# Adjuvant Treatment of Gastrointestinal Stromal Tumor with Imatinib Mesylate in the Brazilian National Health System: Descriptive Ecological Study of Ten Years of Incorporation

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*Tratamento Adjuvante do Tumor do Estroma Gastrointestinal com Mesilato de Imatinibe no Sistema Único de Saúde: Estudo Ecológico Descritivo de Dez Anos de Incorporação*

Tratamiento Adyuvante del Tumor del Estroma Gastrointestinal con Mesilato de Imatinib en el Sistema Único de Salud del Brasil: Estudio Ecológico Descriptivo de Diez Años de Incorporación

**Felipe Mendes Delpino[1]; Laura Augusta Barufaldi[2]; Natália Dias Brandão[3]; Mirian Carvalho de Souza[4]**

ABSTRACT

**Introduction:** Gastrointestinal stromal tumor is a mesenchymal neoplasm of the digestive tract with a risk of postoperative recurrence, for which adjuvant imatinib has demonstrated clinical benefit. In the Brazilian National Health System, this medication was incorporated in 2014. **Objective:** To describe a decade of adjuvant imatinib use for gastrointestinal stromal tumor in the Brazilian National Health System, characterizing patient profile, geographic distribution, and utilization patterns. **Method:** Descriptive ecological study using secondary data from High-Complexity Outpatient Procedure Authorizations, from January 2014 to December 2024, linked to digestive system diagnosis codes and treatment regimens compatible with adjuvant imatinib. **Results:** A total of 1,602 initial treatments were identified, with progressive annual growth. There was a slight female predominance (52.9%) and concentration in patients aged 50 to 69 years (56.2%). Treatments were concentrated in the Southeast (42.6%) and South (23.8%) regions; among the population aged 50 years or older, the highest densities were observed in the North and Central-West. The stomach was the most frequent primary site (50.9%), and most treatments were elective (99.1%). The mean time between request and authorization for incident cases decreased from 17.5 days in 2014 to 7.8 days in 2024. Findings should be interpreted in light of the inherent limitations of administrative data, which do not allow individual confirmation of adjuvant indication, surgical resection, or clinical outcomes. **Conclusion:** The use of adjuvant imatinib in the Brazilian National Health System expanded steadily, with shorter authorization times and persistent regional heterogeneity.

**Key words:** Gastrointestinal Stromal Tumors/therapy; Imatinib Mesylate; Chemotherapy, Adjuvant/methods; Unified Health System.

RESUMO

**Introdução:** O tumor estromal gastrointestinal é uma neoplasia mesenquimal do trato digestivo com risco de recorrência pós-operatória, para a qual o imatinibe adjuvante demonstrou benefício clínico. No SUS, esse medicamento foi incorporado em 2014. **Objetivo:** Descrever uma década de uso de imatinibe adjuvante para tumor estromal gastrointestinal no SUS, caracterizando o perfil dos usuários, a distribuição geográfica e os padrões de utilização. **Método:** Estudo ecológico descritivo com dados secundários de autorizações de procedimentos ambulatoriais de alta complexidade, de janeiro de 2014 a dezembro de 2024, vinculados a códigos diagnósticos do sistema digestivo e a esquemas terapêuticos compatíveis com imatinibe adjuvante. **Resultados:** Foram identificados 1.602 tratamentos iniciais, com aumento anual progressivo. Houve leve predomínio do sexo feminino (52,9%) e concentração entre 50 e 69 anos (56,2%). Os tratamentos se concentraram nas Regiões Sudeste (42,6%) e Sul (23,8%); entre a população com 50 anos ou mais, as densidades de usuários mais altas foram observadas no Norte e Centro-Oeste. O estômago foi o sítio primário mais frequente (50,9%) e a maioria dos tratamentos foi eletiva (99,1%). O tempo médio entre solicitação e autorização para casos incidentes diminuiu de 17,5 dias em 2014 para 7,8 dias em 2024. Os achados devem ser interpretados considerando as limitações inerentes aos dados administrativos, que não permitem confirmação individual da indicação adjuvante, da ressecção cirúrgica ou de desfechos clínicos. **Conclusão:** O uso de imatinibe adjuvante no SUS aumentou de forma constante, com tempos de autorização mais curtos e heterogeneidade territorial.

**Palavras-chave:** Tumores do Estroma Gastrointestinal/terapia; Mesilato de Imatinib; Quimioterapia Adjuvante/métodos; Sistema Único de Saúde.

RESUMEN

**Introducción:** El tumor del estroma gastrointestinal es una neoplasia mesenquimal del tracto digestivo con riesgo de recurrencia posoperatoria, para la cual el imatinib adyuvante ha demostrado beneficio clínico. En el Sistema Único de Salud (SUS) del Brasil se incorporó este medicamento en 2014. **Objetivo:** Describir una década de uso de imatinib adyuvante para tumor del estroma gastrointestinal en el SUS, caracterizando el perfil de los usuarios, la distribución geográfica y los patrones de uso. **Método:** Estudio ecológico descriptivo con datos secundarios de autorizaciones de procedimientos ambulatorios de alta complejidad, desde enero de 2014 hasta diciembre de 2024, vinculados a códigos diagnósticos del aparato digestivo y a esquemas terapéuticos compatibles con imatinib adyuvante. **Resultados:** Se identificaron 1602 tratamientos iniciales, con crecimiento anual progresivo. Se observó leve predominio femenino (52,9%) y mayor frecuencia entre 50 y 69 años (56,2%). Los tratamientos se concentraron en las regiones Sudeste (42,6%) y Sur (23,8%); entre la población de 50 años o más, las mayores densidades se observaron en las regiones Norte y Centro-Oeste. El estómago fue el sitio primario más frecuente (50,9%) y la mayoría de los tratamientos fue electivo (99,1%). El tiempo medio entre solicitud y autorización para casos incidentes disminuyó de 17,5 días en 2014 a 7,8 días en 2024. Los hallazgos deben interpretarse considerando las limitaciones inherentes a los datos administrativos, que no permiten confirmar individualmente la indicación adyuvante, la resección quirúrgica ni los desenlaces clínicos. **Conclusión:** El uso de imatinib adyuvante en el SUS se expandió de manera sostenida, con tiempos de autorización más cortos y heterogeneidad territorial.

**Palabras clave:** Tumores del Estroma Gastrointestinal/terapia; Mesilato de Imatinib; Quimioterapia Adyuvante/métodos; Sistema Único de Salud.

[1-4]Instituto Nacional de Câncer (INCA), Coordenação de Prevenção e Vigilância (Conprev), Divisão de Avaliação de Tecnologias em Saúde. Rio de Janeiro (RJ), Brasil.
[1]E-mail: felipe.delpino@inca.gov.br. Orcid iD: https://orcid.org/0000-0002-3562-3246
[2]E-mail: laura.barufaldi@inca.gov.br. Orcid iD: https://orcid.org/0000-0001-9040-4399
[3]E-mail: natalia.brandao@inca.gov.br. Orcid iD: https://orcid.org/0000-0003-2023-7032
[4]E-mail: miriancs@inca.gov.br. Orcid iD: https://orcid.org/0000-0001-7516-1974
**Corresponding author:** Felipe Mendes Delpino. Praça Cruz Vermelha, 23 – Centro. Rio de Janeiro (RJ) Brasil. CEP 20230-130. E-mail: fmdsocial@outlook.com

## INTRODUCTION

Among the digestive tract mesenchymal neoplasms, the gastrointestinal stromal tumor (GIST) is the most frequent diagnosis, with population studies estimating an incidence of 10 to 15 cases per million individuals[1]. This clinical-pathological entity is characterized by KIT-gene activating mutations, identified in 80% of cases, or PDGFRA mutations, which appear in 5 to 10% of cases, which encode tyrosine-kinase receptors[2]. The total resection surgical procedure is the conventional treatment for the disease in a localized stage. However, there is a considerable risk of recurrence in individuals classified as high risk, like those with tumors larger than 10 cm, high mitotic indices, or that had tumoral rupture[3].

Imatinib mesylate, classified as a selective tyrosine-kinase inhibitor, improved the GIST therapeutic approach by demonstrating its efficacy in adjuvant and palliative contexts[4]. Randomized clinical trials demonstrated that three-year imatinib therapy at a 400 mg/day dose in high-risk individuals significantly decreases the probability of recurrence and offers an additional benefit in terms of overall survival, when compared to the one-year treatment[5,6]. In 2014, based on these results, Brazil incorporated imatinib mesylate into its National Health System (SUS), in accordance with the recommendation by the National Commission for the Incorporation of Technologies into SUS (Conitec)[7].

In the Brazilian context, information coming from actual data administrative bases enables the exploration of utilization patterns, epidemiological profiles of users that receive treatment, and geographic distribution of access to the incorporated technologies[8]. Diseases such as GIST justify this analysis, especially due to the scarcity of specialists concentrated in reference centers and persistent regional inequalities in access to oncological treatment in the country[9].

The assessment of information from SUS has the potential to investigate the implementation of this technology in a universal healthcare system, which cares for over 200 million individuals, presenting regional and socioeconomic inequalities[10]. Despite this, national studies that assess the utilization of adjuvant imatinib after its incorporation, using actual SUS data, are still scarce, which constitutes a relevant gap for monitoring the management and access to this technology. The objective of this study is to describe the utilization of imatinib mesylate as adjuvant treatment for GIST within SUS across a decade since its incorporation, assessing the epidemiological profile of users who received the medication, geographic distribution of access, and modifications in usage frequency across time.

## METHOD

Descriptive ecological study that analyzed the utilization of imatinib mesylate as adjuvant treatment for GIST in SUS, assessing trends across time and geographic distribution. Secondary data from High-Complexity Authorization for Outpatient Procedures (APAC) of the SUS Ambulatory Information System (SIA-SUS) were used. The APAC is an administrative system used to record, supervise, and pay APACs in SUS, encompassing both elective and urgent procedures, including those related to oncological treatment[11]. Data analysis occurred on July 1st, 2025, encompassing the period from January 2014 (date of imatinib implementation within SUS) to December 2024.

APAC records related to the procedure codes 03.04.05.033-4 (chemotherapy for GIST), established by Ordinance SAS N. 743[12], of August 21, 2014, were selected. To ensure the cases treated with imatinib mesylate were identified precisely, additional eligibility criteria were defined: (1) The neoplasm persistent to the procedure should be classified by codes from the 10th review of the International Classification of Diseases and Related Health Problems[13] (ICD-10): C15 (esophagus), C16 (stomach), C17 (small intestine), C18 (colon), C19 (rectosigmoid junction), C26.8 (overlapping lesion of digestive system), or C48.1 (specified parts of peritoneum); and (2) the field designated to the therapeutic scheme should have the following terms: "105", "GLIVEC", "IMATI", "GIST", "MEZI", "MELIZ", "MEZIL", "NIBE", "GLIVE", "MESIL", "NIB", "IMAT", "GLIV" or its variants related to imatinib mesylate. The identification of cases as adjuvant treatment adopted an operational definition based on the combination of the specific APAC procedure (03.04.05.033-4), gastrointestinal tract ICD-10 codes, and therapeutic scheme terms compatible with imatinib, given that administrative bases do not allow to individually confirm surgical resection, tumoral risk stratification, or therapeutic intention registered by the prescriber.

Variable processing was done as follows: age at the time of diagnosis was categorized in age groups (18-29, 30-39, 40-49, 50-59, 60-69, 70-79, and 80 years and older); race/skin color was classified in white, brown, black, yellow, indigenous, according to the categorization of the Brazilian Institute of Geography and Statistics (IBGE); Federation Units and Regions were identified from the code of municipality of residence or location of the establishment; the time interval between request and APAC authorization was determined; and, finally, duration of treatment was recorded.

The blank fields of the therapeutic schemes (AQ_ESQU_P1 and AQ_ESQU_P2) were standardized

(capital letters and space removal) and submitted to textual search for terms and orthographic variants relative to imatinib mesylate; eligibility required correspondence in at least one of the fields. APACs with a missing National Health ID (CNS) or missing information were excluded. For the initial treatments, records were ordered by CNS and date, retaining the first occurrence per individual; for continuity analysis, all eligible APACs (types 1 and 2) were maintained. Absent data were presented in their own category, with effective denominators when pertinent. Negative differences between the request and authorization were treated as absent.

Two assessment types of APAC data were applied, one to identify initial procedures and another to characterize treatment continuity and total volume of procedures per individual. The first consisted of the analysis of initial treatments, based exclusively on type 1 APAC records (first competency). Each CNS was associated with the first consultation registered within the analyzed period, characterizing the demographic, epidemiological, and clinical profile of individuals, examining the trends across time and geographic distribution by State and Region of residence. The second approach encompassed all the eligible procedures registered (APAC type 1 and type 2), enabling the description of the total volume of performed procedures, the utilization patterns of the service and records associated with treatment continuity, as well as the frequency of these procedures per CNS, the characteristics of provider institutions, and temporal analysis of the demand for treatment.

IBGE data referring to the 50-year-and-older population in the 2015-2024 period were used for the population density assessments, considering that GIST presents a higher incidence among individuals in that age group[1]. The rates were calculated for each 100 thousand inhabitants and presented in continuous scale maps, with square root transformation, to improve visualization of the geographic distribution. Such uniformization allows comparison between the Federation Units with different population dimensions.

The analyses were done using the free R software (version 4.3.1)[14], incorporating the *tidyverse* packages for data manipulation and analysis, *geobr* for obtaining geographic data on Brazil, *sf* for spatial analyses, *viridis* to elaborate the color palettes in maps, *scales* for data formatting, *openxlsx* for table export, *microdatasus* for downloading the microdata bases from the Department of Informatics of the National Health System (DATASUS)[15]. Absolute and relative frequencies were calculated for categorical variables, while measures of central tendency and dispersion were used for continuous variables in the descriptive statistics. The variations observed across the years were described as trends in the descriptive sense, without the application of formal temporal regression models or statistical inference tests for trends.

Additionally, maps were elaborated per Federation Units to represent the distribution of initial GIST treatments with imatinib mesylate in SUS, considering the relationship with the 50-year-and-older population. The maps were presented for the full period (2014-2024) and for comparison between 2015 and 2024.

This study dismisses approval by the Research Ethics Committee, since it used exclusively secondary data from public sources, with no patient identification of sensitive data, according to Resolution N. 510/2016[16] of the National Health Council. All data were examined in conformity with privacy and confidentiality principles.

## RESULTS

In total, between 2014 and 2024, 1,602 initial treatments for GIST with imatinib mesylate were registered in SUS, identified by CNS. The temporal analysis across the period revealed continuous growth, going from 11 patients with initial treatment registered in 2014 to 229 in 2024 (Figure 1).

The sociodemographic profile of patients is detailed in Table 1. There was a slight predominance of the female sex, an age concentration in the 50 to 69 years age group, and a higher frequency of self-reported white individuals, followed by brown individuals.

The distribution of initial treatment records was concentrated in the Southeast and South Regions, which, together, accounted for approximately two-thirds of cases, with lower proportions in the other Regions (Table 1). In terms of absolute numbers, the State of São Paulo ranked first, with 375 cases, followed by Minas Gerais with 220 and by Paraná with 161 (Figure 2).

Using the population aged 50 years or older as the denominator, geographic heterogeneity was observed in the density of initial treatments for GIST with imatinib mesylate recorded in SUS, expressed per 100 thousand inhabitants in this age group (Figure 3). This density was calculated by the ratio between the number of initial treatments in each Federation Unit or Region and the respective resident population aged 50 years or older, multiplied by 100 thousand. The figure scale ranges from 0 to 5 records per 100 thousand inhabitants, indicating a higher relative concentration of treatments recorded in the territories with higher values. In relative terms, some Federation Units in the North and Central-West Regions presented higher densities, although the highest absolute number of records remained concentrated in the Southeast and South Regions.

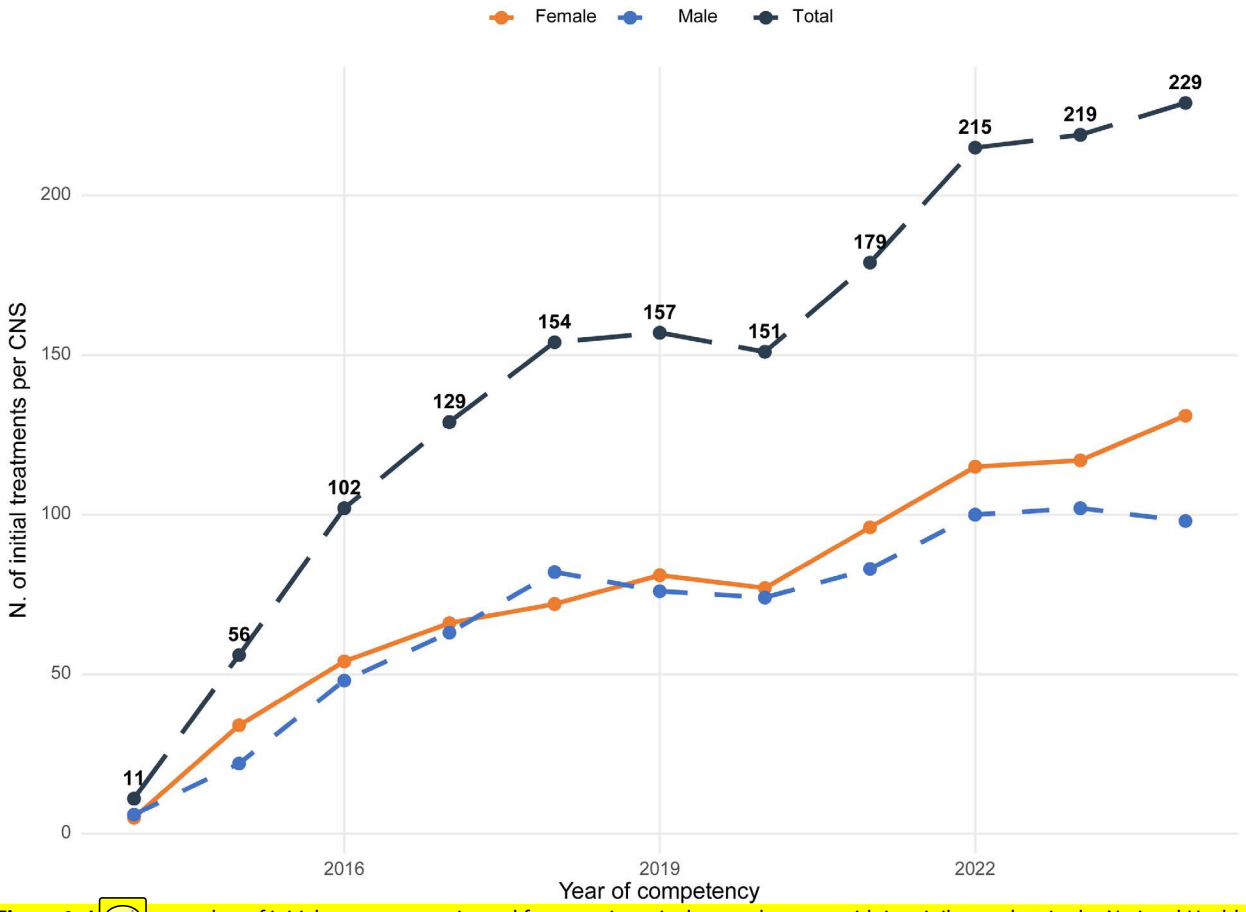


**Figure 1.** Absolute number of initial treatments registered for gastrointestinal stromal tumors with imatinib mesylate in the National Health System, per year of treatment start, Brazil, 2014-2024
**Source:** SIA/SUS[11].
**Captions:** CNS = National Health ID; APAC = High-Complexity Authorization for Outpatient Procedures.
**Note:** Each bar represents the annual total of initial treatments identified by the first type 1 APAC per CNS.

**Table 1.** Sociodemographic characteristics of users with gastrointestinal stromal tumor treated with imatinib mesylate in the National Health System, Brazil, 2014-2024

| Studied characteristics | n (%) |
|---|---|
| **Sex** | |
| Male | 754 (47.1) |
| Female | 848 (52.9) |
| **Age group (Years)** | |
| 18 to 29 | 28 (1.7) |
| 30 to 39 | 94 (5.9) |
| 40 to 49 | 217 (13.5) |
| 50 to 59 | 441 (27.5) |
| 60 to 69 | 459 (28.7) |
| 70 to 79 | 302 (18.9) |
| 80 and + | 61 (3.8) |
| **Race/skin color[a]** | |
| White | 717 (44.8) |
| Brown | 544 (34.0) |
| Black | 115 (7.2) |
| Yellow | 42 (2.6) |
| Indigenous | 1 (0.1) |
| **Region of residence** | |
| Southeast | 683 (42.6) |
| South | 381 (23.8) |
| Northeast | 362 (22.6) |
| Central-West | 144 (9.1) |
| North | 32 (2.0) |

**Caption:** [a] For 181 cases, race/skin color was not recorded.

In clinical terms, elective procedures predominate, with the esophagus as the most frequent primary site, followed by the small intestine and other topographies of the digestive tract. Among the 1,308 patients with available staging information, there was a predominance of stages II and III. Moreover, most patients did not have a history of previous oncological treatment (Table 2). The number of initial APACs per individual varied widely, indicating heterogeneity in treatment duration.

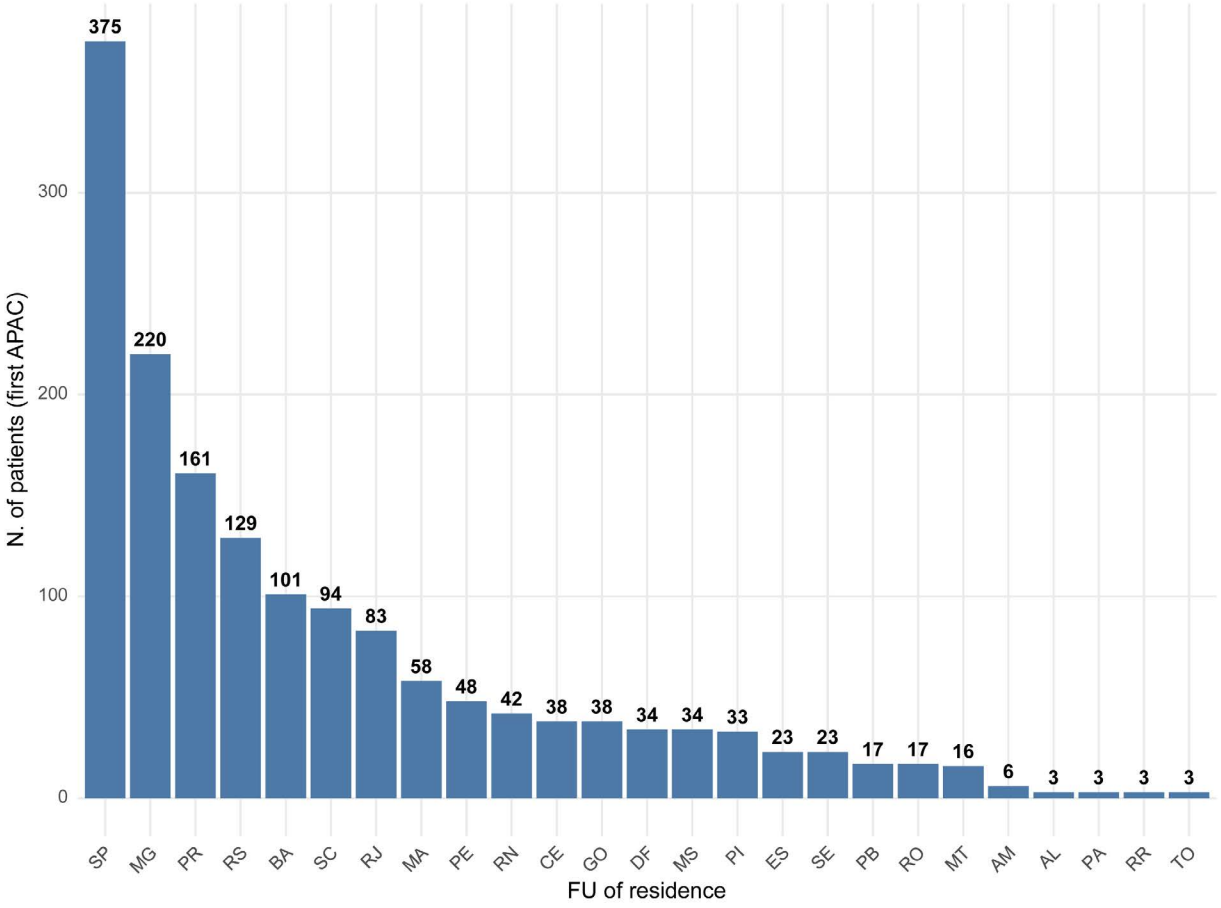


**Figure 2.** Distribution in absolute numbers of initial treatments registered for gastrointestinal stromal tumors with imatinib mesylate in the National Health System, per Federation Unit, Brazil, 2014-2024
**Source:** SIA/SUS[11].
**Captions:** APAC = High-Complexity Authorization for Outpatient Procedures; FU = Federation Unit.
**Note:** The values correspond to the total number of initial treatments registered in each Federation Unit for the period, with no population adjustment.

The average value of APACs remained relatively stable after 2015, with no expressive variations across the series (Table 2). The average time between the request and approval of APACs for initial treatments also decreased, going from 17.5 days in 2014 to 7.8 days in 2024. In contrast, the authorization times for continuity procedures went in the opposite direction, with gradual increases that, in 2022, resulted in an average of 18 days.

## DISCUSSION

This national analysis of Brazil's public healthcare system found an increase in the number of initial adjuvant imatinib treatments for resected GIST over a decade, shorter authorization times for new cases, and evidence of regional heterogeneity. These real-world standards are in line with evidence from clinical trials that supported the recommendation of incorporating adjuvant imatinib to treat high-risk resected GIST and suggest that the adoption of the technology by a great public provider was followed by a reduction in administrative authorization

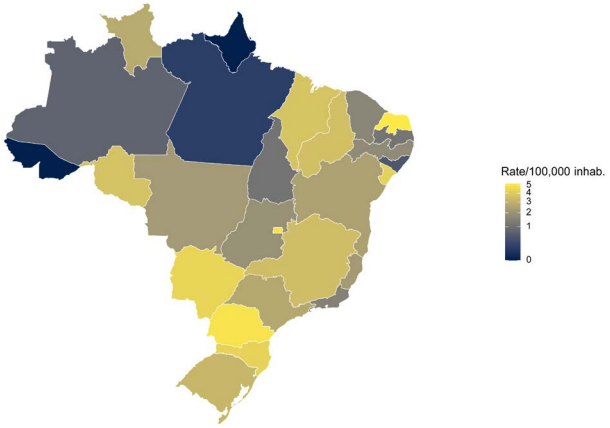


**Figure 3.** Density of initial treatments registered for gastrointestinal stromal tumor with imatinib mesylate in the National Health System, per Federation Unit, Brazil, 2014-2024
**Source:** SIA/SUS[11].
**Note**: Density was calculated as the registered number of initial treatments divided by the resident population aged 50 years and older in each Federation Unit, multiplied by 100 thousand inhabitants. The scale represents the density of administrative records, ranging from 0 to 5 initial treatments per 100 thousand inhabitants aged 50 years and older. Higher values indicate a higher relative concentration of records in relation to the size of the population in this age group, and not the population incidence of GIST.

**Table 2.** Clinical characteristics, treatment standards, and administrative aspects of the initial treatments for gastrointestinal stromal tumor in the National Health System, Brazil, 2014-2024

| Studied characteristics | N (%) |
|---|---|
| **Nature of the treatment** | |
| Elective | 1,588 (99.1) |
| Urgency | 14 (0.9) |
| **Tumor location** | |
| Stomach | 787 (50.9) |
| Small intestine | 456 (29.5) |
| Malignant neoplasm of the digestive system with an invasive lesion | 149 (9.6) |
| Colon | 79 (5.1) |
| Esophagus | 45 (2.9) |
| Rectosigmoid junction | 30 (2.0) |
| **Staging*** | |
| Stage 1 | 124 (9.3) |
| Stage 2 | 389 (29.0) |
| Stage 3 | 584 (44.2) |
| Stage 4 | 232 (17.5) |
| **Previous treatment** | |
| No | 1,118 (69.7) |
| Yes | 485 (30.3) |
| **Number of initial APACs** | |
| 1 | 201 (12.5) |
| 2-4 | 396 (24.7) |
| 5-8 | 347 (21.7) |
| 9-12 | 364 (22.7) |
| 13 or over | 294 (18.4) |
| **Administrative and economic aspects** | |
| Average APAC value (R$) | 16.12 |
| Average time between request and authorization (days) | 11.9 |
| Average time for authorization in new cases 2014 (days) | 17.5 |
| Average time for authorization in new cases 2024 (days) | 7.8 |
| Average APAC value in 2014 (R$) | 12.36 |
| Average APAC value in 2015-2024 (R$) | 14.00-16.00 |

**Caption:** *Staging information available for 1,308 cases (82.6%); APAC = High-Complexity Authorization for Outpatient Procedures.

times, although the present study did not allow for inferences regarding timely access to treatment or clinical outcomes[5]. Maps per Federation Units, considering the population aged 50 and older, reinforce the geographic heterogeneity in the distribution of initial treatments over the assessed period.

The observed epidemiological profile is compatible with that described in the literature about GIST, a rare neoplasm of the gastrointestinal tract whose diagnosis centers on the fifth decade of life, and whose most frequent primary site is the stomach, followed by the small intestine[1,17,18]. The slight female predominance and age distribution found are coherent with international population-based series, although North American and European studies report, in general, a slight predominance of males, which can reflect variations in data sources, demographic composition of cohorts, or patterns of access to diagnosis[17-19]. The higher frequency of self-reported white and brown individuals probably reflects the demographic composition of the Brazilian population cared for by SUS, and not biological differences in risk for GIST, which limits inferences about racial disparities from administrative data. The concentration of treatments in the Southeast and South Regions is consistent with the distribution of the licensed oncological network and with displacement patterns and access to cancer treatment already described in Brazil[9,20]. The described profile must, therefore, be interpreted as representative of patients who accessed the adjuvant treatment from SUS, and not necessarily the population incidence of GIST in the country, given that administrative records do not capture cases diagnosed outside the public system nor enable individual confirmation of staging, surgical resection, or risk of recurrence.

The findings from this study, particularly the rising trend of imatinib mesylate as an adjuvant indication and shorter authorization times for new treatments, are consistent with the diffusion of this technology in routine assistant practice after its national incorporation in 2014 and the publication of protocolled guidelines[21,22]. The observed regional variation, including densities of treatments calculated per 100 thousand inhabitants and standardized for the population aged 50 or older, higher outside the most populated Regions, probably reflects a combination of the evolution of diagnostic capacity, assistance referral pathways, and centralization of reference centers, as described in contemporary epidemiological analyses[15]. These findings, however, must be interpreted with caution: the densities observed in the North and Central-West Regions may reflect not only greater relative access but also interstate patient flows for licensed centers, registration standards in the municipality of residence

in APAC, and statistical instability from small absolute numbers in less populated States, factors that limit direct comparison between regions.

In the Brazilian context, post-incorporation monitoring of targeted therapies at SUS is still incipient but is beginning to gain relevance as a health technology assessment tool with real-world data[23]. Studies about trastuzumab, the first high-cost targeted therapy widely incorporated into SUS, show sustained growth of its utilization after incorporation, with survival compatible with that described in clinical trials, although heterogeneities between regions and care centers persist[24]. More recent analyses produced by Conitec indicate that most oncology medications commercialized in the country have not been formally assessed by the commission, and those assessed had predominantly unfavorable recommendations for being incorporated, a finding that partly reflects the model of funding per procedure currently in force for Oncology at SUS[25]. In this scenario, the present study contributes by presenting, with national administrative data, the utilization standard of a low-budget, though clinically relevant, targeted therapy for a rare neoplasm.

The observed shorter authorization time for initial treatments suggests operational improvements in administrative processes, although the clinical impact of this reduction was not assessed in this study. Considering that the power of the adjuvant therapy relies on proper treatment duration, monitoring continuity authorizations (APACs subsequent to the initial authorization) and preventing unjustified interruptions remain as operational priorities[5,6], especially in subgroups with worse prognoses, like individuals with KIT exon 11 mutation[26,27].

The findings from this study suggest actionable opportunities for reducing the interval between the request and administrative authorization of adjuvant imatinib for resected GIST. The progressive reduction of authorization time, observed across the historical series, points towards improvements in the administrative flows related to APAC authorization. However, establishing explicit operational goals for expediting the service, such as authorizations issued within seven to ten days after request, an often-used operational marker in timely access analyses, could support gains in process administrative predictability, reduce regional variations, and contribute to treatment continuity. The regional heterogeneity observed reinforces that these temporal variations did not occur homogeneously in the national territory.

Such variations reinforce the need for interventions in the organization of the care network, among which stand out the definition of formal referral routes for greater volume centers, teleoncology support to less experienced services, and standardization of administrative requests aligned to the clinical guidelines. Linking administrative data to population-based cancer registries and pathology information can improve longitudinal monitoring of imatinib use and acquisition and provision management strategies, which include purchase coordination, safeguards against shortages, and programs to support adherence — resulting in the reduction of losses associated with treatment interruptions.

The strengths of this study include the compilation of registers in the treatment of GIST in the context of SUS, identification of the initial treatment and aggregation of continuity procedures through CNS, standardized identification of APAC authorizations across time and Region, as well as the application of reproducible methodology, which confers greater transparency to the findings. There are, however, limitations due to the nature of the administrative data, like the absence of morphological and genetic information, possible encoding errors, difficulties in the verification of clinical co-variables, and the impossibility of studying the outcomes at the patient level. Additionally, the classification of cases as adjuvant treatment was based on an operational definition, since the data available does not allow for individually confirming the performance of surgical resection, postoperative tumoral risk, or adjuvant therapeutic intention registered in clinical practice. Despite incorrect classifications being minimized through logical combinations of diagnosis, procedures, and therapeutic schemes, there may still be incorrect classifications. Finally, ecological inferences do not establish causality at the individual level.

## CONCLUSION

Over the course of ten years after the incorporation of adjuvant imatinib for GIST in SUS, this study described the increase of initial treatments registered in administrative bases, reduced authorization times for new cases, and regional differences in the distribution of records. These findings must be interpreted considering the descriptive design of the analysis and limitations inherent to administrative data, which do not allow for individually confirming adjuvant indication, assessing clinical effectiveness, adherence, recurrence, survival, or drawing causal relations. Still, the results can foster monitoring and management strategies targeted at equity of access and continuity of treatment in the prescribed intervals.

## CONTRIBUTIONS

Felipe Mendes Delpino and Mirian Carvalho de Souza have substantially contributed to the study design and planning; data acquisition, analysis, and interpretation;

and wording. Laura Augusta Barufaldi and Natália Dias Brandão contributed intellectually and to critical review. All the authors approved the final version for publication.

### DECLARATION OF ARTIFICIAL INTELLIGENCE USE

Artificial intelligence tools were used solely to support linguistic review and textual improvement of the manuscript. AI tools were not employed in the analysis, interpretation, or conclusion of the data. The authors are solely responsible for the originality, accuracy, and integrity of the work.

### DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interest to declare.

### DATA AVAILABILITY STATEMENT

The data sets analyzed during the present study are publicly available at the Department of Informatics of SUS (DATASUS). All the contents associated with the article are included in the manuscript.

### FUNDING SOURCES

None.

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