



## Food and nutrition surveillance in Minas Gerais: a contribution to nutritional interventions?

### *Vigilância alimentar e nutricional em Minas Gerais: uma contribuição para intervenções nutricionais?*

**Maria Gabriella Ferreira Bastos<sup>1</sup>, Bianca Araujo Milbratz<sup>2\*</sup>, Tábatta Renata Pereira de Brito<sup>1</sup>, Daniela Braga Lima<sup>1,2</sup>**

<sup>1</sup> Faculdade de Nutrição, Universidade Federal de Alfenas (Unifal-MG), Alfenas (MG), Brasil.

<sup>2</sup> Departamento de Nutrição, Programa de Pós-Graduação Mestrado em Nutrição e Saúde, Universidade Federal de Lavras (UFLA), Lavras (MG), Brasil.

\*Corresponding author: Bianca Araujo Milbratz –E-mail: bianca.milbratz1@estudante.ufla.br

#### ABSTRACT

To analyze the dietary situation of children assisted in Primary Health Care services. Data originated from public reports from the Food and Nutritional Surveillance System, referring to the food consumption of children aged 5 to 9 years old and assisted by Primary Health Care in the state of Minas Gerais between 2015 and 2019. Data was presented in percentage, average percentage variation, and percentage points, found using a simple linear regression. The food intake of 120,666 children was characterized as inadequate, with a growing tendency towards the habit of having meals while watching television in both sexes ( $p=0.045$  for females,  $p=0.008$  for males). Greater focus on the population studied here is necessary to promote adequate and healthy eating in children, including the provision of multidisciplinary care in the Primary Health Care network.

**Keywords:** Eating. Child Health. Food and Nutritional Surveillance.

#### RESUMO

Analisar a situação da alimentação de crianças atendidas nos serviços de Atenção Primária à Saúde. Os dados foram provenientes dos relatórios públicos do Sistema de Vigilância Alimentar e Nutricional, referentes ao consumo alimentar de crianças de 5 a 9 anos de idade, assistidas pela Atenção Primária à Saúde do estado de Minas Gerais, entre 2015 a 2019. Os dados foram apresentados em percentual, variação percentual média e pontos percentuais, obtidos por meio da regressão linear simples. O consumo alimentar de 120.666 crianças caracterizou-se inadequado, com crescente tendência no hábito de realizar as refeições assistindo à televisão, em ambos os sexos ( $p = 0,045$  para o sexo feminino,  $p = 0,008$  no sexo masculino). Faz-se necessária maior atenção à população estudada para promoção de alimentação adequada e saudável, incluindo o cuidado multiprofissional, na rede de Atenção Primária à Saúde.

**Palavras-chave:** Consumo Alimentar. Saúde da Criança. Vigilância Alimentar e Nutricional.

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## INTRODUCTION

Childhood is a decisive period in the formation of dietary habits, which tend to continue into adult life. It also influences the state of health and nutrition, and that is why it is important to encourage a varied and balanced diet<sup>1,2</sup>. Dietary habits are formed by the availability of foods at home, parent and familial habits, and, later, influenced by insertion in the school environment.<sup>1,2,3,4</sup>

Throughout the last decades, Brazil has been through intense social, economic, and political transformations that have contributed for changes in the disease profile of the population, leading to discussions about the impacts on the reorganization of society. Currently, the increase in noncommunicable diseases and health issues has raised concerns about the paradox of the coexistence of malnutrition and obesity.<sup>5</sup>

In this changeable context, we can also observe a trend towards the reduction of *in natura* and minimally processed foods, and an increase in the intake of mostly processed foods. This characterizes patterns of high intake of foods with high energetic density, rich in sugar, saturated fats, and preservatives, while poor in fibers and micronutrients; this pattern, which has been appearing in increasingly young ages, lead to an increase in the consumption of cholesterol, fats, sodium, and calories.<sup>6</sup>

Another negative, but relevant factor for child dietary patterns, is the influence of media, where most advertisements show mostly processed foods, encouraging the intake of this type of food.<sup>7</sup>

Food intake analysis is usually based on nutrients and energetic content in foods. Nonetheless, the World Health Organization (WHO) states that food intake can be evaluated considering food ingested, not only the nutrients in it. Thus, studies that use questionnaires addressing typical eating habits can be used to identify dietary patterns. Thus, studies that use

questionnaires addressing typical eating habits can be used to identify dietary patterns.<sup>8,9</sup>

The SISVAN Web, created using the SISVAN, can record data regarding dietary and nutritional surveillance of all Single Health System (SUS) users. The SISVAN Web, created using the SISVAN, can record data regarding dietary and nutritional surveillance of all Single Health System (SUS) users.<sup>10</sup>

Considering this context, the need to recognize the dietary pattern of the child population, to identify harmful and risk factors, thus contributing to elaborate nutritional interventions and the creation of public policies to promote the health of this target population. In this regard, this study aimed at analyzing the dietary situation of children attended in the Primary Health Care services.

## METHODS

This is an ecological time series study, whose data were selected from public reports (public access module) of the SISVAN Web, available for free access at: <https://sisaps.saude.gov.br/sisvan/relatoriopublico/index>.<sup>11</sup>

Reports were created using forms that registered food intake of school age children (5 to 9 years old), assisted by the Primary Health Care in cities of Minas Gerais, from 2015 to 2019. The chosen period was chosen to verify the epidemiological situation of food consumption of school children in recent years. It reflects the reality of health services before the covid-19 pandemic, since 2019 was probably the last year in which the data were input and reviewed. It is worth mentioning that this period was chosen due to the extremely significant implementation of the National Policy for Integral Child Health Care, in the end of 2015; and to an update in the food intake forms.<sup>12,13</sup>

The filters chosen for data collection at SISVAN Web are presented in Figure 1.

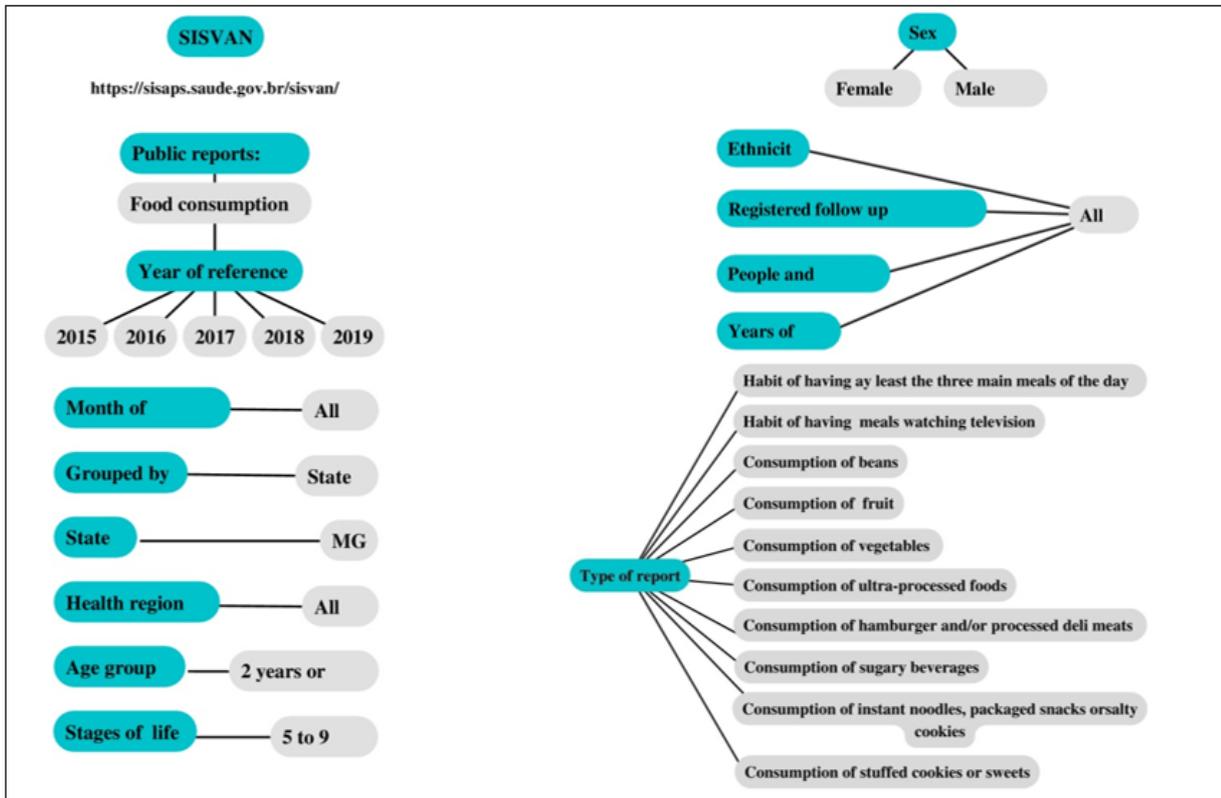


Figure 1. Flowchart of the filters selected in SISVAN data collection.

SVAN Web has nine food intake markers for children above 2 years old. They were all analyzed considering the creation, for each marker, of two reports, separating the children per sex. This led to 18 reports for each year in the period analyzed.

The independent variables in this study were: sex (male and female) and time variables

(per year, from 2015 to 2019). The dependent variables studied (food intake), their indicators and respective questions, considered the children according to sex, with the answer “Yes” to the questions, which can be found in Chart 1.

Chart 1. Dependent Variables (Food Intake) With Their Respective Markers And Guiding Questions

(Continua)

Healthy food intake	
Marker	Question
Proportion of children that ate beans in the day prior to the evaluation	“Did you eat beans yesterday?”
Proportion of children that ate fruit in the day prior to the evaluation	“Did you eat fruit yesterday (fruit juice not included)?”
Proportion of children that ate vegetables in the day prior to the evaluation	“Did you eat vegetables yesterday (potato, cassava, and yam not included)?”

(Conclusão)

Unhealthy food intake	
Marker	Question
Proportion of children who ate hamburger and/or processed deli meats (ham, mortadella, salami, sausages) in the day prior to evaluation	“Did you eat hamburger and/or processed deli meats (ham, mortadella, salami, sausages) yesterday?”
Proportion of children who drank sugary drinks (soft drinks, juice boxes, powder juice, boxed coconut water, guarana/redcurrant syrup, and fruit juices with added fruit)	“Did you drink sugary drinks (soft drinks, juice boxes, powder juice, boxed coconut water, guarana/redcurrant syrup, and fruit juices with added fruit) yesterday?”
Proportion of children who ate instant noodles, packaged snacks, or salt cookies in the day prior to the evaluation	“Did you eat instant noodles, packaged snacks, or salt cookies yesterday?”
Proportion of children who ate stuffed cookies or sweets (candy, lollipops, chewing gum, caramel, jello) in the day prior to the evaluation	“Did you eat stuffed cookies or sweets (candy, lollipops, chewing gum, caramel, jello) yesterday?”

The time trend analysis of the evolution of the prevalence of food intake was found using linear regression. We determined the percentage mean variation per year (pp), which can be interpreted as increasing (positive rate variation), stationary (when there is no statistical difference), or decreasing (negative variation rate). We only considered as significant variations with  $p < 0.05$ , using a significance interval of 95% (CI95%). The software Stata, version 13.0 as used for statistical analysis<sup>14,15</sup>

The study was not submitted to the Research Ethics Committee for Research with Human Beings due to the fact that it only used information available in public domain databases. Still, all aspects of National Health Resolution

466/12, which regulates research with human beings, were respected.

## RESULTS

120.666 children from 5 to 9 years old, with food intake data, were followed up by the SISVAN from 2015 to 2019, in Minas Gerais, from 5,239 in 2015 to 41,108 in 2019. Data showed an increase in the number of children from both sexes followed up in the system, with a higher number of female children in all years evaluated. The trend of female and male child records was stationary, showing no change over the years (Table 1).

**Table 1.** Time trend of records available for children from 5 to 9 years old in the Food and Nutritional Surveillance System in the state of Minas Gerais, from 2015 to 2019

(Continua)

Age	Female		Male		Total	
	n	%	n	%	n	%
2015	2.648	50,54	2.591	49,46	5.239	100
2016	5.683	50,92	5.477	49,08	11.160	100
2017	13.610	51,27	12.934	48,73	26.544	100
2018	18.606	50,82	18.009	49,18	36.615	100
2019	20.980	51,04	20.128	48,96	41.108	100
<b>Mean yearly variation</b>	0,09		-0,09			

			(Conclusão)
CI 95%	-0,17-0,35	-0,35-0,17	
P-value	0,361	0,361	
Trend	Stationary	Stationary	

Source: SISVAN data (2022).

Regarding food intake markers, our analysis of healthy food intake data in females (Table 2) shows a satisfactory intake of beans, fruit, and vegetables. Throughout the years analyzed, we can find a drop in the intake of beans in 2019, from 94% to 89%. This decrease, however, lacks statistical significance. Regarding

unhealthy dietary markers, it was found that stuffed cookies, sweets, and sugary drinks were often consumed, with results around 70% and 63% in the five years evaluated. Nonetheless, all markers, healthy or not, were stationary in the years evaluated ( $p > 0.05$ ).

**Table 2.** Time trend of the prevalence of food intake markers in female children from 5 to 9 years old in the Food and Nutritional Surveillance System in the state of Minas Gerais, from 2015 to 2019

Year	Intake markers						
	Prevalence of healthy foods intake (%)			Prevalence of unhealthy foods intake (%)			
	Beans	Fruit	Vegetables	Hamburger and/or processed deli meats	Sugary drinks	Instant noodles, packaged snacks, or salty cookies	Stuffed cookies or sweets
2015	94,0	78,0	72,0	42,0	71,0	48,0	63,0
2016	90,0	74,0	70,0	35,0	69,0	44,0	63,0
2017	92,0	75,0	72,0	38,0	68,0	44,0	61,0
2018	92,0	77,0	73,0	40,0	69,0	46,0	62,0
2019	89,0	74,0	71,0	42,0	70,0	46,0	63,0
<b>Mean yearly variation</b>	-0,8	-0,5	0.1	0.5	-0,5	-0,2	-0,1
CI 95%	-2,52 -0,92	-2,40 -1,40	-1,21 -1,41	-2,82 -3,83	-1,95 -0,95	-2,10 -1,70	-1,12 -0,92
P-value	0.236	0,464	0.824	0,665	0,355	0,761	0,776
Trend	Stationary	Stationary	Stationary	Stationary	Stationary	Stationary	Stationary

Source: SISVAN data (2022); negative answers were omitted.

Analyzing the health diet markers in male children (Table 3), we found that the intake of beans decreased significantly ( $p < 0.05$ ) throughout the years, going from 95% in 2015 to 90% in 2019, in a decreasing trend. Among unhealthy markers, we found a high intake of sugary drinks, stuffed cookies, and sweets. The intake of these foods was stationary. Excepting regarding bean intake, all markers showed stationary trends throughout the years ( $p > 0.05$ ).

Regarding food intake markers associated with eating lifestyle, it was found that the number of children who had at least three meals a day decreased, and the number of children who ate watching the television increased, for both sexes. Thus, the habit of having meals while watching television showed a growing trend in both sexes ( $p < 0.05$ ). On the other hand, the habit of having, at least, three meals a day, was stable throughout time ( $p > 0.05$ ) (Figure 2).

**Table 3.** Time trend of the prevalence of food intake markers in male children from 5 to 9 years old in the Food and Nutritional Surveillance System in the state of Minas Gerais, from 2015 to 2019

Year	Intake markers						
	Prevalence of healthy foods intake (%)			Prevalence of unhealthy foods intake (%)			
	Beans	Fruit	Vegetables	Hamburger and/or processed deli meats	Sugary drinks	Instant noodles, packaged snacks, or salty cookies	Stuffed cookies or sweets
2015	95,0	75,0	71,0	42,0	73,0	48,0	65,0
2016	93,0	72,0	68,0	38,0	71,0	44,0	64,0
2017	92,0	73,0	70,0	39,0	69,0	45,0	61,0
2018	92,0	76,0	72,0	43,0	70,0	46,0	62,0
2019	90,0	73,0	69,0	46,0	71,0	47,0	63,0
<b>Mean yearly variation</b>	-1,1	-	-	1,3	-0,5	-	-0,6
<b>CI 95%</b>	-1,70 -0,04	-1,90 -1,90	-1,83 -1,83	-1,56 -4,16	-1,95 -1,95	-1,83 -1,83	-2,06 -0,86
<b>P-value</b>	0,010*	1,000	1,000	0,244	0,355	1,000	0,285
<b>Trend</b>	Decreasing	Stationary	Stationary	Stationary	Stationary	Stationary	Stationary

Source: SISVAN data (2022); negative answers were omitted. \*  $p < 0,05$

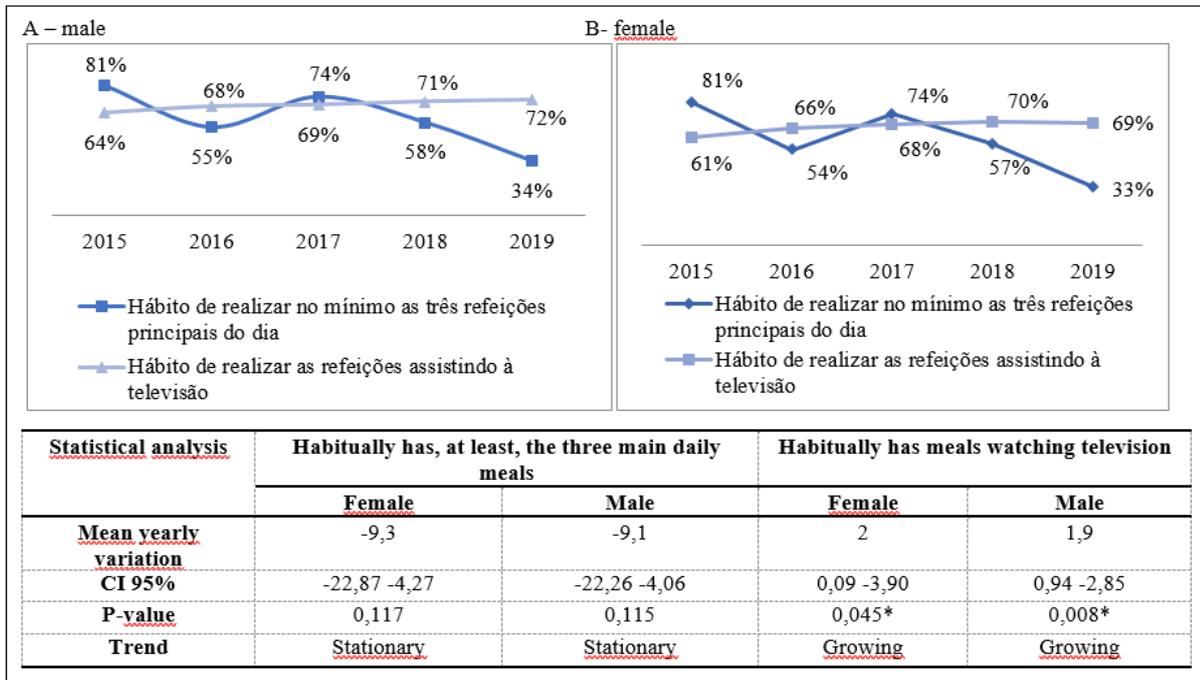


Figure 2. Time trend of life habits of children from 5 to 9 years old, per sex, according to the Food and Nutrition Surveillance System in the state of Minas Gerais, from 2015 to 2019. Source: SISVAN data (2022); negative answers were omitted. \* p < 0,05.

DISCUSSION

The study showed an increase in records of food intake data of children followed up in the Primary Health Care of Minas Gerais. We found a growing time trend for the habit of eating while watching television in both sexes; in males, bean intake, one of the markers of health eating, showed a decreasing trend.

Despite the increase in the number of children followed up by SISVAN in Minas Gerais during the years considered, results showed the need to broaden system coverage, since numbers are still much short of the total number of children in the state, according with data from the Brazilian Institute of Geography and Statistics (IBGE) from 2018, which estimated the state would have 1,340,004 children from 5 to 9 years old in 2015, and 1,311,803 in 2019. Nonetheless, the number of children in this age group followed up by SISVAN whose food intake data was available, was of only 5,239 in 2015 and 41,108 in 2019.<sup>16</sup>

In July 2022, the Organization Child Obesity on the Spotlight presented an Overview of Obesity in Children and Adolescents, when the rate of coverage of SISVAN, for children from 5 to 9 years old, in Minas Gerais, was 0.5% in 2015 and 3.1% in 2019, demonstrating a low system coverage. Still, throughout the years, the number of children in the age group studied who had their data inserted was higher. In Brazil as a whole, the coverage was 0.25% in 2015 and 1.55% in 2019, showing a low coverage, below that of the state of Minas Gerais.<sup>17</sup>

Due to the vulnerability of children in regard to malnutrition-related diseases, this public must be watched more closely. However, although the SISVAN prescribes nutritional actions involving this public, data collection is still lacking. A study carried out in 2018 to analyze the use and coverage of SISVAN by primary care showed that less than half those responsible for data collection filled in food intake markers, prioritizing the records of information related with anthropometrics.<sup>18</sup>

Food intake analysis is important to develop Food and Nutrition Educational actions (FNE), whose goal is sharing knowledge and encouraging more adequate and healthy eating, thus promoting health and quality of life. The Food Guide for the Brazilian Population is an important FNE tool, whose main focus is providing the populace with information about healthy and adequate eating habits. This guide reiterates that *in natura* and minimally processed foods must be the basis of healthy eating, and mostly-processed foods should be avoided.<sup>19</sup>

We found stationary trends in regard to *in natura* and minimally processed foods intake in the period analyzed, for both sexes. Nonetheless, the intake of beans among male children showed a significant decreasing trend. Beans are considered a source of vegetable proteins, and, coupled with rice, is a daily fixture of Brazilian food habits. Both foods have different and incomplete protein profiles, but, when put together in the same meal, they complement each other, providing all essential amino acids. It is worth highlighting that both beans and rice are considered to be important foods to guarantee food and nutritional security.<sup>20,21</sup> The decrease in the intake of beans among male children can be explained by factors such as acceptability and access.

Although findings have not shown statistically significant data regarding the intake of ultra-processed foods, it is well known that their consumption is harmful to health. Several studies with children have shown less consumption of fruit and vegetables, coupled with a substantial increase in the intake of ultra-processed foods, such as cookies, processed deli meats, soft drinks, instant noodles, and sweets.<sup>6,22,23,24</sup>

A study with 22,761 children from the south of Brazil, using SISVAN data, found a high consumption of ultra-processed foods, especially instant noodles, snacks, packaged

cookies, and hamburger and/or processed deli meats, especially in the age group from 5 to 9 years old. This corroborates other studies where the children and adolescent present a profile of unhealthy eating habits, due not only to the little consumption of *in natura* and minimally processed foods processed foods, but especially due to the high intake of ultra-processed foods.<sup>25,26</sup>

The findings of this study showed a growing trend in the practice of watching television during meals, for both sexes. This can be seen as harmful for the creation of eating habits. The Food Guide for the Brazilian Population reiterates the relevance of the act of sitting down to eat one's meals, highlighting the importance of eating regularly, attentively, in adequate environments, and, especially, with company.<sup>19</sup>

This reiterates that the use of television or any other electronic device should be avoided, and eating in the presence of loved ones, such as family and friends, is a habit that should be encouraged. This interaction is essential during childhood and transforms the meal in a moment of pleasure and happiness.<sup>19</sup>

Furthermore, the media has as negative role in the formation of the eating habits of a child. Currently, most food ads in the media are for foods considered to be unhealthy, especially ultra-processed ones. Few ads encourage fruit and vegetable consumption.<sup>4,7</sup>

The marketing for these types of foods takes advantage of abusive strategies, both to get the attention of children and their relatives, and to promote the use of eye-catching packaging and promotional gifts that are harmful to health.<sup>25</sup>

We believe that the results found here show the reality experienced by the SUS health services in Minas Gerais, such as the low SISVAN coverage and the little data registered by its workers regarding the markers of food intake. Nonetheless, the findings of this study are limited,

and should be interpreted with regard to the secondary origin of the data found. Therefore, although this is a system of information in health, the quality of its data can be compromised due to shortcomings in the data collection process.

Therefore, despite these limitations, the information generated by this study can contribute to strengthen public health policies and formulate new ones, as to encourage the training of workers for Food and Nutritional Surveillance. This would contribute for an increase in the coverage of the system, whose focus is promoting adequate and healthy eating habits to promote care and prevent disease, according with the National Food and Nutritional Politics.<sup>27</sup>

## CONCLUSION

The eating habits of children from Minas Gerais, Brazil, attended in Primary Health Care services, showed changes through time that indicate inadequate eating standards. The exposure of children to the television during meals also stands out, as it can contribute for this situation.

Inadequate eating habits during childhood can have a negative impact in all stages of life. Therefore, it is extremely important to implement actions Food and Nutritional Surveillance actions, including interventions and strategies in the formulation of public policies aimed at promoting adequate and healthy eating, including multiprofessional care in the Primary Health Care network.

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