

From Diagnosis to the Beginning of Cancer Treatment: Waiting Time for Patients and Associated Factors in Brazil Southern States

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Do Diagnóstico até o Início do Tratamento Oncológico: Tempo de Espera dos Pacientes e Fatores Associados nos Estados do Sul do Brasil

Desde el Diagnóstico hasta el Inicio del Tratamiento Oncológico: Tiempo de Espera de los Pacientes y Factores Asociados en los Estados del Sur del Brasil

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ABSTRACT

Introduction: Cancer poses a significant threat to human health, being considered the second leading cause of mortality worldwide. Although cancer patients in Brazil have the right to access quality healthcare, early diagnosis, and treatment within a 60-day period, as established by Federal Law number 12,732/2012, the data available from *PAINEL-Oncologia* highlights a significant disparity between this mandate and the reality faced by the oncology population. In light of this, the Southern Region was selected to assess its compliance with the 60-day Law requirements. **Objective:** To identify the profile of oncology patients and the time from diagnosis to the beginning of the treatment in Brazil Southern Region from 2013 to 2023. **Method:** A descriptive cross-sectional study based on *PAINEL-Oncologia*. The variables of interest included: a) treatment time or timely treatment; b) sex; c) age; d) detailed diagnosis; e) staging; f) treatment modality; g) state where the diagnostic was made. **Results:** There was a significant increase in the proportion of timely treatments from 2013 to 2023; however, the rate of delayed treatments remains high, particularly among men, patients over 50, and cases requiring radiotherapy. Santa Catarina had the lowest rate of on-time treatments, while Paraná showed the highest rate of timely treatment. **Conclusion:** Demographic and disease-related factors influence treatment delay, indicating the need for public policies focused to improve access and efficiency of oncology services in the region.

Key words: Neoplasms/epidemiology; Time-to-Treatment/statistics & numerical data; Health Services Accessibility/statistics & numerical data; Unified Health System; Healthcare Disparities/statistics & numerical data.

RESUMO

Introdução: O câncer representa significativa ameaça à saúde humana, sendo considerado a segunda principal causa de mortalidade no mundo. Apesar de os pacientes oncológicos no Brasil possuírem, por direito, acesso à saúde de qualidade, diagnóstico precoce e tratamento dentro do prazo de 60 dias, por intermédio da Lei Federal n.º 12.732/2012, os dados disponíveis no PAINEL-Oncologia evidenciam a significativa disparidade entre essa norma e a realidade enfrentada pela população oncológica. Diante do exposto, a Região Sul foi selecionada para verificar sua conformidade com os requisitos da Lei dos 60 dias. **Objetivo:** Identificar o perfil do paciente oncológico e o tempo do diagnóstico até o início do tratamento, na Região Sul do Brasil, no período de 2013 a 2023. **Método:** Estudo transversal descritivo, com dados do PAINEL-Oncologia. As variáveis de interesse elencadas foram: a) tempo de tratamento ou tratamento oportuno; b) sexo; c) idade; d) diagnóstico detalhado; e) estadiamento; f) modalidade terapêutica; g) estado de diagnóstico. **Resultados:** Ocorreu aumento significativo na proporção de tratamentos oportunos de 2013 a 2023, porém a taxa de tratamentos inoportunos ainda é alta, especialmente entre homens, pacientes acima de 50 anos, e em casos que requerem radioterapia. Santa Catarina foi o Estado com a menor taxa de tratamentos dentro do prazo, já o Paraná apresentou-se com a maior taxa de tratamento oportuno. **Conclusão:** Fatores demográficos e relacionados à doença influenciam o atraso no início do tratamento, indicando a necessidade de políticas públicas focadas em melhorar o acesso e a eficiência dos serviços oncológicos na Região.

Palavras-chave: Neoplasias/epidemiologia; Tempo para o Tratamento/estatística & dados numéricos; Acessibilidade aos Serviços de Saúde/estatística & dados numéricos; Sistema Único de Saúde; Disparidades em Assistência à Saúde/estatística & dados numéricos.

RESUMEN

Introducción: El cáncer representa una amenaza significativa para la salud humana, siendo considerado la segunda causa principal de mortalidad en el mundo. A pesar de que los pacientes oncológicos en el Brasil tengan, por derecho, acceso a la atención de salud de calidad, diagnóstico precoz y tratamiento dentro del plazo de 60 días, por medio de la Ley Federal n.º 12.732/2012, los datos disponibles en el PAINEL-Oncologia evidencian una disparidad significativa entre esta norma y la realidad enfrentada por la población oncológica. Ante esto, se seleccionó la región Sur para verificar su conformidad con los requisitos de la Ley de los 60 días. **Objetivo:** Identificar el perfil del paciente oncológico y el tiempo desde el diagnóstico hasta el inicio del tratamiento en la región Sur del Brasil, en el período de 2013 a 2023. **Método:** Estudio transversal descriptivo, con datos del PAINEL-Oncologia. Las variables de interés incluidas fueron: a) tiempo de tratamiento o tratamiento oportuno; b) sexo; c) edad; d) diagnóstico detallado; e) estadificación; f) modalidad terapéutica; g) estado de diagnóstico. **Resultados:** Hubo un aumento significativo en la proporción de tratamientos oportunos de 2013 a 2023; sin embargo, la tasa de tratamientos inoportunos sigue siendo alta, especialmente entre hombres, pacientes mayores de 50 años y casos que requieren radioterapia. Santa Catarina fue el estado con la menor tasa de tratamientos dentro del plazo, mientras que Paraná presentó la mayor tasa de tratamiento oportuno. **Conclusión:** Los factores demográficos y relacionados con la enfermedad influyen en el retraso en el inicio del tratamiento, lo que indica la necesidad de políticas públicas enfocadas en mejorar el acceso y la eficiencia de los servicios oncológicos en la región.

Palabras clave: Neoplasias/epidemiología; Tiempo de Tratamiento/estadística & datos numéricos; Accesibilidad a los Servicios de Salud/estadística & datos numéricos; Sistema Único de Salud; Disparidades en Atención de Salud/estadística & datos numéricos.

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INTRODUCTION

Cancer encompasses more than 100 pathologies characterized by uncontrolled cell growth and potential spread to adjacent tissues and organs, resulting in physiologic disorders¹. It is a non-communicable and significant life-threatening disease, the second cause of global mortality, behind only cardiovascular diseases. It is estimated that cancer related deaths will exceed cardiovascular diseases globally in the upcoming decades².

Survival improves when cancer is detected earlier³. According to the World Health Organization (WHO), nearly one in six deaths is caused by cancer. Nearly 50% of the cancers are diagnosed at advanced stages, which is one of the causes of high mortality, making many of them to lose the opportunity of cure^{3,4}. In addition, mortality by cancer is higher in low Human Development Index (HDI) countries, exposing the disparity of access to health as the great challenge for early diagnosis and timely treatment^{5,6}.

The Federal Constitution of 1988⁷ ensured the right to health and the National Health System (SUS)⁸ was structured according to the principles of universal access and integrality. Within this legal frame, the Federal Law 12,732/2012⁹ determined that patients with malignant neoplasms have the right to begin treatment at SUS within 60 days after the diagnostic pathological confirmation and proper treatment – surgery, radiotherapy or chemotherapy. This guideline was strengthened by Directive GM/MS 3,896/2022¹⁰ that regulates the national policy of cancer prevention and control in SUS, defining responsibilities and actions to organize the attention network to the individual with cancer and ensure timely access to treatment.

In October 2019, Federal Law 13,896¹¹ revised Law 12,732, dated November 22, 2012, and determined the maximum time of 30 days to perform the required confirmatory diagnostic tests if the main assumption is malignant neoplasm¹¹. *PAINEL-Oncologia* is a tool developed to monitor the compliance with the law and record the date of the diagnosis and beginning of the treatment based on data consolidated by the computer department of SUS (DATASUS)¹². Although the panel does not reflect the totality of the cases of cancer in the country, this tool helps to manage and reorganize the assistance network by monitoring the time until the first oncologic treatment.

Given that the majority of the population affected by the disease relies on SUS to be diagnosed and treated, it is important to ensure a positive outcome for the patients as fast and effectively as possible to allow timely treatment. In despite of the legal frame, data provided by *PAINEL-Oncologia* exhibits how the reality is far

from the actual access to health. According to a study conducted by “*Universidade Federal de Sergipe (UFS)*”, certain neoplasms, sex, and age range receive treatment after the law-mandated time, affecting the survival of these patients¹³.

The incidence of cancer varies according to genetic, environmental and social factors¹⁴. The most frequent types of cancer in Brazil are non-melanoma skin cancer, breast, prostate, colorectal and lung cancer. According to the National Cancer Institute (INCA), South and Southeast regions concentrate nearly 70% of all the cases in the country, standing out non-melanoma skin cancer, prostate, lung and colorectal cancer that impose a heavy burden to health services at these regions¹⁵. This scenario justifies the regional analysis of complying with the 60-day law, given the volume of cases and complexity of access to treatment.

Further to the high incidence of cancer, the South region faces important challenges related to access to oncologic treatment. Notwithstanding the high health indicators above the national average with the highest primary attention coverage in 2024, the region still lives with significant local inequalities¹⁶. Among the main bottlenecks, are the concentration of high complexity services in urban centers, which contributed to the difficulty of access in rural areas, in addition to logistic hurdles¹⁷. This paradox makes the region a particularly relevant scenario to evaluate the efficacy of the 60-day law.

The objective of the study is to analyze the prevalence of oncologic patients treated out of the 60-day law mandated period – law 12,732/2012⁹ – and identify the demographic, clinical and therapeutic factors associated with delay to begin the treatment in the Southern states between 2013 and 2023.

METHOD

Descriptive, cross-sectional study to identify the variables involved in late beginning of oncologic treatment. Public data of *PAINEL-Oncologia* available through DATASUS of the Ministry of Health which provides online information at TABNET¹⁸ were collected.

The determination of cases through the database met the criteria of *PAINEL-Oncologia* since the integration of the national health ID with chapter II of the corresponding International Statistical Classification of Diseases and Related Health Problems 10th revision (ICD-10)¹⁹. Therefore, the same ID with different ICD codes will be considered as distinct cases²⁰.

The data were fully collected in August 2024. The dependent variable was defined as “Time of Treatment”, which represents the amount of time since diagnosis

up to the beginning of the treatment. This measure was categorized in two different ranges for the analysis of law 12,732/12⁹: timely treatment (0-60 days) and late treatment (more than 60 days). The time to begin the treatment is calculated by *PAINEL-Oncologia* from the dates of diagnostic and treatment registered at the outpatient information system (SIA)²¹ through the record of care provided to the individual (BPA-I) and authorization of high complexity procedure (Apac) of the hospital information system (SIH)²² and cancer information system (Siscan)²³.

The following independent variables have been defined: a) age range – below 19 years, 20-49 years, 50-69 years and 70 years of more; b) sex – male and female; c) detailed diagnosis – group of neoplasm and respective ICD-10; d) staging – 0, I, II, III, IV and “not applicable” (cases treated with surgery); e) therapeutic modality – surgery, chemotherapy, radiotherapy and both (chemotherapy and radiotherapy); f) study period – 2013 to 2023; g) year of diagnosis – 2013-2015, 2016-2018, 2019-2021 and 2022-2023; h) state where the diagnosis was made – Paraná, Santa Catarina and Rio Grande do Sul.

The variable “detailed diagnosis” refers to the neoplasm reported in the anatomopathological exam (ICD-10)¹⁹ which is listed in codes ICD C00 to C97. The data extracted for this variable were categorized in groups according to the topography and function of the organ affected.

The exclusion criteria utilized were: non-melanoma skin neoplasms (C44); “*in situ*” neoplasms (D00-D09); “neoplasms of uncertain or unknown behavior” (D37-D48). Empty ICD codes have been excluded: C27, C28, C29, C35, C36, C42, C59, C86 and C87. In addition, C97 (malignant neoplasms of independent multiple sites) was excluded due to lack of cases at the database analyzed.

Cases classified as “unknown” and “not informed” were not utilized in the calculation of the prevalence of timely and late treatments nor included in the total population analyzed because they hindered the measurement of the main outcome. However, the absolute values were collected to evaluate the incompleteness of the data. According to the technical note of *PAINEL-Oncologia*, “unknown” refers to records without any information about the date of the beginning of the treatment, while “not reported” corresponds to blank fields in the origin system²³.

A descriptive analysis of the variables was performed, presenting absolute and relative frequency distributions (%) to characterize the population investigated. For comparisons among categorical groups, Pearson chi-square

test was utilized²⁴. Given the cross-sectional design of the study and high prevalence of the outcome (late treatment >10%), it was chosen the prevalence ratio (PR)²⁴ instead of odds ratio (OR), because the latter overestimates the magnitude of the association with frequent outcomes. Poisson regression²⁴ with robust variance was utilized to estimate PR, considering its fit in cross-sectional studies²⁴. This method is widely utilized due to its accuracy in the analysis of subgroups and common outcomes. The measures of association were reported with confidence intervals of 95% (CI95%), and statistical significance was evaluated by Wald test, adopting $p < 0.05$ as threshold. The software SPSS²⁵ (IBM Corp., version 20.0) was utilized for all the analyzes according to the guidelines for health-related secondary data.

For the categorical variables, it was necessary to define reference categories for groups comparison. In case of the variable “year of diagnosis”, it was decided to use 2013 as reference because it is the first year of the time series analyzed allowing to evaluate the evolution of the prevalence of timely treatment along the period. The mandatory record of the individual health ID and ICD on the anatomopathological exams implemented in May 2018 has significantly improved the quality of the data from 2019 on, but the decision of maintaining the initial year favors the longitudinal and comparative analysis.

The review by the ethics committee was waived because only secondary, public, deidentified data were utilized in compliance with Directive 510/2016²⁶ of the National Health Council (CNS).

RESULTS

PAINEL-Oncologia reached a total of 1,003,318 cases of cancer diagnosis notified. 288,260 cases of non-melanoma skin cancer (C44), neoplasms *in situ* (D00-D09) and neoplasms of uncertain or unknown behavior (D37-D48) have been excluded. In addition, 182,351 cases classified as “unknown” or “ignored” for failing to present data to calculate the time until the beginning of the treatment have also been excluded. Therefore, the final sample consisted in 532,707 cases (53.09%) that met the criteria of Law 12,732/12⁹.

The proportional distribution of cases treated timely (until 60 days) remained practically stable and higher than those treated later than 60 days until 2017. Since then, this favorable relation of timely treatment was 2.12-fold higher (timely/late) in 2023 (Graph 1).

The analysis of Table 1 revealed that male patients had high prevalence of timely treatment than female patients. Patients aged 50 years or older presented higher late treatments rates, especially when compared to younger



than 49 years, standing out patients below 19 years of age who had lower proportion of late beginning of treatment.

Higher prevalence of beginning of first timely treatment for patients submitted to surgery was observed, of which only 8.47% were treated late. In contrast, the therapeutic modality with low proportion of timely treatment was single radiotherapy with 64.4%% of late treatments, followed by a combination of chemotherapy and radiotherapy. Stages I and II exhibited the higher rates of timely treatment with 54.03% and 60.0%, respectively. Staging IV, on the other hand, presented the highest rate of treatment within 60 days.

Of the most frequent diagnoses at the South region, neoplasms of digestive organs (C15-C26), breast (C50), female genital organs (C51-C58), male genital organs (C60-C63) and malignant neoplasms of ill-defined, other secondary and unspecified sites (C76-C80) stand out. Of these, malignant neoplasms of female genital organs (C51-C58) presented the best rate between timely and late treatment, with performance significantly better than others (Graph 2). In counterpart, malignant neoplasms of male genital organs (C60-C63) registered the higher proportion of treatments initiated after the law-mandated time as shown in Table 1.

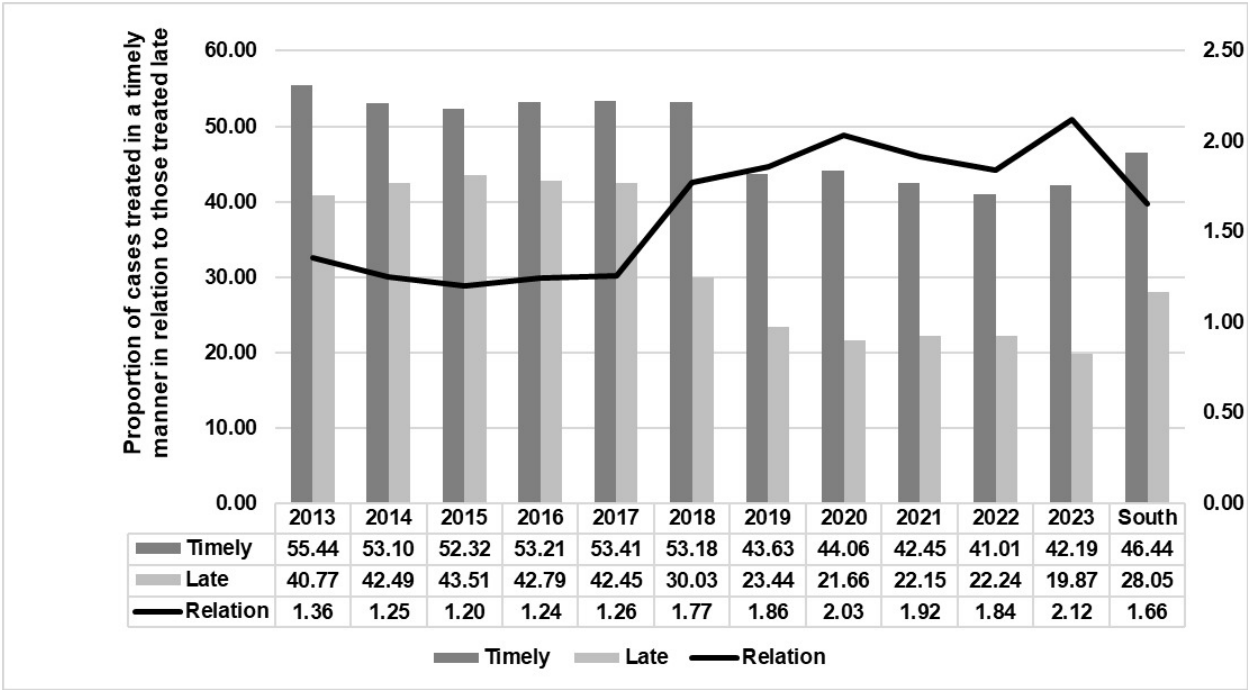
Paraná stood out among the Southern states with the best performance, presenting the highest proportion of timely treatments (up to 60 days), a rate of 2.26 of timely and late cases. On the other hand, Santa Catarina exhibited the lowest adhesion to the 60-day law as shown in Graph 3. Rio Grande do Sul presented intermediate performance between the two states at a reason of 1.50.

DISCUSSION

The analysis of the data from 2013 to 2023 revealed that 62.34% of oncologic patients of the South regions initiated treatment within 60 days as determined by Law 12,732/12⁸. The prevalence of timely treatments was relatively stable until 2017 and increased progressively from 2018 on, which can be associated with the implementation of Directive 643/2018²⁷ that determined the mandatory report of ICD-10 and individual health ID and improvements of the information and monitoring systems as *PAINEL-Oncologia*.

The highest percent of adherence was observed in 2023 where 67.99% of the patients were treated timely at a ratio of 2.12 for timely and late cases (Graph 1). This finding can be partially attributed to the efforts to readjust health services post COVID-19 pandemic because of a relevant decline of diagnostic and therapeutic procedures for neoplasms, overload of the health systems and reassignment of resources to fight the coronavirus²⁸. However, even at the peak of the pandemic, 2020 registered the second best rate of timely treatment, possibly due to the reduction of seeking for health services and decline of cancer diagnoses, which may have overestimated the proportion of timely treatments in that year^{29,30}.

Despite the implementation of Directive 643/2018²⁷ that determined the mandatory report of ICD-10 and individual health ID, *PAINEL-Oncologia* still presents more than 180 thousand cases without sufficient data to measure the time until the beginning of the treatment.



Graph 1. Proportional distribution of cases of malignant neoplasms treated timely (until 60 days) and late (beyond 60 days) in the South region registered in *PAINEL-Oncologia*, 2013 to 2023, Brazil



Table 1. Variables related to the treatment of patients with malignant neoplasms. *PAINEL-Oncologia*, 2013 to 2023, Brazil

Variable	n	Prevalence of late treatments	PR (CI 95%)	Value of p
Year of the diagnosis (n=532,707)				< 0.001
2013-2015	106,823	44.08%	1	
2016-2018	128,483	41.06%	1.05 [1.046 - 1.061]	
2019-2021	173,639	34.09%	1.18 [1.171 - 1.186]	
2022-2023	123,762	33.58%	1.19 [1.180 - 1.196]	
State of the Diagnosis (n=532,707)				< 0.001
Paraná	201,010	30.72%	1	
Santa Catarina	118,746	45.26%	0.79 [0.785 - 0.795]	
Rio Grande do Sul	212,951	39.96%	0.87 [0.863 - 0.871]	
Sex (n=532,707)				< 0.001
Female	276,170	36.84%	1	
Male	256,537	38.54%	0.97 [0.969 - 0.977]	
Age range Females (n=276,170)				< 0.001
< 19	5,443	13.52%	1	
20-49	78,361	35.05%	0.75 [0.742 - 0.760]	
50-69	136,568	38.57%	0.71 [0.702 - 0.718]	
> 70	55,795	37.37%	0.72 [0.715 - 0.733]	
Age range Males (n=256,537)				< 0.001
< 19	6,820	14.25%	1	
20-49	37,070	29.48%	0.82 [0.813 - 0.832]	
50-69	136,828	40.03%	0.70 [0.692 - 0.707]	
> 70	75,817	42.46%	0.67 [0.663 - 0.679]	
First therapeutic modality (n=532,707)				< 0.001
Surgery	149,392	8.47%	1	
Chemotherapy	281,337	43.13%	0.62 [0.619 - 0.624]	
Radiotherapy	97,559	64.44%	0.39 [0.385 - 0.392]	
Chemotherapy + radiotherapy	4,419	62.66%	0.41 [0.393 - 0.424]	
Staging (n=532,707)				< 0.05
0	18,482	47.66%	1	
I	44,696	54.03%	0.88 [0.864 - 0.893]	
II	60,559	60%	0.76 [0.752 - 0.777]	
III	92,79	46.69%	1.02 [1.003 - 1.034]	
IV	107,592	44.3%	1.06 [1.049 - 1.080]	
Not applicable	149,392	8.47%	2.08 [2.055 - 2.111]	

To be continued



Table 1. Continuation

Variable		n	Prevalence of late treatments	PR (CI 95%)	Value of p
Specific diagnosis (n=532,707)	ICD-10				< 0.001
Total	C00-C97	532,707	37.66%	1	
Male genital organs	C60-C63	60,846	57.38%	0.68 [0.677 - 0.690]	
Breast	C50	91,346	48.36%	0.83 [0.823 - 0.834]	
Lip, oral cavity and pharynx	C00-C14	33,770	45.62%	0.87 [0.864 - 0.881]	
Malignant neoplasm of other and ill-defined sites	C76-C80	48,809	40.5%	0.95 [0.947 - 0.962]	
Malignant neoplasms of eye, brain and other parts of central nervous system	C69-C72	9,889	35.09%	1.04 [1.026 - 1.057]	
Female genital organs	C51-C58	47,911	33.9%	1.06 [1.053 - 1.067]	
Malignant neoplasms of digestive organs	C15-C26	106,038	33.3%	1.07 [1.065 - 1.075]	
Melanoma	C43	9,749	31.1%	1.11 [1.090 - 1.120]	
Malignant neoplasms of respiratory and intrathoracic organs	C30-C39	41,905	27.68%	1.16 [1.153 - 1.167]	
Malignant neoplasms of bone and articular cartilage	C40-C41	4,439	23.61%	1.23 [1.205 - 1.246]	
Malignant neoplasms of lymphoid, hematopoietic and related tissue	C81-C96	39,076	23.3%	1.23 [1.223 - 1.238]	
Malignant neoplasms of mesothelial and soft tissue	C45-C49	12,689	22.16%	1.25 [1.237 - 1.261]	
Malignant neoplasms of urinary tract	C64-C68	19,919	16.5%	1.34 [1.331 - 1.348]	
Malignant neoplasms of thyroid and other endocrine glands	C73-C75	6,321	6.88%	1.49 [1.483 - 1.504]	

Captions: PR = prevalence ratio; CI95% = confidence interval 95%; ICD-10 = International Statistical Classification of Diseases and Related Health Problems, 10th revision.

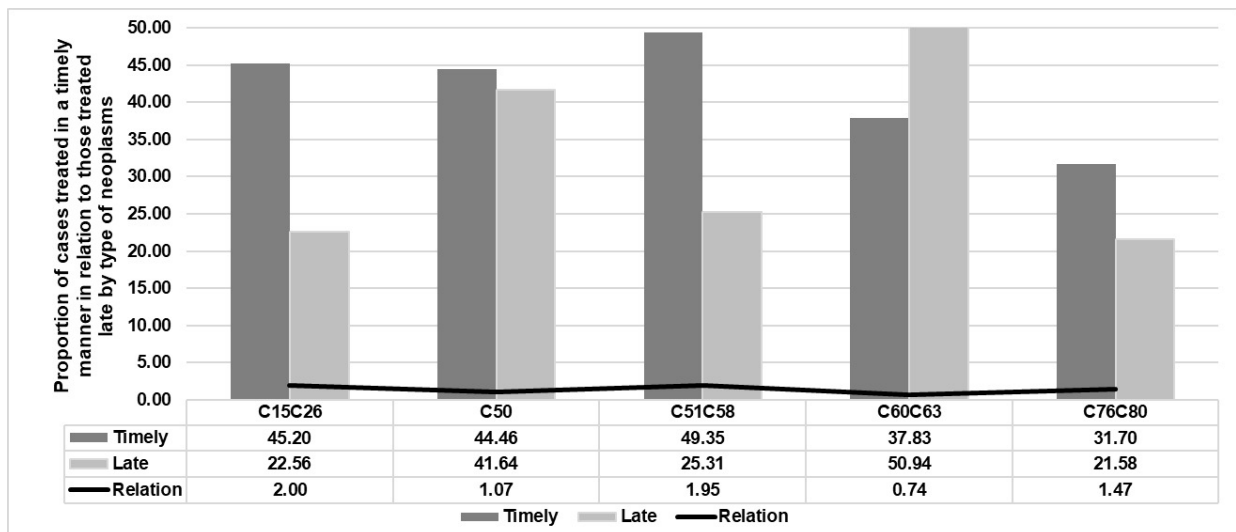
The elevated incompleteness compromises the appraisal of the efficacy of the law and reduces the monitoring of health services. Reporting gaps hinder the accurate measurement of the adherence to the legal frame, damage the improvement of oncologic care and prompt the necessity of identifying urgently why these information are not reported in the official systems³¹.

While comparing the Southern states, Paraná stood out with the best adherence rate of timely treatment, while Santa Catarina presented the worst results. This disparity can be explained by the differences of health infrastructure, investments in oncology and regional public policies. Paraná, for instance, has adopted decentralization strategies and intermunicipal cooperation that expanded the access to high complexity services^{32,33}. Therefore, the regional attention network facilitates the referral and treatment of oncologic patients, especially in high demand areas³⁴. In contrast, Santa Catarina faces logistic and structural challenges as concentration of services in great urban centers and poor offer of specialized services in rural and remote areas, which negatively impacts the possibility of beginning treatment within the law-mandated 60-day window^{35,36}. Rio Grande do Sul, with

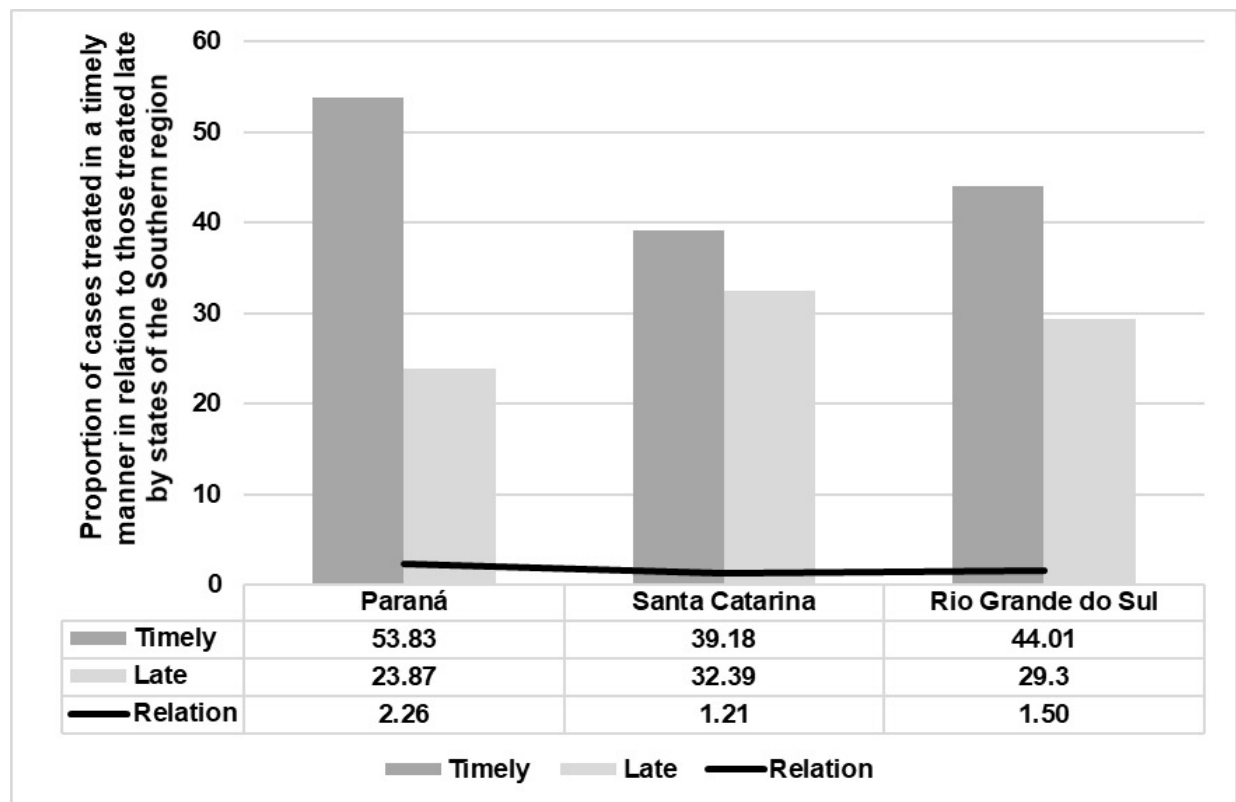
satisfactory results, exhibits significant variations within the state. The literature indicates that the regionalization in the state is affected by decentralized governance where regional differences and interaction among the different government layers directly impact the access to health services³⁷.

There was prevalence of late treatment in patients older than 50 years of age. Although populational ageing is associated with increased incidence of oncologic diseases^{38,39}, many health professionals may underestimate the urgency to treat older patients, reflecting an undesired bias that prioritizes younger patients^{40,41}. The patients, because of multiple comorbidities, have a reduced perception of the severity of their clinical condition and fear of what lies ahead, a potential cancer diagnosis^{42,43}.

Male patients present higher rates of late treatment, 38.54% (Table 1). This pattern is aligned with studies that indicate that men tend to postpone seeking for medical care, usually influenced by sociocultural aspects that associate masculinity with resistance and denial of vulnerability, which is corroborated by evidences that show how seeking care is seen as a weakness⁴⁴. This attitude is evident for neoplasms with initial modest symptoms



Graph 2. Proportional distribution of cases treated timely (until 60 days) and late (beyond 60 days) according to most prevalent groups of neoplasms registered at *PAINEL-Oncologia*, 2013 to 2023, Brazil



Graph 3. Proportional distribution of cases treated timely (until 60 days) and late (beyond 60 days) according to the Southern states registered at *PAINEL-Oncologia*, 2013 to 2023, Brazil

as prostate cancer, with strategies of ‘active surveillance’ usually adopted. Although active surveillance is a safe approach for low risk cancers, lack of strict follow-up and cultural barriers can lead to postponement of the treatment when necessary.

Male genital organs were more prevalent for late treatment among specific diagnoses. A study conducted in Australia⁴⁵ analyzed the preparedness of medical students

on male health, most of them reported minimum or poor preparation in their curricula during their graduation, suggesting a learning gap that can negatively impact the early recognition and proper management of these neoplasms.

However, a slight difference of the prevalence of timely treatment for breast cancer (ICD C50) in the present study has been observed, approximately 3% between timely and

late treatment. This can occur because of the detailed and multidisciplinary pre-operative evaluation of breast cancer, being necessary to define the best therapeutic modality and, in some cases, genetic tests to guide the therapeutic plan. Therefore, the global time from diagnosis to the beginning of the treatment is affected^{46,47}.

Neoplasms of the digestive organs presented one of the highest prevalence of timely treatment with 66.70% of the cases beginning treatment within the law-mandated time (Table 1). As these neoplasms usually exhibit important symptoms, it reflects on fastest seek for medical care⁴⁸. In addition, patients who have gastrointestinal problems are usually followed up by their doctors with frequent diagnostic exams, and prompting the early identification of malignant neoplasms⁴⁹.

Surgery is the most prevalent among the modalities of first timely treatment with 91.53% (Table 1), possibly because of easy access to this therapeutic and preparedness of some general hospitals to perform oncologic surgery⁵⁰. Some diagnoses are determined after the histopathological analysis post-surgery excision⁵¹⁻⁵³. In counterpart, timely radiotherapy alone is less prevalent, followed by radiotherapy associated with chemotherapy because of poor infrastructure and lack of skilled professionals which compromises the assistance causing delays to begin and continue the treatment^{54,55}.

These factors can help the patients to be followed-up at more advanced stages of the disease. According to Table 1, staging IV presented high prevalence of timely treatment than staging II and I, respectively. Due to the overload of SUS and the impossibility of accepting all the cases, there is a regulation system which prioritizes neoplasms at more advanced stages and clear symptomatology⁵⁶. This condition is associated with worst prognosis, high morbimortality rates and more aggressive treatments^{3,4}.

The overload is caused by several factors, among them, poor access to health basic units that usually close at 6PM at the most; it is a challenging situation for workers who have to complete their work shifts and the entrance door to SUS is not available^{57,58}. In addition, there are administrative and logistic barriers as long waiting lines due to lack of skilled professionals and excessive bureaucracy that delay the processes of authorization of essential exams⁵⁹, similarly to communication gaps among the levels of attention that hamper the patient understanding, contributing to the postponement of or missed visits^{59,60}.

Patients who live in rural areas or small cities need to travel long distances to reach the reference centers, especially in cases of irregular or absence of shuttle services⁶¹. Other factors potentially influence the delay of timely treatment as race, ethnicity, socioeconomic status, private health insurance and living in rural areas³¹. Nevertheless, these information are unavailable

in *PAINEL-Oncologia*, hindering the evaluation of these factors in the present study and a more comprehensive and thorough analysis of the disparities of access and quality of the oncologic treatment. These aspects expose structural and planning flaws of the oncologic attention network that compromise the access and equity of the offer of treatment.

To reverse this scenario, law 14,758/2023 created the National Policy of Cancer Prevention and Control (PNPCC) that defines principles of full and timely access to reduce the mortality and impairment caused by cancer⁶². In complementation, Directives GM/MS 6,590¹⁰, 6,591⁶³ and 6,592/2025⁶⁴ came into force comprehending strategic actions to organize SUS oncologic attention network as: the strengthening of primary attention as gateway and coordination of the care⁶³, the implementation of Cancer Prevention and Control Network (RPCC) with standardized regulatory flows, the program of navigation of the patient aimed to reduce barriers of access and to ensure continuous follow-up of oncologic patients and regulation of access based on staging and clinical severity.

The emphasis on health primary attention is critical for early screening, identification of suspicious signs and agile referral to reduce the time from diagnosis to beginning of the treatment. In addition, the Directives encouraged the regionalization of the offer of specialized services, qualification of professionals of the network and integration with information systems for effective monitoring. These structuring measures guide how the access to cancer treatment at SUS should be, contributing to reduce delays and improve the clinical outcomes of oncologic patients.

However, regardless of recent normative advances, the practical implementation is still challenging which impacts the effective access to treatment. Therefore, the real-time analysis from diagnosis to treatment, as the present study did, is pivotal to understand the gaps and support public policies that improve oncologic care in SUS.

CONCLUSION

While analyzing the time from diagnosis to first treatment in Brazil Southern states, an expressive increase of timely treatment between 2013 and 2023 has been observed. Oncologic patients with low prevalence of timely treatment include males, older than 50 years, specific diagnosis of neoplasms of male genital organs and single radiotherapy as the treatment modality of choice. Santa Catarina, one of the three states of that region, presented the lowest rate of timely treatment. The present study exposed the disparities of timely beginning of oncologic treatment

according to age-range, type of neoplasm, staging and geographic location, being possible to identify structural gaps of SUS oncologic attention network.

Based on these results, it is recommended the strengthening of the intermunicipal regulation, prioritizing the screening and early referral of patients with low rates of timely treatment, especially in critical performance regions. In addition, it seems to be essential to invest in professional training to screen neoplasms, identification of early signs and implementation of Directive GM/MS 6,592/2025⁶⁴ that determined the beginning of the navigation program since the diagnostic suspicion with integrated action of the management nuclei, regulation teams and governance committees. Given the variations among the three states, it is important that the strategies to face this scenario are adjusted to local realities with critical analysis of public policies and organization of oncologic services.

The limitations of the present study are the incompleteness and inconsistencies of the data available, further to lack of important variables to determine the time until the beginning of the treatment in *PAINEL-Oncologia*. Therefore, it is suggested to prioritize strategies to improve the quality and completeness of the registers, strengthening monitoring and management of oncologic treatments in Brazil. These initiatives will not only contribute for more robust future studies but also guide more effective and timely interventions, ensuring the achievement of the main principles of SUS: universality of access and integrality of healthcare.

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CONTRIBUTIONS

All the authors contributed substantially to the conception and design of the study, collection, analysis and interpretation of the data, writing and critical review. They approved the final version for publication.

DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interests to declare.

DATA AVAILABILITY STATEMENT

All content underlying the text is contained in the manuscript.

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