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Estimated number of people diagnosed with cancer in Brazil: data from the National Health Survey, 2013

Estimativa de pessoas com diagnóstico de câncer no Brasil: dados da Pesquisa Nacional de Saúde, 2013

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ABSTRACT: *Objective:* To describe the profile of patients who reported a medical diagnosis of cancer and describe the most prevalent types of cancer, according to selected variables. *Methods:* A descriptive study that used data from the National Survey of Health, 2013, to estimate prevalence and their values of confidence interval (95%CI). *Results:* Less than 2% of adults reported a medical diagnosis of cancer, with most reported by women, people over 60, among whites, residents in the village and residents of South Prostate cancer was the most reported among men and breast among women. The lowest average age of first diagnosis was identified for cervical cancer (35.4 years; 95%CI 30.3 – 40.6) and the highest for prostate (65.7 years; 95%CI 64.2 – 67.0). *Conclusion:* The findings of this study are important for the planning of health services and access, as they show differences mainly regional.

Keywords: Neoplasms. Chronic disease. Health surveys. Epidemiological surveillance. Prevalence. Brazil.

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RESUMO: *Objetivo:* Descrever o perfil dos pacientes que referiram diagnóstico médico de câncer e descrever os tipos de câncer mais prevalentes, segundo variáveis selecionadas. *Métodos:* Estudo descritivo que utilizou dados da Pesquisa Nacional de Saúde (PSN) de 2013 para estimar prevalências e respectivos valores do intervalo de confiança (IC95%). *Resultados:* Menos de 2% dos adultos referiram diagnóstico médico de câncer, sendo mais relatado por mulheres, por pessoas com mais de 60 anos, entre brancos, em residentes da zona urbana e moradores da Região Sul. O câncer de próstata foi o mais referido entre os homens; entre as mulheres, o câncer de mama foi o mais prevalente. A menor idade média do primeiro diagnóstico foi identificada para câncer de colo de útero (35,4 anos; IC95% 30,3 – 40,6), e a maior, para câncer de próstata (65,7 anos; IC95% 64,2 – 67,0). *Conclusão:* Os achados deste estudo são importantes para o planejamento dos serviços de saúde e do seu acesso, pois revelam diferenças, principalmente regionais.

Palavras-chave: Neoplasias. Doença crônica. Inquéritos epidemiológicos. Vigilância epidemiológica. Prevalência. Brasil.

INTRODUCTION

Cancers may be caused by different risk factors and their role in its etiology is currently well known. It is a disease of multiple causes, such as environmental, cultural, socioeconomic factors, life style and customs, with focus on: smoking and eating habits, genetic factors and the aging process itself[1-3]. Tumors have grown worldwide and are the second cause of death in most countries[4]. In developed countries it is expected that soon cancers Will surpass cardiovascular diseases[5].

In Brazil, in 2011, cancer was responsible for 16.4% of deaths, being the second cause of mortality[6]. Besides that, for some kinds of cancer, the mortality trend follow a pattern similar to the one observed in developed countries[7]. The hospitalization data of the Unified Health System (*Sistema Único de Saúde* – SUS) show that tumors were the third cause for hospitalization in the period from 2002 to 2012[8].

According to the cancer estimates for the country, based on the Population-Based Cancer Registries (*Registros de Câncer de Base Populacional* – RCBP) of the country and the Mortality Information System (*Sistema de Informação sobre Mortalidade* – SIM), were estimated, for 2014, approximately 576 thousand new cases of cancer, excluding the non-melanoma skin cancer (182 thousand new cases)[9], which shows the burden of the disease in the morbidity and mortality profile of the country. Cancer requires great demand of investment in prevention and assistance policies, especially when considering the long exposure period to environmental and individuals risk factors, in addition to populational aging[10].

In the editions of 2003 and 2008 of the National Household Sample Survey (*Pesquisa Nacional de Amostra Domiciliar* – PNAD) were estimated prevalences of cancer of 0.40 and 0.56%, respectively, considering that in the edition of 2008 the prevalence of cancer among men was 0.51%, and among women of 0.61%[11,12].

Considering the burden of this disease for the country, in 2013, the National Health Survey (NHS), in the module for chronic diseases, issues related to cancer were investigated, with the objective

of knowing the prevalence of people who live or lived with the disease in the country. Thus, the objective of this work was to describe the profile of patients who reported medical diagnosis for cancer and to describe the most prevalent types of cancer, according to the selected variables.

METHODS

This was a cross-sectional study which used data from the NHS of 2013, carried out by the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística* – IBGE), in partnership with the Ministry of Health (MS). The population of the study consisted of adults living in private households in Brazil.

The parameters used to the sample calculation takes into account the main indicators studied on people with characteristics of interest, to be representative of Brazil, of the 5 regions and the 27 federation units. A conglomerate sample in three stages was carried out. In the first stage the census sectors in a simples random form from a Master Sample of the Integrated System of Household Surveys of IBGE. In the second stage there were the households by simple random sampling using the National Address List for Statistical Purposes of IBGE. And finally, in the third stage, a resident aged 18 years old or more was selected by equiprobability[13,14].

The final sample consisted of 64,348 households, conducting 60,202 interviews. In order to represent Brazilian adults, the samples was considered taking into account the sampling weight for each selection stage. For more methodological details, see the NHS[14].

The IBGE coordinated the field work, the interviews were carried out using the PDAs (Personal Digital Assistance), handheld computers. The module about chronic diseases was answered by the adult themselves through the random selection program of the PDA, as mentioned above. The interviews were scheduled on the dates and times more convenient for the informants, predicting two or more visits in each household[14].

Cancer prevalences were analyzed using the following variables and the respective question in the questionnaire:

1. medical diagnosis of cancer ("Has any doctor ever given you a cancer diagnosis?"): yes/no;
2. type of cancer ("In the first cancer diagnosis, what kind of cancer do or did you have?"): lung, intestine, breast and cervical cancer — only for women, prostate cancer — only for men, skin and others;
3. age of the first diagnosis ("How old were you at the time of your first cancer diagnosis?").

The calculation was carried out for the prevalence of categorical variables and their respective values in the confidence interval of 95% (95%CI) according to gender, race/color, place of residence; the mean age and the 95%CI of the diagnosis were estimated by location. The data were analyzed using the statistical package *Stata*.

The NHS project was approved by the Research Ethics Committee, of the National Health Council, under endorsement No. 328.159, of June 26th 2013, in June 2013.

RESULTS

The NHS pointed out that 1.8% (1.6 – 2.0) of the adults reported having been diagnosed with cancer at some point in their lives. Despite this report being higher among women (1.9%; 1.8 – 2.3), there was no difference between genders. The prevalence of the ones who reported the diagnosis was lower within the age range from 18 to 29 years of age (0.3%; 0.1 – 0.6) and from 30 to 59 years of age (1.3%; 1.1 – 1.5), reaching 7.7% (5.9 – 9.4) among people who were older than 75 years of age; 3.0% (2.2 – 3.8) of the ones who completed their college degree reported the diagnosis; however, no differences of diagnosis were observed among people with different levels of instruction. The prevalence of medical diagnosis of cancer was higher among people who were self-declared race/color Caucasian/White (2.6%; 2.3 – 3.0). Considering the place of residence, the highest prevalences were observed in the urban area (1.9%; 1.7 – 2.2) and among the residents of the South region (3.2%; 2.6 – 3.8) (Table 1).

As for the type of cancer diagnosed, the prostate cancer was the most often reported one among men (36.9%; 29.5 – 45.0), and the breast cancer was the most often reported one among women (23.0%; 18.8 – 27.8) (Figure 1).

The mean age of the first cancer diagnosis was 51.9 years of age. The lowest mean age was observed for cervical cancer (35.4 years of age), and the highest, for prostate cancer (65.7 years of age). When comparing the mean ages, it was verified that there was no difference for lung, intestine, stomach, skin and other cancers, nor between men and women, for neither kind of cancer evaluated (Table 2).

When analyzing the types of cancer by region of residence, it was observed that, in the Northern region, the highest proportion was cervical cancer, while in the Southeastern region it was the breast cancer. For the Northeastern, Southern and Mid-Western regions, the highest proportions observed were the ones for breast cancer and others. The stratified analysis by gender showed that the prostate cancer had the highest proportion among men living in the Mid-Western, Northern and Southeastern regions. Among women, it was observed the highest proportion of breast cancer in the Southeastern and Northeastern regions, and cervical cancer in the Northern region (Table 3).

DISCUSSION

This survey showed that less than 2% of the adults reported medical diagnosis for cancer at some point in their lives, more often among women, people over 60 years of age, with complete college degree, among the ones self-declared White/Caucasian, among the residents of urban areas and residents of the Southern region. The prostate cancer was the most reported one among men; among women, breast cancer was the most prevalent one. The mean age for the first diagnosis was lower for cervical cancer and higher for prostate cancer. Among men, the prostrate cancer was the most reported one in the Mid-Western,

Table 1. Distribution (proportion and indication of values of the confidence interval 95%) of the characteristics of adults who reported medical diagnosis of cancer. Brazil, 2013.

| Characteristics	Medical diagnosis of cancer
	% (95%CI)
Gender	
Male	1.6 (1.3 – 1.9)
Female	2.0 (1.8 – 2.3)
Age (years)	
18 – 29	0.3 (0.1 – 0.6)
30 – 59	1.3 (1.1 – 1.5)
60 – 64	3.7 (2.6 – 4.9)
65 – 74	5.7 (4.6 – 6.8)
75 +	7.7 (5.9 – 9.4)
School education level	
Without education and incomplete Elementary School	2.3 (2.0 – 2.7)
Complete Elementary School and incomplete High School	1.1 (0.8 – 1.4)
Complete College degree	3.0 (2.2 – 3.8)
Race/color	
Caucasian/White	2.6 (2.3 – 3.0)
Black	1.4 (0.9 – 1.9)
Brown	1.0 (0.9 – 1.2)
Place of residence	
Urban	1.9 (1.7 – 2.2)
Rural	1.2 (0.9 – 1.5)
North	0.9 (0.6 – 1.1)
Northeast	0.9 (0.8 – 1.1)
Southeast	2.1 (1.7 – 2.5)
South	3.2 (2.6 – 3.8)
Mid-West	1.6 (1.3 – 2.0)
Total	1.8 (1.6 – 2.0)

95%CI: confidence interval of 95%.
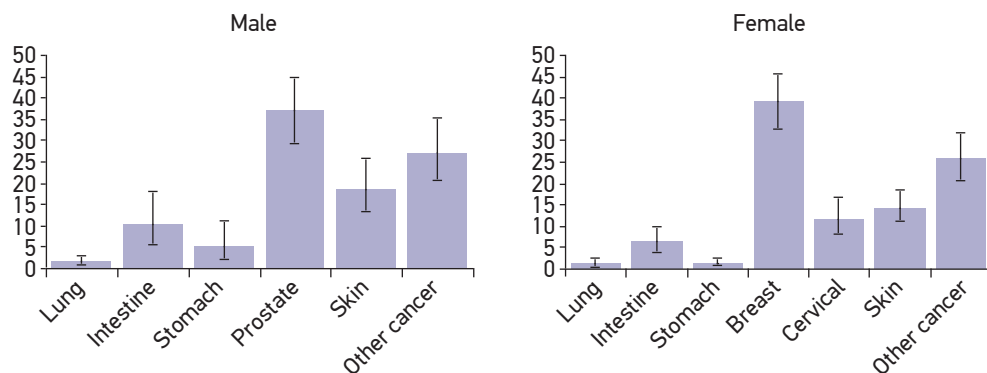
Figure 1. Distribution (and indication of confidence interval of 95%) of the adults who reported medical diagnosis of cancer, by type of cancer, according to gender. Brazil, 2013.

Table 2. Mean age of the first cancer diagnosis, by type of cancer, according to gender. Brazil, 2013.

Location	Mean age of at the momento of diagnosis, years
	Mean (95%CI)
Breast (n = 228)	
Female	49.0 (45.5 – 52.6)
Cervical (n = 89)	
Female	35.4 (30.3 – 40.6)
Prostate (n = 129)	
Male	65.7 (64.2 – 67.0)
Lung (n = 22)	
Total	58.4 (49.4 – 67.3)
Male (n = 11)	64.9 (51.7 – 78.1)
Female (n = 11)	51.6 (45.0 – 58.7)
Intestine (n = 73)	
Total	58.1 (53.0 – 63.1)
Male (n = 24)	56.1 (49.3 – 63.0)
Female (n= 49)	60.3 (53.0 – 67.5)
Stomach (n = 31)	
Total	53.5 (44.0 – 63.1)
Male (n = 17)	53.3 (40.6 – 66.0)
Female (n = 14)	54.0 (41.9 – 66.1)
Skin (n = 182)	
Total	52.5 (47.7 – 57.5)
Male (n = 69)	54.3 (45.3 – 63.3)
Female (n = 113)	50.8 (46.0 – 55.5)
Other cancers (n = 269)	
Total	48.1 (44.7 – 51.4)
Male (n = 95)	51.1 (46.2 – 55.9)
Female (n = 174)	45.8 (41.4 – 50.3)
All locations (n = 1,023)	51.9 (50.1 – 53.7)

95%CI: confidence interval of 95%.

Table 3. Distribution (and indication of the confidence interval of 95%) of the adults who reported medical diagnosis of cancer, by type of cancer#, according to the residence regions and gender. Brazil, 2013.

Place of residence	Location						
	Lung	Intestine	Stomach	Breast	Cervical	Prostate	Other cancer
	% (95%CI)	% (95%CI)	% (95%CI)	% (95%CI)	% (95%CI)	% (95%CI)	% (95%CI)
Total							
North (n = 99)	2.6 (0.5 – 13.9)	4.2 (1.4 – 11.7)	4.4 (1.5 – 11.9)	17.1 (7.2 – 35.5)	24.6 (14.2 – 39.2)	21.0 (11.2 – 35.8)	26.1 (15.5 – 40.4)
Northeast (n = 162)	2.0 (0.8 – 5.0)	3.1 (1.4 – 6.8)	2.3 (1.0 – 5.5)	32.8 (22.1 – 45.7)	7.1 (3.0 – 15.7)	14.6 (8.0 – 25.2)	38.1 (27.5 – 49.9)
Southesat (n = 285)	1.9 (0.9 – 3.9)	9.0 (4.7 – 16.4)	4.4 (1.9 – 9.7)	31.7 (23.9 – 40.7)	7.3 (3.8 – 13.6)	19.7 (13.9 – 27.2)	26.0 (19.4 – 33.9)
South (n = 195)	0.9 (0.3 – 2.6)	14.0 (7.7 – 24.2)	2.2 (0.5 – 10.1)	19.1 (13.0 – 27.3)	6.7 (3.1 – 13.9)	17.0 (10.4 – 26.5)	40.1 (29.5 – 51.7)
Mid-west (n = 100)	*	12.8 (7.0 – 22.2)	4.0 (0.9 – 15.6)	19.3 (11.5 – 30.6)	16.4 (8.5 – 29.5)	15.5 (8.2 – 27.4)	32.0 (22.0 – 44.0)
Male							
North (n = 35)	6.7 (0.9 – 35.6)	*	10.8 (3.2 – 30.3)	–	–	60.4 (37.7 – 79.3)	22.1 (9.7 – 43.0)
Northeast (n = 49)	1.9 (0.5 – 7.8)	6.1 (2.1 – 16.2)	3.4 (0.9 – 11.5)	–	–	40.1 (22.8 – 60.4)	48.5 (29.4 – 68.0)
Southesat (n = 97)	2.3 (0.8 – 6.3)	13.9 (5.6 – 30.3)	7.7 (2.6 – 206)	–	–	47.9 (34.5 – 61.6)	28.2 (17.4 – 42.2)
South (n = 71)	0.9 (0.2 – 3.7)	15.9 (6.7 – 33.2)	4.3 (0.6 – 23.4)	–	–	39.1 (24.3 – 56.3)	39.8 (24.2 – 57.8)
Mid-west (n = 24)	*	4.7 (1.1 – 18.0)	5.3 (0.7 – 30.1)	–	–	63.0 (38.7 – 82.1)	27.0 (11.3 – 51.9)
Female							
North (n = 64)	0.4 (0.1 – 3.3)	6.4 (2.1 – 17.7)	1.0 (0.1 – 6.9)	26.3 (11.5 – 49.6)	37.7 (21.7 – 56.8)	–	28.2 (14.5 – 47.6)
Northeast (n = 113)	2.0 (0.6 – 6.7)	1.4 (0.4 – 4.3)	1.7 (0.5 – 5.6)	51.6 (37.2 – 65.7)	11.1 (4.8 – 23.8)	–	32.2 (21.1 – 45.6)
Southesat (n = 188)	1.5 (0.5 – 4.5)	5.5 (2.5 – 11.7)	2.1 (0.9 – 4.9)	53.9 (42.9 – 64.6)	12.5 (6.6 – 22.4)	–	24.5 (16.9 – 34.1)
South (n = 124)	0.9 (0.2 – 4.1)	12.6 (5.3 – 27.0)	0.7 (0.1 – 3.3)	33.7 (22.8 – 46.8)	11.8 (5.4 – 23.7)	–	40.3 (26.6 – 55.7)
Mid-west (n = 76)	*	15.4 (8.1 – 27.4)	3.6 (0.5 – 21.3)	25.6 (15.4 – 39.5)	21.8 (11.4 – 37.7)	–	33.6 (22.0 – 47.6)

95%CI: confidence interval of 95%; #except skin; *no observations.

Northern and Southeastern regions; among women, in the Southeastern and Northeastern, the breast cancer, as well as the cervical cancer, were the most reported ones.

The prevalence found in this study was higher than the one found in researches using data from the PNAD from 2003 to 2008, being 0.40 and 0.56, respectively[11,12].

In this work, the diagnosis of cancer was most often reported by women, as well as in other studies[11,12]. It is noteworthy that women tend to report their morbidities more than men, as well as more often seeking for health care, and consequently having timely diagnosis and treament[15,16].

It was verified, also, most reports of diagnosis with the increasing age, corroborating the results from other studies[11,12]; besides that, such finding is what would be expected according to the natural story of most cancers. Similar findings were also verified in other Brazilian surveys[12,17,18]. It is noteworthy that the significant increase of cancer prevalence with the growing age, once that, with the aging of the Brazilian population, the chronic diseases began representing an expressive and increasing demand for health services[18].

The data found follow the cancer epidemiology in Brazil, in which it is observed higher incidence of prostate and breast cancers[9]. It is also observed that most people had their diagnosis after they were 60 years of age, which is expected for most malignant tumors[19].

An exception to this finding was verified for the diagnosis of cervical cancer which showed a mean age of 35 years old. This, besides being a characteristic observed in poor countries, it is compatible with the natural story of the disease, in which women infected by the human papillomavirus (HPV) close to their sexual initiation have greater probability to early [20]. Te control actions for cervical cancer in Brazil which began in the late 1990s[21] broadened the preventive gynecological exam[22], which may be measured by the high coverages informed in previous researches[23,24]. It is also pointed out the introduction of the HPV vaccine for teenagers in 2013, which may, in the future, change the picture of infections by this virus[25]. Besides the early performing of the exam, in order to obtain a reduction on the incidence and in mortality it is necessary that all women who had results changes in screening have their treatment in a timely manner[26,27].

Another interesting fact is the high prevalence of people diagnosed in the Southern region (3.2; 2.6 – 3.8), even higher to the one registered in the Southeastern region (2.1; 1.7 – 2.5). These two regions are the ones with the highest socioeconomic level in the country, the most populated ones, with higher numbers of available health care, and therefore higher option for diagnosis, and with greater elderly population, which results in higher prevalences of cancer[24].

Unlike the results found in this study, in which the prevalence, when analyzed by school education, Did not show significant differences between the people with higher or lower education, other studies pointed out higher frequencies in the segments of low education levels, revealing social inequality in the presence of chronic diseases[11,12]. It should be mentioned that, as the prevalence measured in the NHS is defined by medical diagnosis, it only considers people Who had Access to specialized services, which allows residents of urban areas to have higher chances of being diagnosed[28]. This finding was also observed in the study using data from the PNAD of 2003[11].

The presence of reported morbidity is strongly dependent of the pattern of Access to health services and diagnostic procedures. Having been informed by a health Professional about having a given clinical condition or being submitted to a drug treatment for the control of a disease implies having had Access to the services, which is differentiated regionally and socially. Thus, an increase on the prevalence of a morbid condition may be a positive indicator of Access to the services (with broadening of the Access to the diagnostic and/or reduction of mortality), if accompanied by the absence of incidence growth[11,12].

The recognition of the disease by the individual depends on the perception degree of signs and symptoms, the Access to medical services and to diagnostic tests, besides the type and the quality of the guidance obtained by health professionals[12]. In the case of cancer, in addition to awareness, having Access to diagnosis and treatment means having had referral to specialized services with complementary tests and specialized treatment, which requires the services to have resoluteness in Oncology.

The limitations of this study refer to the formulation of the matters studied: the issue on cancer diagnosis does not allow distinction between people Who were diagnosed with cancer and the ones Who have it at the moment, which may overestimate the prevalence; and in this study it was higher than the ones found by the PNAD of 2003 and 2008, as mentioned before. As for the matter of types of cancer there is a category called "other cancers" and it had great proportions, however, it is not possible to stratify them, due to the way the issue was built.

As for the percentages of this study, they do not represent the incidence of cancer or the mortality rates, but the prevalent cases instead, i.e., the percentage of individuals Who survived after the diagnosis. Among the ones Who survived cancer, it is expected a higher percentage among individuals with diagnosis of tumors with better prognostic, such as breast cancer (among women), and the prostate one (among men) and intestine cancer (for both genders). On the other hand, it is expected lower prevalence of people diagnosed with high mortality cancer, such as lung cancer, since survivors are, probably, the ones Who had early detection of very early tumors, before they metastasized, increasing the possibility of cure. This number is low since that, for lung cancer, there is no recommendation of radiographic screening and the therapeutic possibilities for initial cases are still limited.

Thus, the prevalences found regard tumor reported, i.e., the competition between prevalent cancers with better prognostic, as observed for the colorectal cancer in the Southern and Southeastern regions, and, consequently, lower prevalence of other types of cancer, such as lung cancer in the Southern region.

In 2011, with the launch of the Strategic Plano f Action for Fighting Non-Communicable Chronic Diseases in Brazil (*Plano de Ações Estratégicas para o Enfrentamento das Doenças Crônicas Não Transmissíveis no Brasil*)[29] and the National Policy for Prevention and Control of Cancer in the Primary Health Care Network for People with Chronic Diseases in SUS (*Política Nacional para a Prevenção e Controle do Câncer na Rede de Atenção à Saúde das Pessoas com Doenças Crônicas no âmbito do SUS*)[30], several measured were adopted in order to reduce mortality and morbidity caused by breast and cervical cancer, established by the Brazilian Guidelines for Screening of Cervical Cancer (*Diretrizes Brasileiras para o Rastreamento do Câncer de Colo de Útero*), containing

clinical procedures For the appropriate care of women identified as possible carriers of precursor lesions of cervical cancer, broadened the screening age range, including women from 25 to 64 years of age, and determined guidelines for a greater Access to the Pap test, resulting in an increase of tests carried out. It was also created the National Program of Cytopathology Quality (*Programa Nacional de Qualidade em Citopatologia*), with the measures for qualification of large cytopathology laboratories, and there is an ongoing structuring of 20 services of diagnosis confirmation and treatment of the precursor lesions of cervical cancer[31-33].

In relation to the prevention and control action for breast cancer, a reference service was created for the diagnosis of breast cancer, which has invested in order to expand the mobile mammography service and the structuring of 50 mammary diagnostic services[31,32]. There was an increase of offers For mammography exams and the results of the Surveillance of Risk Factors and Protection for Chronic Diseases by Telephone Inquiry (*Vigilância de Fatores de Risco e Proteção para Doenças Crônicas por Inquérito Telefônico* – Vigitel) showed expansion in mammography coverage in the capitals, from 71.1%, in 2007, to 78.0%, in 2013[23]. In the Radiotherapy Expansion Plan in SUS (*Plano de Expansão da Radioterapia no SUS*) is expected the creation of radiotherapy services in 48 hospitals and expansion of 32 existing services, totaling the acquisition of 80 radiotherapy equipments by the MS (Linear Accelerator), in addition to remodeling of hospitals[31,34].

The vaccine against Hepatitis B is part of the vaccination calendar of children, adolescents and adults and is available in vaccine centers of SUS, which expanded the offer of vaccines for the age range from 30 to 49 years old. Besides that, every newborn must have their first dose right after birth, preferably within the first 12 hours of life. If the mother has hepatitis B, the newborn, in addition to the vaccine, should receive immunoglobulin against hepatitis B within the first 12 hours of life. The HPV vaccine is offered to pre-teenagers between 11 and 13 years of age in the Primary Care Units (*unidades básicas de saúde* – UBSs) and also in public and private schools, in coordination with the health units of each region. In 2015, teenagers between 9 and 11 years of age Will be vaccinated[31]. It is expected, with those action, to improve in prevention, treatment and survival of patients with cancer in the country and Who converge with the enforcement of the Law ensuring the beginning of the cancer treatment within 60 days after the diagnosis[35].

CONCLUSION

The findings of this study are important for the planning of health services and their Access, since they show differences, specially regional ones. These may be, also, a reflex of how the health services were previously organized. Nowadays, it is expected that, with the investments in the health área, especially regarding the reorganization of services, such as the building of a line of care for patients with cancer[30], may, in addition to helping with Law enforcement for the treatment of cancer to also, in the future, have an impact on the natural story of the disease, especially in the pathogenic period of cancer, allowing the early diagnosis and treatment and, thus, as a result, provide greater survival time for patients Who were diagnosed with cancer.

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