objectives and premises of the intervention is one of the first stages of a theory-based assessment study²³, and it is usually presented in the form of logic models, which can be of three types: causal, theoretical, and operational^{24,26,27}.

The causal logic model describes the causes of the problem on which the intervention intends to act. The TLM tries to analyze the plausibility of the relationships of causality between structure, processes, and results, aiming to reach the intervention objectives, established in its regulatory and organizational instruments. It also allows analyzing the plausibility of the intervention's strategy and logic. Finally, the operational logic model tries to establish how the TLM is implemented at the local level, considering the particularities of each context. Thus, it is a TLM development based on its validation in different contexts^{24,23}.

This study describes two TLM. The first, food and nutrition actions in PHC, and as its development, a TLM proposal of food and nutrition surveillance, to deepen the discussion about the processes conducted in the PHC context to obtain the population's food and nutritional diagnosis.

Food and nutrition surveillance was modeled in three stages: 1) identification and description of the official documents and literature available about the intervention; 2) description and delimitation of the intervention, its activities, target population, objectives, and goals; and 3) identification of the assessment users and other potential stakeholders.

Identification and description of official documents and the literature available about the intervention was based on an extensive literature review, systematically searching the *Biblioteca Virtual em Saúde* (Bireme, Virtual Health Library), which includes the databases Medical Literature Analysis and Retrieval System Online (MedLine), *Literatura Latino-Americana e do Caribe em Ciências da Saúde* (Lilacs, Latin American and Caribbean Literature on Health Sciences) and Scientific Electronic Library Online (SciELO). The following English and Portuguese descriptors were used: "*Segurança Alimentar e Nutricional*" (Food and Nutrition Security), "*Vigilância Nutricional*" (Nutritional Surveillance), "*Vigilância Alimentar*" (Food Surveillance), "*Atenção Primária à Saúde*

Atenção Básica" (Primary Health Care/Primary Care), "*Sistema de Informação*" (Information System), "*Planejamento em Saúde*" (Health Planning), "*Programas e Políticas de Nutrição e Alimentação*" (Food and Nutrition Programs and Policies).

The search, conducted in June 2014, returned 447 publications, of which 160 were articles, 102 were official documents, 39 were theses, and 146 were other types of documents, such as congress annals, monographies, and reports. Based on their relationship with the subject, 46 articles, 61 official documents of the Brazilian government, and 8 theses were selected. Many publications appear in more than one search, so they were considered only once. Official documents from other countries were not included.

The concept of intervention and the items that compose the TLM guided the construction of content analysis categories for document analysis²⁸, from which food and nutrition surveillance legislation and regulatory publications, listed chronologically in Chart 1, were analyzed. References of the selected documents were also consulted, as well as interministerial decrees, in order to identify intersectoral articulations with education, agriculture, food and nutrition security, and social assistance. The food and nutrition surveillance goals were described in Chart 1, which contain the National Health Plans, offering elements related to the political and organizational context of food and nutrition surveillance in Brazil.

Key informants were interviewed to describe and delimit the intervention, its activities, target population, objectives, and goals, identifying the users of a probable assessment and other potential stakeholders; to analyze documents; and to review the literature.

This stage was conducted by the same research group in another study from the first semester of 2012, which assessed the degree of Sisvan web implementation in *Minas Gerais* (CAAE n° 0032.0.238.000-11) using yet

Chart 1. Legal milestones and regulations of the Ministry of Health for Food and Nutrition Surveillance.

1 of 3

Period	Legislation	Technical norms and manuals basic health texts
1990	<p>Decree nº 1.156 – 31/08/1990. Institutes the Sisvan in the Ministry of Health and creates the National Executive Working Group.</p> <p>Law nº 8.080 – 19/09/90. Establishes the conditions for health promotion, protection, and recovery, and the organization and functioning of the corresponding services.</p> <p>Decree nº 080-P – 16/10/90. Institutes the Sisvan Helping Committee and its attributions.</p>	
1997	<p>Decree nº 1.882 – 18/12/1997. Establishes a minimum salary for Primary Health Care and its composition.</p>	
1999	<p>Decree nº 710 – 10/06/1999. Approves the National Food and Nutrition Policy. Its third guideline covers Sisvan expansion and optimization to extend coverage to the whole country and population segments from Primary Health Care.</p>	<p>Final Report of the Inter-agency Health Information Network about Sisvan indicators, 1999.</p>
2004	<p>Decree nº 1.172 – 15/06/04. Regulates NOB SUS nº 01/96 regarding the jurisdictions of the federal, state, municipal, and Federal District governments in the area of health surveillance, and defines the funding system and other measures.</p> <p>Decree nº 2.246 – 18/10/04. Institutes and discloses basic guidelines for the implementation of food and nutrition surveillance actions in the scope of SUS primary health care actions throughout the country.</p> <p>Interministerial Decree nº 2.509 – 18/11/2004. Articulation between the Ministries of Health and Social Development. Establishes the attributions and norms for providing and monitoring health actions related to the requirements for families to participate in the <i>Programa Bolsa Família</i> (Cash Transfer Program).</p> <p>Decree nº 2.607 – 10/12/2004. Approves the 2004-2007 National Health Plan. Goals for promoting a healthy diet and fighting malnutrition. Monitor the fortification of wheat flour and cornmeal 2004-2007 in the 27 federal units; Monitor the food and nutrition situation in roughly 60% of the municipalities; annually provide micronutrients to at least 70% of the population at risk.</p>	<p>Food and Nutrition Surveillance: Basic instructions for health service data and information collection, processing, and analysis, 2004.</p>
2005	<p>Decree nº 729 – 13/05/2005. Institutes the National Program of Vitamin A Supplementation, among other measures.</p> <p>Decree nº 730 – 13/05/2005. Institutes the National Iron Supplementation Program, which aims to prevent iron-deficiency anemia, among other measures.</p> <p>Decree nº 2.362 – 01/12/2005. Restructures the National Program to Prevent and Control Iodine Deficiency Disorders, called Pro-Iodine.</p> <p>Decree nº 2.608/GM – 28/12/05. Defines maximum financial resources available for health surveillance to encourage the structuring of surveillance actions to prevent noncommunicable diseases and problems by state and state capital departments of health.</p>	<p>Sisvan Informatization – part I (Implementation of Sisvan Module for Managing the <i>Programa Bolsa Família</i>).</p>
2006	<p>Decree nº 399/GM – 22/02/06. Discloses the 2006 Health Pact – Consolidation of SUS and approves its operational guidelines (Pact for Life, Pact to Defend SUS, and Pact of SUS Management)</p> <p>Decree nº 648 – 28/03/06. Approves the National Primary Health Care Policy, establishing the review of the guidelines and norms for the organization of primary health care for the Program Family Health and Program of Community Health Agents. Implementation of food and nutrition surveillance from this level of care.</p> <p>Decree nº 687 – 30/03/06. Approves the National Health Promotion Policy.</p> <p>Decree nº 148 – 27/04/2006. Establishes norms, criteria, and procedures to support the management of the <i>Programa Bolsa Família</i> and <i>Cadastro Único de Programas Sociais do Governo Federal</i> (Single Register of Social Programs of the Federal Government) at the municipal level, and creates the Decentralization Management Index of the Program.</p>	<p>Primary Health Care Periodicals nº 12. Obesity. Ministry of Health, 2006.</p>

Chart 1. Legal milestones and regulations of the Ministry of Health for Food and Nutrition Surveillance.

2 of 3

Period	Legislation	Technical norms and manuals basic health texts
2006	<p>Interministerial Decree n° 1.010 – 08/05/06. Institutes the guidelines for promoting a healthy diet in public or private kindergartens and elementary and high schools throughout the country.</p> <p>Decree n° 1.097 – 22/05/06. Defines the Process of Covenanted and Integrated Programming of Health Assistance in the scope of SUS.</p> <p>Law n° 11.346 – 15/09/06. Creates the Sisan, to ensure the Human Right to Adequate Food, among other measures.</p>	Management Report of the Food and Nutrition Coordination Office of the Ministry of Health for 2003-2006.
2007	Decree n° 6.286 – 5/12/2007. Institutes the Health at School Program, whose health actions should be developed together with the primary public education network following SUS principles and guidelines, including nutritional assessment of schoolchildren, among other actions.	Primary Health Care Periodicals n° 20. Micronutrient deficiencies. Ministry of Health, 2007.
2008	<p>Decree 154 – 24/01/2008. Creates the NASF.</p> <p>Decree n° 325/GM – 21/02/08. Establishes priorities, objectives, and goals for the 2008 Pact for Life, the indicators for monitoring and assessing the Pact for Health, and the instructions for their pact.</p> <p>Decree n° 1.424 – 10/07/2008. Establishes the fund to fund annual transfer to structure and implement the food and nutrition actions in the scope of the state and municipal departments of health based on the National Food and Nutrition Policy.</p> <p>Decree n° 321 – 29/09/2008. Regulates the management of the <i>Programa Bolsa Família</i> requirements.</p>	<p>Sisvan Informatization – part II (Implementation of Sisvan web).</p> <p>Sisvan protocols for health assistance, 2008.</p>
2009	2009-2011 National Health Plan. Published in 2009. Sisvan – related goals: Expand food and nutrition surveillance in all municipalities, especially with respect to food intake. Insertion of food and nutrition actions in NASF. Expand the population covered by Sisvan from the 4.7% in 2007 to 10% in 2011; increase the prevalence of exclusive breastfeeding in the first six months of life from 40% in 2007 to 50% until 2011; reduce protein-energy malnutrition (underweight) in children aged less than five years from the 5.8% in 2007 to 4.0% until 2011; maintain the elimination of iodine deficiency disorders throughout the country (<5% of the population); reduce iron-deficiency anemia in women of childbearing age from 29% to 24%, and in children aged less than two years, from 24% to 19%.	<p>Matrix of food and nutrition actions in primary health care, 2009.</p> <p>Collection of norms for social control in SUS, 2009.</p> <p>Food and Nutrition Indicators, 2009.</p> <p>Primary Health Care Periodicals n° 23. Child's Health: Child nutrition, breastfeeding, and complementary foods. Ministry of Health, 2009.</p> <p>Primary Health Care Periodicals n° 24. Health at School. Ministry of Health, 2009.</p>
2010	<p>Decree n° 1.630 – 24/06/2010. Establishes the fund to fund annual transfer to structure and implement the food and nutrition actions of the state and municipal departments of health based on the National Food and Nutrition Policy.</p> <p>Decree n° 3.462 – 11/11/2010. Establishes criteria for feeding the National Health Care Information System databases.</p> <p>Decree n° 649 – 26/11/2010. Institutes the Centers for Food and Nutrition Collaboration of the Ministry of Health to help establish the guidelines and strategies that optimize the National Food and Nutrition Policy actions.</p> <p>Decree n° 4.279 – 30/12/2010. Establishes guidelines for the organization of the Health Care Network in SUS scope.</p>	<p>Instruction Manual of the <i>Programa Bolsa Família</i> in Health, 2010.</p> <p>Management Report of the <i>Programa Bolsa Família</i> in Health for 2005 to 2010.</p> <p>Management Report of the Food and Nutrition Coordination Office of the Ministry of Health for 2007-2010.</p> <p>Primary Health Care Periodicals n° 27 0150 NASF Guidelines: Family Health Support Center. Ministry of Health, 2010.</p>

Chart 1. Legal milestones and regulations of the Ministry of Health for Food and Nutrition Surveillance.

3 of 3

Period	Legislation	Technical norms and manuals basic health texts
2011	<p>National Health Plan 2012-2015. Published in 2011. Establishes as goals related to Sisvan: To increase by 25.0% the Sisvan coverage; to reduce protein-energy malnutrition (underweight) in children aged less than five years by 10.0%, going from 4.4% in 2011 to 4.0% in 2015; to reduce chronic malnutrition (stunting) in children aged less than five years by 15%, going from 13.5% in 2011 to 11.5% in 2015; to reduce by 25% the intake of salt by the Brazilian population, going from 12g/person/day in 2008/2009 to 9g/person/day until 2015.</p> <p>Decree nº 7.508 – 28/06/2011. Regulates Law nº 8.080/1990, to establish SUS organization, health planning, health assistance, and inter-federative articulation.</p> <p>Decree nº 2.029 – 24/08/2011. Institutes Household Care in SUS scope, defining actions for household care in primary, outpatient, and hospital care.</p> <p>Decree nº 2.488 – 21/10/2011. Approves the National Primary Health Care Policy, establishing the review of guidelines and norms for the organization of primary health care for the Family Health Strategy and the Program of Community Health Agents.</p> <p>Decree nº 2.685 – 16/11/2011. Establishes the annual fund to fund transfer for structuring and implementing food and nutrition actions in the scope of the state and municipal health departments based on the National Food and Nutrition Policy.</p> <p>Decree nº 2.715 – 17/11/2011. Updates the National Food and Nutrition Policy.</p> <p>Decree nº 3.156 – 27/12/2011. Enables the municipalities that will receive financial resources for structuring the food and nutrition surveillance in primary health care units with primary health care teams adhering to homologated.</p> <p>Decree nº 3.157 – 27/12/2011. Homologates municipalities to receive incentive to pay for the health promotion actions of the Health Academy Program and homologates the municipalities that will receive financial resources to structure food and nutrition surveillance in these centers.</p>	<p>Plan of strategic actions for fighting chronic noncommunicable diseases in Brazil 2011-2022.</p> <p>Instructive Program Health at School, 2011.</p> <p>Instructions for collecting and analyzing anthropometric data in health services, 2011.</p> <p>Management Report of the Food and Nutrition Coordination Office of the Ministry of Health. 2011</p>
2012		
2013		
2014		<p>Intersectoral Strategy to Prevent and Control Obesity: Recommendations for states and municipalities. Caisan, 2014.</p>

Note: Sisvan: *Sistema de Vigilância Alimentar e Nutricional*; NOB: *Norma Operacional Básica*; SUS: *Sistema Único de Saúde*; GM: *Gabinete do Ministro*; NASF: *Núcleo de Apoio à Saúde da Família*; Caisan: *Câmara Interministerial de Segurança Alimentar e Nutricional*.

unpublished survey results. In the qualitative stage, 56 municipalities were selected, two by the Regional Health Superintendence, one with the highest and another with the lowest degree of Sisvan web implementation, classified according to an electronic questionnaire sent previously and answered by 432 of the 853 municipalities of the state. Of the 56 municipalities that met the inclusion criteria for the 28 Regional Health Superintendence, 26 municipalities of 13 Regional Health Superintendence authorized the

study. Thus, we identified and contacted the professionals responsible for entering data in the Sisvan web of 26 municipalities to administer a semi-structured interview, conducted *in loco*, to check how they perceived the operational characteristics of Sisvan web through technical parameters of usability, information architecture, and accessibility.

Although these interviews presented the limitation of revealing only a part of the local food and nutrition surveillance, they were useful for

contextualizing the intervention in a real situation, in which the problems that affect its execution could be identified and analyzed, contributing to the creation of theoretical suppositions and exposing rival theories. They also contributed to the identification of individuals potentially involved in the intervention and assessment, and to its modeling.

Once the interviews were finished, the content was transcribed, and after successive readings, the material was organized into analytical categories, complementing document analysis²⁸. Based on the described data collection techniques, the intervention modeling stage began²⁴⁻²⁶. By considering food and nutrition surveillance an intervention, we intend to describe it as an organized action system that includes the actors involved in planning, organizing, and carrying out the activities; a structure that covers the set of resources and rules beyond the actors' control as it contains a political, ideological, and normative component; and the objectives and goals of the intervention actions, in this case, to supply continuous and quality information on the nutritional status and food intake of the territorial population. The TLM tried to schematically represent all components of the intervention – problem, objectives, inputs, activities, and expected results in the short, medium, and long term, exposing its work and operational aspects²⁴.

RESULTS

To consider food and nutrition surveillance an intervention means to recognize it as a system of organized actions that should produce periodical information about the food and nutritional conditions of individuals and populations, and its determinants, allowing monitoring the food and nutrition transition. These data would be useful for defining health promotion and care actions under the light of SUS and FNS principles⁵⁻¹⁰.

Food and nutrition surveillance is, thus, understood as an intervention that allows monitoring and assessing FNS-related social policies¹¹⁻¹³. The data produced locally by PHC are useful for managers of the health sector, and through the intersectoral articulation of this with other sectors such as education, agriculture, social assistance, habitation, supply, social security, and labor, among others, to make decisions that enable achieving Food and nutrition surveillance^{7-10,13}.

The identified food and nutritional surveillance objectives were the organization of the necessary inputs and activities to: 1) supply continuous and updated data about the food and nutritional situation of municipal and state PHC users; 2) identify geographic areas, social segments, and population groups at risk of nutritional problems; 3) promote an early diagnosis of nutritional problems, whether underweight or excess weight, enabling actions that prevent the consequences of these problems; 4) enable monitoring and assessing the nutritional status of families that benefit from social programs; and 5) offer subsidies for the formulation and assessment of public policies that aim to improve the food and nutritional situation of the Brazilian population.

To implement and supervise food and nutrition actions at the local level, the municipal manager should designate a coordinator, preferably a dietitian. This coordinator, responsible for planning and organizing food and nutrition actions, should articulate with other PHC coordinators to organize the necessary structure and the work of the professionals in Family Health Strategy teams to make the food and nutritional diagnosis of individuals and population groups in the attached territory. Based on food and nutrition actions, individual user data would be collected (clinical, biochemical, anthropometric, and food intake) and immediately processed and analyzed by Sisvan web and other *Sistema de Informação em Saúde* (SIS, Health Information Systems), which would provide complementary information

about the life and health conditions of individuals and specific population groups^{9,13-22,29}.

With Sisvan and SIS data, it is possible to carry out a health situation analysis to serve as a basis for the local health planning and programming, considering the assistance and nutritional care actions, including referral and counter-referral; prevention of the most common nutritional diseases and disorders and health promotion focusing on the determinants of nutritional, life, and health conditions^{5,6,29}. For this purpose, the methodological principles of situational strategic planning are recommended, defining the objectives, goals, actions, and activities to face the most important problems, and defining the individuals in charge, deadlines, and resources to advance the intersectoral work^{1,3,30}.

Expansion of Sisvan population coverage and qualification of its actions are PNAN guidelines. For the first, the Ministry of Health recommended the "Nutritional Calls" along with the national immunization campaigns; the second regarded the inclusion of a dietitian in the *Núcleo de Apoio à Saúde da Família* (NASF, Family Health Support Centers) as a way to strengthen the actions performed by Family Health Strategy teams related to it, including the provision of trainings^{7-10,14,29,31}.

Each technical component uses inputs to carry out management activities or activities directed at individuals, families, and community, to obtain immediate results (product), medium-term results (results), and long-term results (impact)²⁴ to advance in the search for FNS assurance.

These components are described and systematized in the TLM of the food and nutrition actions in PHC, detailed in Figure 1, developed by analyzing the literature and Ministry of Health regulation instruments, such as the 2008 "*Cartilha de Protocolos do Sistema de Vigilância Alimentar e Nutricional na assistência à saúde*" (Compendium of Protocols of the Food and Nutrition Surveillance

System in Health Care) and the 2009 "*Matriz das Ações de Alimentação e Nutrição na Atenção Básica em Saúde*" (Matrix of Food and Nutrition Actions in Primary Health Care).

By considering food and nutrition surveillance one of the components of food and nutrition actions and the focus that should be given to the food and nutrition surveillance implementation process in PHC, a specific TLM was created specifically for food and nutrition surveillance. This TML involves planning and management of food and nutrition actions, and food and nutrition diagnosis, which were specifically systematized and described in Figure 2.

The following were identified as potentially involved in the intervention, and thus, possible users of a food and nutrition surveillance implementation assessment in PHC: (a) the municipal technical references of food and nutrition surveillance, responsible for the planning and management of food and nutrition actions and for analyzing and disclosing information about the food and nutritional status of the population, which were named food and nutrition surveillance managers; (b) the health professionals involved in data collection and digitization; (c) professionals of different sectors related to FNS; (d) the technical references of food and nutrition surveillance at the regional level, also named food and nutrition surveillance managers in this management level; (e) the population of ascribed territories.

Chart 2 details the identified potential users, their role in food and nutrition surveillance, their interest and role in the assessment, and their role in using the findings.

DISCUSSION

The expected product from food and nutrition surveillance modeling is the full description of the intervention²⁴ and its schematic

Chart 2. Potential users of an assessment of food and nutrition surveillance implementation in primary health care.

Potential assessment user	Role in the intervention	Interest in assessment	Role in the assessment	Role in using the findings
State Manager	Responsible for the organizational guidelines in the state, encouraging planning, and inducing implementation	To increase the knowledge and involvement of the health sector and inter-sector; improve the intervention	To institutionally support and encourage assessment and monitoring To contribute to the definition of the focus of assessment	To correct directions, define state policies, induce municipal assessments
Regional manager of food and nutrition surveillance	Responsible for supporting the municipal manager with respect to the planning and management of local actions Responsible for analyzing and disclosing information at the regional level	To identify potentialities and weaknesses to improve the intervention, and to increase knowledge about the intervention	To guarantee institutional support for conducting the study To help create assessment criteria	To improve regional management of food and nutrition surveillance
Municipal manager of food and nutrition surveillance	Responsible for planning and managing local actions Responsible for analyzing and disclosing information	To identify potentialities and weaknesses to improve the intervention, and to increase knowledge about the intervention	To help identify and describe the available structure and create assessment criteria	To improve local management of food and nutrition surveillance actions
Municipal health professionals	Carry out data collection activities, support food and nutrition surveillance implementation in health services	To assess practices, opportunity to expose the operational difficulties experienced during the service routine	To supply information about the operationalization of practices in service routine	To review their own practices, support the adjustment of protocols
Professionals responsible for entering data into the system	Responsible for entering data into the system, support food and nutrition surveillance implementation in health services		To supply information about the operationalization of practices in service routine, participate in the discussions about the intervention	To review their own and mobilize articulation efforts
Professionals/managers of other sectors (education, social assistance, agriculture)	Responsible for using food and nutrition surveillance information to define actions of the respective sectors regarding the health needs of the population	To deepen knowledge about the intervention, increase the amount of quality data for intersectoral articulation	To help improve the intervention by requiring quality food and nutrition surveillance information from an intersectoral perspective	To commit to the use of food and nutrition surveillance data for decision making in their respective sectors; to increase intersectoral planning
Population of the attached territory	Are the target population for the food and nutrition diagnosis actions	To improve the intervention and increase access to and quality of health services	To help define the assessment focus; supply information about the functioning of the intervention; To talk about their expectations and needs for the intervention (demand for the health service)	To ask public management to correct directions

representation in the form of TLM. The purpose of these products is to reveal the chain of predicted effects to reach the objectives of making

quality information available in a timely manner about the nutritional status and food intake of the territorial population.

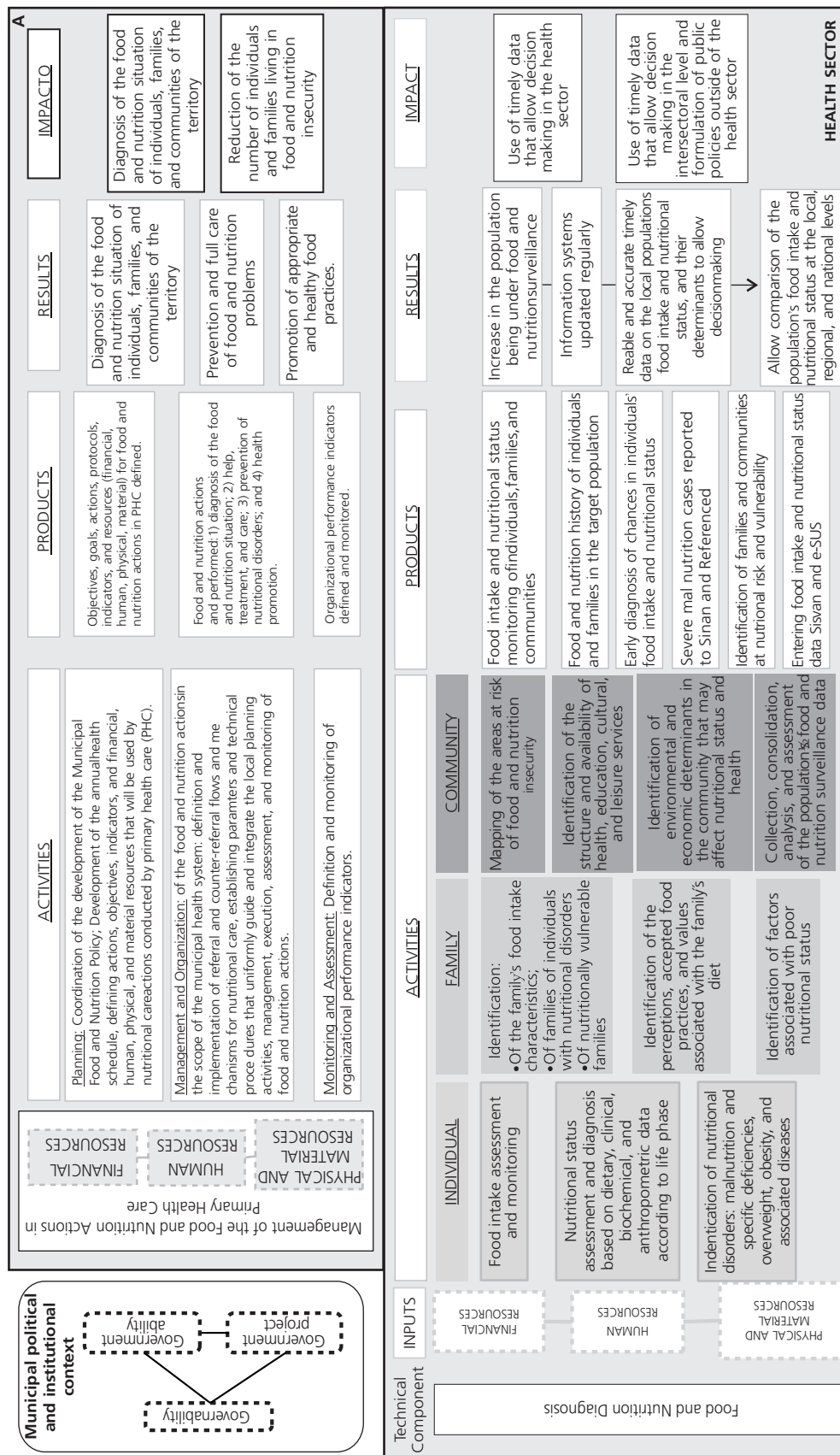


Figure 1. Theoretical and Logical Model of Food and Nutrition Actions in Primary Health Care.

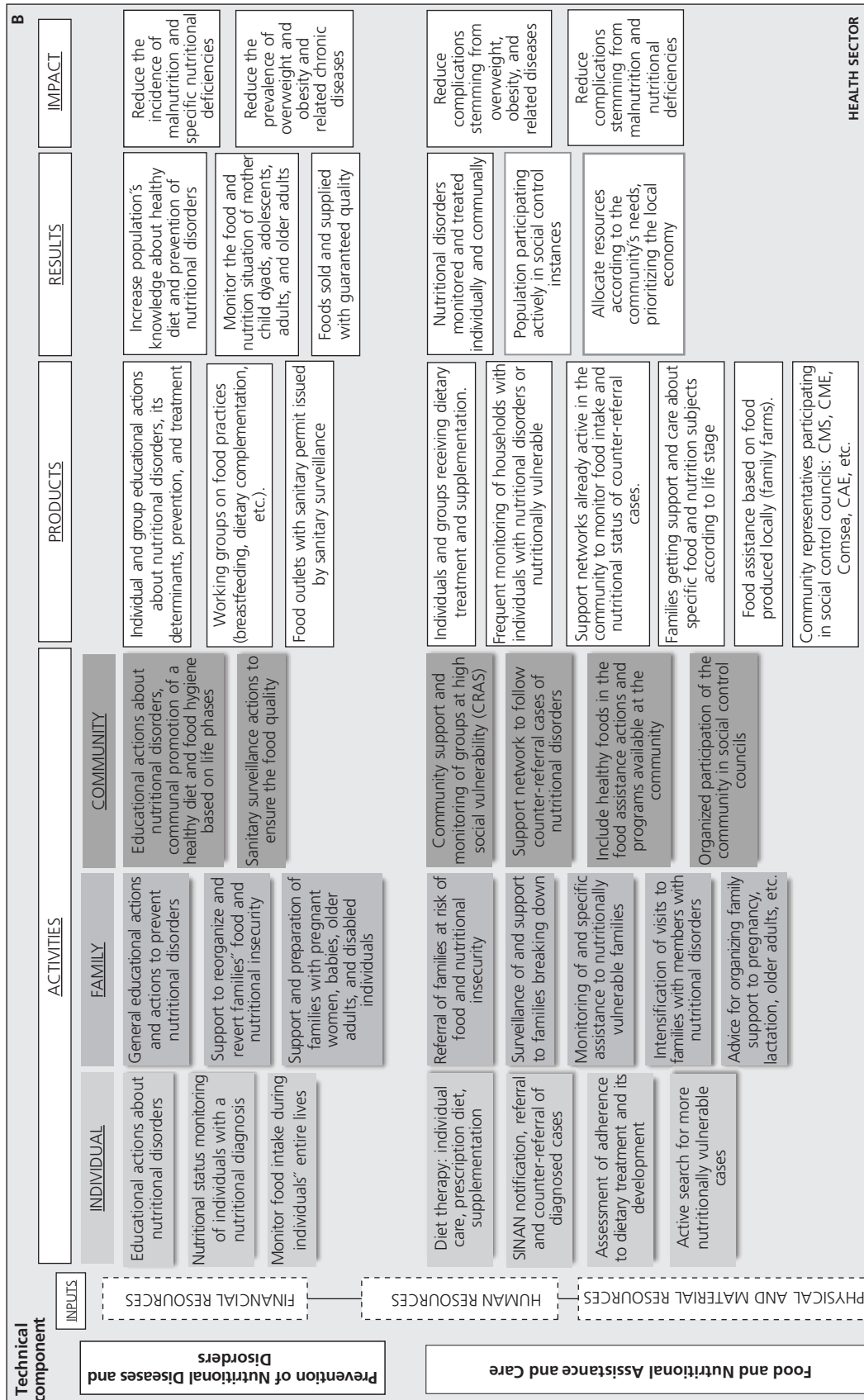


Figure 1. Theoretical and Logical Model of Food and Nutrition Actions in Primary Health Care.

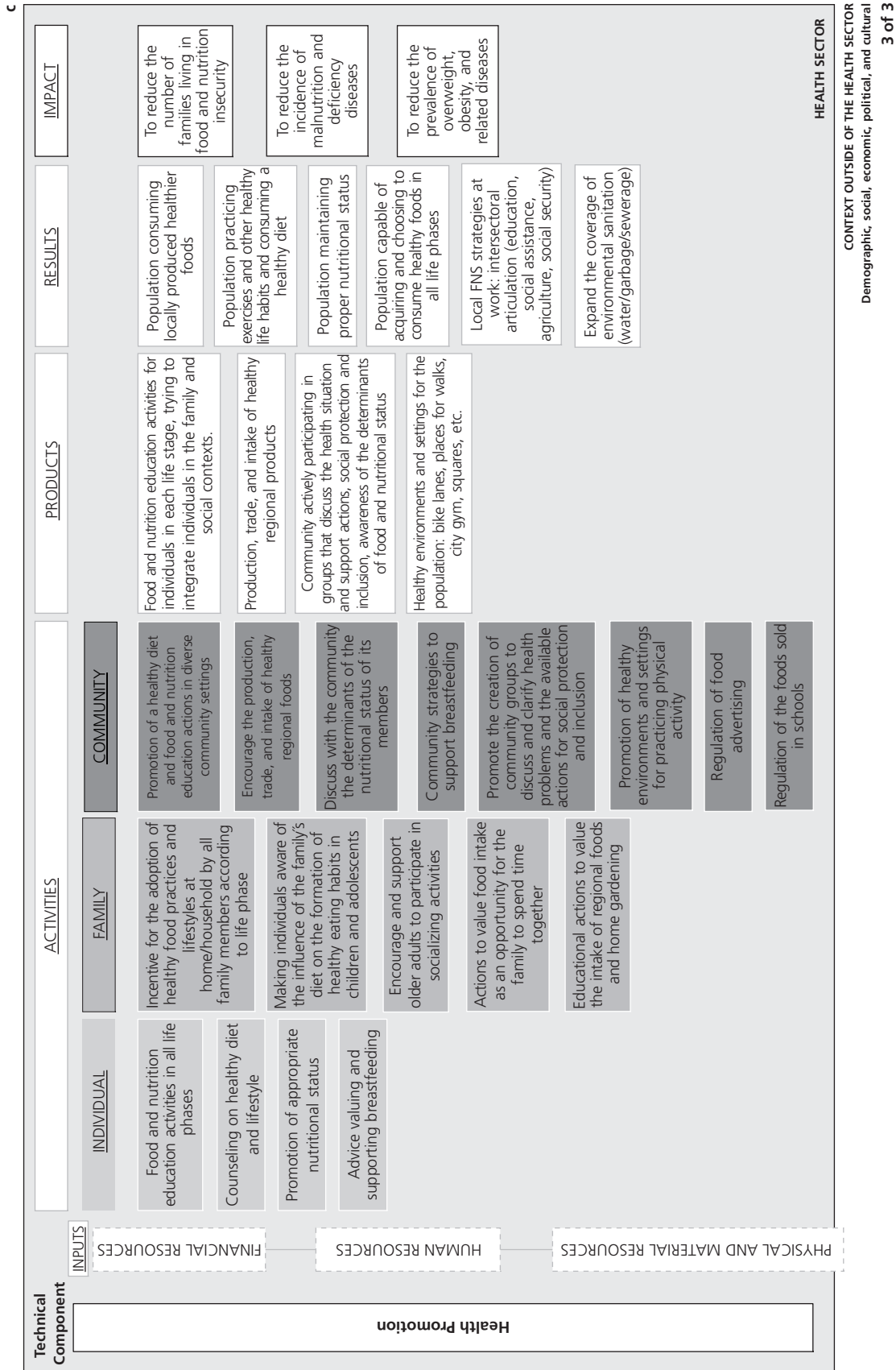


Figure 1. Theoretical and Logical Model of Food and Nutrition Actions in Primary Health Care.

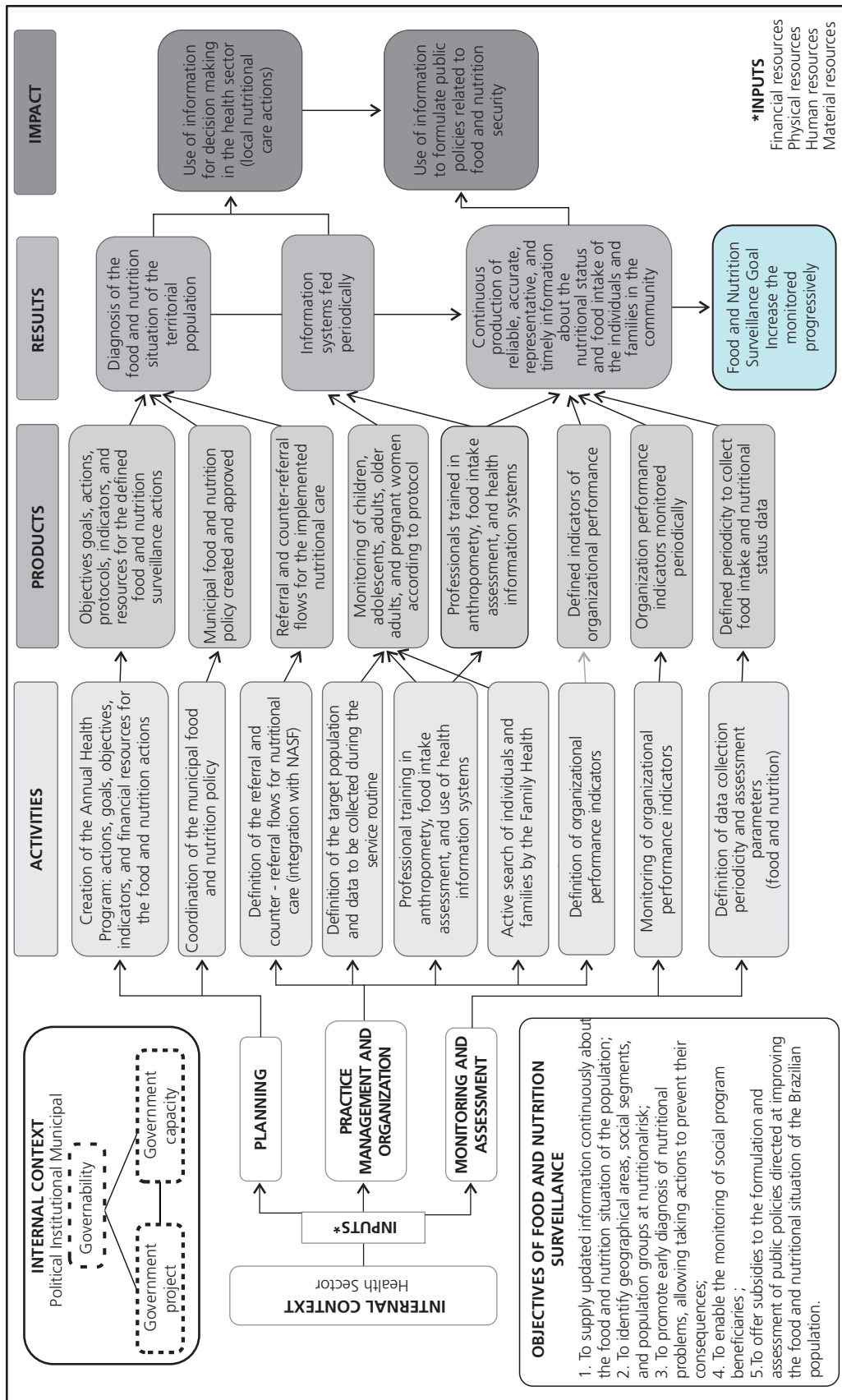


Figure 2. Theoretical Logic Model of Food and Nutrition Surveillance in Primary Health Care.

In addition to describing the intervention, the study identified its objectives, goals, and individuals potentially interested in the assessment. For Champagne *et al.*²⁴, one intervention can be conceived as an organized system of action that involves, within a structure, actors that perform certain processes to reach defined objectives. With this perspective, food and nutrition surveillance ultimately tries to improve the population's life and health conditions by providing updated, timely, and quality information for manager decision making^{9,10,13,15}.

Regarding food and nutrition surveillance, the scope of action of the health sector, particularly primary health care, responsible for the reorganization of the Health Care Networks, refers to the identification of the population's health needs to better guide intersectoral policies and actions that affect its determinants and requirements²⁹. In addition to identifying health needs, it is PHC role to refer to secondary and tertiary care the cases that require individual diagnosis and treatment (referral), and to monitor and follow these individuals in the service routine (counter-referral)^{29,31}.

The description of food and nutrition surveillance based on regulations and literature review allowed identifying the limited expansion of food and nutrition surveillance coverage to population segments other than the beneficiaries of social programs, pregnant women, and children^{15,16,20-22}. The absence of monitoring of other life stages, such as adolescence, adulthood, and old age, limits its field of action as an instrument to monitor nutritional problems related to overweight, obesity, and specific nutritional deficiencies, which have been the most prevalent and challenging to SUS³¹.

In addition to expanding the coverage to adolescents, adults, and older adults, it is essential to qualify food and nutrition surveillance actions, aspects that have been incorporated in the goals of sectoral and intersectoral planning^{6-10,14}. The goals defined by the federal sphere must guide

the local actions, in consonance with the particularities and needs identified by analyzing the health situation. Hence, they show the priorities and political options adopted by the Brazilian government over the years. The study identified the absence of goals related to health promotion, hardly measurable by quantitative methods, and that require assessments of social changes^{4,5,30}. Although these aspects have been considered important in the analyzed documents, there are no planned goals and indicators for their measurement. This is an important aspect that still requires strengthening.

It is important to point out the essential role of food and nutrition surveillance as a pillar for the food and nutritional monitoring of the population, as an instrument to be prioritized as much as the large nationwide surveys. Although the latter are more reliable, accurate, and allow the establishment of causal relationships, they are more expensive and complex, so conducted less frequently. Food and nutrition surveillance inserted in the services has lower information quality and reliability, but aids timely decision making at the local level because it is produced continuously and can cover a high percentage of the population^{7,9}.

In this perspective, the large surveys are more useful for the central levels of management and for the definition of macroeconomic policies. At the local level, the use of SIS for organizing the services and intersectoral planning is essential to guarantee the effort of the services to increase their coverage and qualify actions^{1,3}.

Based on the perspective of the usefulness of the assessment results to improve the execution of the intervention, it is necessary to identify and involve individuals potentially interested in the assessment to potentiate their commitment to use the findings²⁴⁻²⁶. They will be involved in the stages of making pacts with respect to the assessment objectives and creation of the matrix of criteria that will guide the assessment^{25,26}.

Specifically, the managers will help to identify and describe the available structure

(financial, physical, human, and material resources) to carry out food and nutrition surveillance actions, its organization, and the data analysis and disclosure processes, while the professionals will help describe the operationalization of routine activities of data collection and subsequent digitization in the system. The territorial population may disclose its expectation and needs regarding food and nutrition actions and surveillance. Validation of the TLM in different contexts is an expected development of intervention modeling from the perspective of theory-based assessment²³.

FINAL CONSIDERATIONS

In the search for expanding the population coverage and qualification of the actions performed, one may say that food and nutrition surveillance description approaches the dimensions of planning, management, and food and nutritional diagnosis, focusing on activities using the available inputs and the main products regarding the food and nutrition surveillance objectives, which is to supply information for action.

Based on the created logic models that describe food and nutrition surveillance, the expected developments are the involvement of the stakeholders identified in theoretical logic model validation, followed by the logical analysis of the intervention, which will allow the identification of the plausibility of the proposed causal relationships.

The strengthening of the intervention functioning theory stemming from all these stages will allow reviewing the developed logic models in an interactive process marked by cycles that update the intervention functioning based on the emergence of new evidence. One limitation is the difficulty of presenting the whole intervention complexity in one single schematic representation.

The discussion about logic models seems to increase the knowledge of all those involved

with the intervention, to contribute to the orientation of different types of assessments about any of the food and nutrition surveillance phases, and to guide future matrices to monitor food and nutrition surveillance processes in PHC. This, undoubtedly, is a useful and timely instrument to help decision making even before the assessment itself is conducted. It may be useful to management instances and service professionals, in addition to instances of social control. The TLM optimizes time, resources, definition of indicators that require monitoring, and aspects that require assessment, identifying more clearly the contribution of the intervention to achieve the results and what other components contribute to this achievement.

Identifying the difficulties and potentialities found locally to increase population coverage and qualify food and nutrition actions is essential for proposing concrete actions that bring the political discourse closer to the reality of Brazilian municipalities and change food and nutrition surveillance into a management instrument for intersectoral planning.

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CONTRIBUTORS

SAS VITORINO helped to conceive and design the study, and to write the article. MM CRUZ helped to conceive the study, reviewed the article, and approved the final version for publication. DC BARROS helped to conceive the study, reviewed the article, and approved the final version for publication.

REFERENCES

1. Paim JS. A Constituição cidadã e os 25 anos do Sistema Único de Saúde (SUS). *Cad Saúde Pública*. 2013;29(10):1927-36.

2. Vasconcelos FAG, Josué de Castro e a Geografia da Fome no Brasil. *Cad Saúde Pública*. 2008;24(11):2710-7.
3. Viana ALA, Heimann LS, Lima LD, Oliveira RG, Rodrigues SH. Mudanças Significativas no processo de descentralização do sistema de saúde no Brasil. *Cad Saúde Pública*. 2002;18(Supl.):139-51.
4. Hartz ZMA, Contandriopoulos AP. Integralidade da atenção e integração de serviços de saúde: desafios para avaliar a implantação de um "sistema sem muros". *Cad Saúde Pública*. 2004;20(Supl.2):S331-6.
5. Buss PM, Pellegrini Filho A. A saúde e seus determinantes sociais. *Physis*. 2007;17(1):77-93.
6. Arreaza ALV, Moraes JC. Contribuição teórico-conceitual para a pesquisa avaliativa no contexto de vigilância da saúde. *Ciênc Saúde Coletiva*. 2010;15(5):2627-38.
7. Jaime PC, Silva ACFS, Lima MC, Bortolini GA. Ações de alimentação e nutrição na atenção básica: a experiência de organização no Governo Brasileiro. *Rev Nutr*. 2011;24(6):809-24. <https://doi.org/10.1590/S1415-52732011000600002>
8. Recine E, Vasconcelos AB. Políticas nacionais e o campo da Alimentação e Nutrição em Saúde Coletiva: cenário atual. *Ciênc Saúde Coletiva*. 2011;16(1):73-9.
9. Coutinho JG, Cardoso AJC, Toral N, Silva ACF, Ubarana JA, Aquino KKNC, *et al*. A organização da Vigilância Alimentar e Nutricional no Sistema Único de Saúde: histórico e desafios atuais. *Rev Bras Epidemiol*. 2009;12(4):688-99.
10. Engstrom EM, Castro IRR. Monitoramento em nutrição e saúde: articulação da informação com a ação. *Saúde Rev*. 2004;6(13):45-52.
11. Jerome NW, Ricci, Judith A. Food and nutrition surveillance: An international overview. *Am J Clin Nutr*. 1997;65(Supl.1):1198s-2002s.
12. Ashworth A, Shrimpton R, Jamil K. Growth monitoring and promotion: Review of evidence of impact. *Matern Child Nutr*. 2008;4(Suppl.1):86-117.
13. Rolim MD, Lima SML, Barros DC, Andrade CLT. Avaliação do SISVAN na gestão de ações de alimentação e nutrição em Minas Gerais, Brasil. *Ciênc Saúde Coletiva*. 2015;20(8):2359-69.
14. Bagni UV, Barros DC. Capacitação em antropometria como base para o fortalecimento do Sistema de Vigilância Alimentar e Nutricional no Brasil. *Rev Nutr*. 2012;25(3):393-402. <https://doi.org/10.1590/S1415-52732012000300009>
15. Santana LAA, Santos SMC. Sistema de Vigilância Alimentar e Nutricional na implementação do programa Leite é Saúde: avaliação em municípios baianos. *Rev Nutr*. 2004;17(3):283-90. <https://doi.org/10.1590/S1415-52732004000300001>
16. Damé PKV, Pedroso MRO, Marinho CL, Gonçalves VM, Duncan BB, Fisher PD, *et al*. Sistema de Vigilância Alimentar e Nutricional (Sisvan) em crianças do Rio Grande do Sul, Brasil: cobertura, estado nutricional e confiabilidade dos dados. *Cad Saúde Pública*. 2011;27(11):2155-65.
17. Lima MAA, Oliveira MAA, Ferreira HS. Confiabilidade dos dados antropométricos obtidos em crianças atendidas na Rede Básica de Saúde de Alagoas. *Rev Bras Epidemiol*. 2010;13(1):69-82.
18. Niquini RP, Bittencourt SA, Lacerda EMA, Saunders C, Leal MC. Avaliação da estrutura de sete unidades de saúde da família para a oferta da assistência nutricional no pré-natal no município do Rio de Janeiro, Brasil. *Rev Bras Saúde Mater Infant*. 2010;10:s61-8.
19. Junqueira TS, Cotta RMM, Gomes RC, Silveira SFR, Siqueira-Batista R, Pinheiro TMM, *et al*. As relações laborais no âmbito da municipalização da gestão em saúde e os dilemas da relação expansão/precarização do trabalho no contexto do SUS. *Cad Saúde Pública*. 2010;26(5):918-28.
20. Ferreira CS, Cherchiglia ML, César CC. O Sistema de Vigilância Alimentar e Nutricional como instrumento de monitoramento da Estratégia Nacional para Alimentação Complementar Saudável. *Rev Bras Saúde Mater Infant*. 2013;13(2):167-77.
21. Jung NM, Bairros FS, Neutzling MB. Utilização e cobertura do Sistema de Vigilância Alimentar e Nutricional no Estado do Rio Grande do Sul, Brasil. *Ciênc Saúde Coletiva*. 2014;19(5):1379-88.
22. Enes CC, Loiola H, Oliveira MRM. Cobertura populacional do Sistema de Vigilância Alimentar e Nutricional no Estado de São Paulo, Brasil. *Ciênc Saúde Coletiva*. 2014;19(5):1543-51.
23. der Knaap PV. Theory-Based Evaluation and Learning: Possibilities and challenges. *Evaluation*. 2004;10(1):16-34.
24. Champagne F, Brousselle A, Hartz ZMA, Contandriopoulos AP. Modelizar as intervenções. In: Brousselle A, Champagne F, Contandriopoulos AP, Hartz Z. Avaliação: conceitos e métodos. Rio de Janeiro: Fiocruz; 2011. p.61-74.
25. Oliveira LGD, Natal S, Felisberto E, Alves CKA, Santos EM. Modelo de avaliação do programa de controle da tuberculose. *Ciênc Saúde Coletiva*. 2010;15:997-1008.
26. Esher A, Santos EM, Azeredo TB, Luiza VL, Osorio-de-Castro CGS, Oliveira MA. Logic models from an evaluability assessment of pharmaceutical services

- for people living with HIV/AIDS. *Ciênc Saúde Coletiva*. 2011;16(12):4833-44.
27. Oliveira JM, Castro IRR, Silva GB, Venancio SI, Saldiva SRDM. Avaliação da alimentação complementar nos dois primeiros anos de vida: proposta de indicadores e de instrumento. *Cad Saúde Pública*. 2015;31(2):377-94.
28. Sá-Silva JR, Almeida CD, Guindani JF. Pesquisa documental: pistas teóricas e metodológicas. *Rev Bras História Ciênc Sociais*. 2009;1(1):1-15.
29. Mendes EV. As redes de atenção à saúde. *Ciênc Saúde Coletiva*. 2010;15(5):2297-305.
30. Rivera FJU, Artmann E. Planejamento e gestão em saúde: histórico e tendências com base numa visão comunicativa. *Ciênc Saúde Coletiva*. 2010;15(5):2265-74.
31. Mendes EV. O cuidado das condições crônicas na Atenção Primária à Saúde: o imperativo da consolidação da Estratégia Saúde da Família. Brasília: Organização Pan-Americana da Saúde; 2012.

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