

# Burden of Schizophrenia on the Brazilian Public Healthcare System: A Cost and Service Analysis

Carlos F. Salgado De Santana<sup>1</sup>, Gustavo Fattobene<sup>1</sup>,MD Leon Nascimento, Ph.D.<sup>2</sup>  
1 Boehringer Ingelheim Brazil, São Paulo, Brazil; 2. FIRJAN, Rio de Janeiro, Brazil.

## Introduction

Schizophrenia is a chronic and disabling psychiatric disorder characterized by delusions, hallucinations, disorganized behavior, and cognitive impairment that significantly affect social and occupational functioning. It affects approximately 1% of the global population and ranks among the leading causes of disability-adjusted life years (DALYs) worldwide, reflecting both its high prevalence and substantial lifetime burden on individuals and society (1,2).

In Brazil, schizophrenia poses a significant challenge to the public healthcare system (Sistema Único de Saúde – SUS), which is responsible for providing universal access to care. Mental health services are primarily delivered through the Psychosocial Care Network (Rede de Atenção Psicossocial – RAPS), with the Psychosocial Care Centers (Centros de Atenção Psicossocial – CAPS) acting as the main entry point for community-based treatment and rehabilitation (3,4). Despite the existence of this structured network, patients with schizophrenia frequently require long-term multidisciplinary management, including pharmacological treatment and periodic hospitalizations, leading to sustained and complex demands on public healthcare resources (5,6).

The combination of chronic disease progression, functional impairment, and high relapse rates results in significant healthcare expenditures and productivity losses. Understanding the direct economic impact of schizophrenia within the SUS framework is therefore critical to informing resource allocation, mental health policy planning, and strategic interventions aimed at ensuring sustainability and equitable access to effective care across all regions of Brazil.

## Objectives

This study aimed to quantify the direct economic burden of schizophrenia within the Brazilian public healthcare system (SUS) by analyzing nationwide data from DATASUS covering the period 2017 to 2023. Specifically, it sought to evaluate the total healthcare expenditure and service utilization associated with ICD-10 code F20 (schizophrenia and subtypes), integrating outpatient and hospital care datasets.

The analysis further explored how these expenditures and service volumes varied across Brazilian states and regions, after adjustment for population, to assess the efficiency and equity of mental care health resource use.

## Methods

- This study employed an observational, descriptive, and cross-sectional design based on secondary data from DATASUS, Brazil's official national health information system, which consolidates data on healthcare production, hospital admissions, and expenditure within the public healthcare system.
- Data Sources and Population data were extracted from the Outpatient Information System (SIA/SUS) and the Hospital Information System (SIH/SUS) for the period between January 2017 and December 2023. These datasets record healthcare events reimbursed by the Ministry of Health (MoH), including procedures, hospitalizations, and costs associated with mental health services.
- The study population included all records in which schizophrenia (ICD-10 code F20 and its subtypes) was identified as the primary diagnosis, representing individuals treated within the SUS network. Data extraction and transformation followed the Big Data integration framework established by the FIRJAN Center for Occupational Health Innovation (CIS-SO). Over 2,100 raw DBC files were retrieved from the DATASUS, processed, and harmonized into annual and regional datasets covering all 27 federative units of Brazil.
- Analyses included both absolute and population-adjusted metrics, using demographic data from the Brazilian Institute of Geography and Statistics (IBGE) to calculate rates of service utilization and expenditure per 100,000 inhabitants. This adjustment enabled cross-state comparability and identification of disparities in mental health service delivery. Direct costs were calculated as the sum of outpatient and inpatient expenditures reported in SIA and SIH. Descriptive statistics were used to summarize healthcare utilization patterns, expenditure distributions, and per capita spending across regions.

## Results

- Between 2017 and 2023, a total of 15.84 million outpatient visits and over 477 thousand hospital admissions related to schizophrenia (ICD-10 F20 and subtypes) were recorded in the Brazilian public healthcare system (SUS). These services corresponded to an accumulated direct expenditure of BRL 898 million, averaging BRL 128 million per year.
- Geographic distribution and patient density:**  
The distribution of patients across the 27 federative units revealed significant geographic disparities. In absolute terms, the state of São Paulo registered the highest number of individuals treated for schizophrenia (~101,000 patients), reflecting both its population size and concentration of tertiary mental health facilities. When adjusted for population, Sergipe exhibited the highest patient density, with approximately 482 patients per 100,000 inhabitants, followed by Alagoas and Pernambuco, indicating relatively greater psychiatric demand in the Northeast region. In contrast, Roraima, Acre, and Amapá presented the lowest patient densities (below 120 per 100,000 inhabitants), consistent with their smaller populations and limited mental health infrastructure. This uneven distribution underscores structural disparities in mental healthcare accessibility and indicates potential underdiagnosis or barriers to continuous treatment in lower-capacity states.

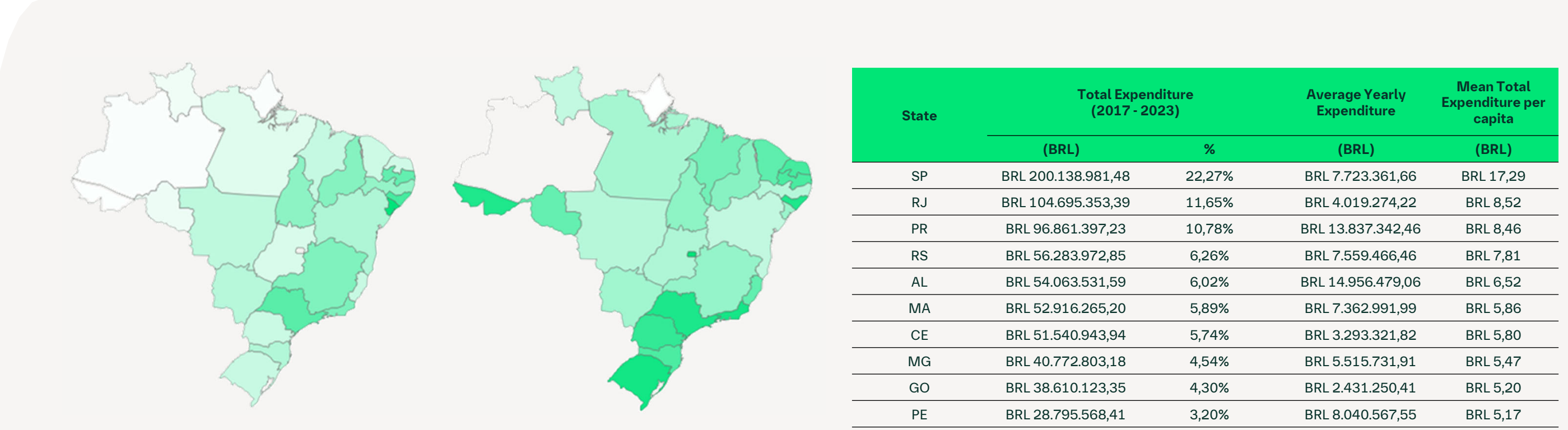


Figure 1. Distribution of Schizophrenia-Related Outpatient Visits and Hospital Admissions in Brazil

State	Total Expenditure (2017–2023)		Average Yearly Expenditure	
	(BRL)	%	(BRL)	Mean Total Expenditure per capita (BRL)
SP	BRL 200,138,981.48	22.27%	BRL 7,723,361.66	BRL 17.29
RJ	BRL 104,695,353.39	11.65%	BRL 4,019,274.22	BRL 8.52
PR	BRL 96,861,397.23	10.78%	BRL 13,837,342.46	BRL 8.46
RS	BRL 56,283,972.85	6.26%	BRL 7,559,466.46	BRL 7.81
AL	BRL 54,063,531.59	6.02%	BRL 14,956,479.06	BRL 6.52
MA	BRL 52,916,265.20	5.89%	BRL 7,362,991.99	BRL 5.86
CE	BRL 51,540,943.94	5.74%	BRL 3,293,321.82	BRL 5.80
MG	BRL 40,772,803.18	4.54%	BRL 5,515,731.91	BRL 5.47
GO	BRL 38,610,123.35	4.30%	BRL 2,431,250.41	BRL 5.20
PE	BRL 28,795,568.41	3.20%	BRL 8,040,567.55	BRL 5.17

Table 1. Total Expenditure and Per Capita Direct Costs of Schizophrenia-related Care in the Brazilian Public Healthcare System by State

- Mean Early Per-capita expenditure**  
When total healthcare expenditure was normalized by population, notable differences emerged across states. The Federal District recorded the highest per-capita expenditure, at approximately BRL 33.9 per inhabitant, reflecting its high concentration of specialized psychiatric services and advanced referral network. Other states with above-average costs included Alagoas (≈ BRL 17 per inhabitant) and Rio Grande do Norte (≈ BRL 8,52 per inhabitant), regions characterized by greater diagnostic coverage and service capacity. In contrast, Amazonas, Roraima, Amapá and Tocantins registered the lowest per-capita expenditures, all below BRL 1 per inhabitant, consistent with their limited presence of specialized facilities, and lower overall healthcare coverage resulting in restricted patient access.
- This uneven distribution are strongly correlated with infrastructure maturity and service accessibility. States with more comprehensive networks and higher service density generate proportionally greater expenditures, while those with fewer facilities and logistical limitations display artificially lower costs, reflecting underdiagnosis and limited treatment continuity rather than true differences in disease prevalence.

- Availability of professionals and service capacity:**  
Data from the Brazilian Ministry of Health and the Federal Medical Council (CBO/IBGE) indicate that, by 2023, Brazil had approximately 10,600 practicing psychiatrists, unevenly distributed across regions. The Southeast region concentrated over 54% of all psychiatrists, averaging 6.8 psychiatrists per 100,000 inhabitants, compared to only 1.4 per 100,000 in the North and 3.2 per 100,000 in the Northeast.
- When comparing demand and workforce, Northeast states such as Pernambuco and Alagoas showed high patient volumes but limited psychiatrist availability, suggesting a substantial imbalance between service demand and capacity. Conversely, Southern states (notably Rio Grande do Sul and Paraná) displayed higher professional density but comparatively lower patient loads, pointing to more efficient or decentralized mental health networks.
- The ratio of patients per psychiatrist ranged from approximately 1:40 in the South to 1:110 in the North and Northeast, highlighting the inequity of human resource allocation relative to disease burden

- Mental health infrastructure (CAPS distribution)**  
The Psychosocial Care Centers (CAPS) remain the primary public facilities for outpatient treatment of schizophrenia in Brazil. As of 2023, there were approximately 2,200 CAPS units nationwide, with an average coverage of one center per 95,000 inhabitants. The Southeast accounted for the largest share of CAPS facilities (around 35% of the national total), followed by the Northeast (30%).When population-adjusted, the South region exhibited the best CAPS density, with roughly one center per 80,000 residents, while Northern states, including Roraima and Amapá, had the lowest density, with one CAPS per 200,000–250,000 inhabitants.
- This pattern demonstrates that areas with the highest patient burden—notably in the Northeast—are also those with scarcer professional and structural resources, amplifying challenges for early detection, follow-up continuity, and equitable access to specialized mental health care.

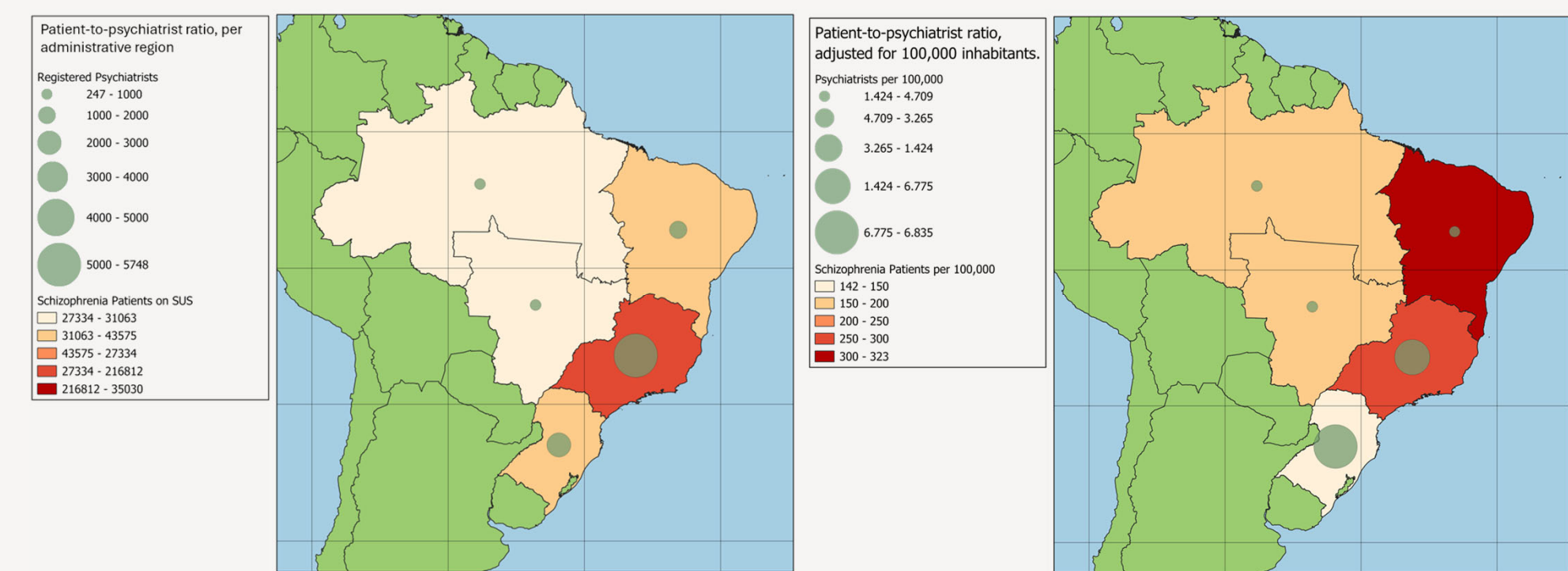


Figure 2. Regional comparison of psychiatrist availability and schizophrenia patient volume in Brazil, shown as absolute counts and population-adjusted rates per 100,000 inhabitants

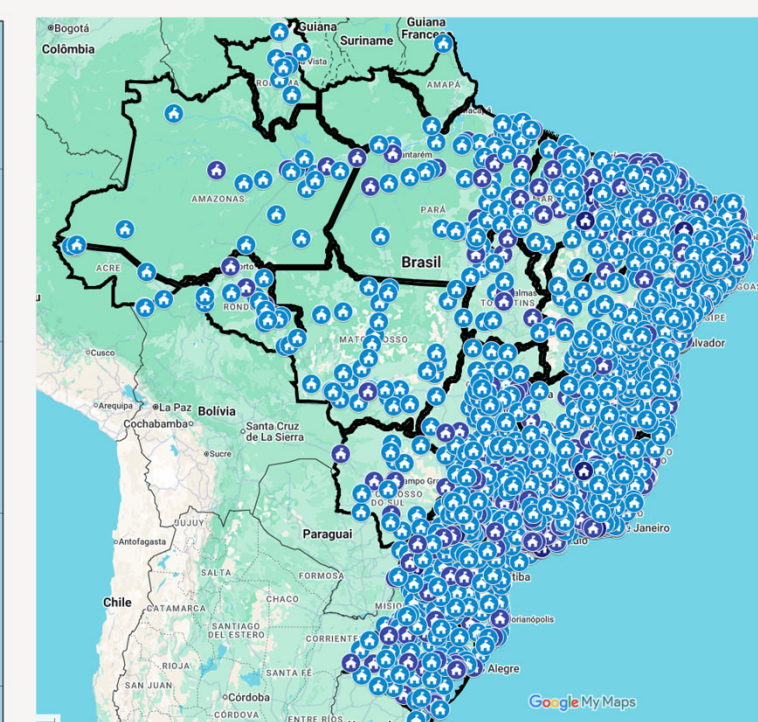


Figure 3. Geographic Distribution of Psychosocial Care Centers (CAPS) Across Brazil's Public Mental Health Network

## Conclusions

Schizophrenia imposes a considerable direct burden on Brazil's public healthcare system (SUS), reflected in sustained outpatient and hospitalization costs and marked regional disparities in service utilization and spending. Despite the robustness of the SUS framework, uneven resource distribution—both in infrastructure and specialized workforce—limits the system's ability to provide equitable and continuous care nationwide.

The results highlight the considerable burden that schizophrenia imposes on Brazil's public healthcare system. Despite SUS having a robust structure essential for ensuring nationwide coverage in line with its principles of universality and equity, there is a pressing need to expand understanding of the magnitude of investments in mental health treatment, particularly schizophrenia. Such insights can foster the development of targeted strategies to optimize resource management and implement effective public policies.

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