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Temporal trends in outpatient dental care in Brazil's SUS by complexity (2011–2025)

Ilan Hudson Gomes de Santana
Undergraduate student in Dentistry, Federal University of Paraíba, João Pessoa, Paraíba, Brazil
E-mail: ilan.hudson@academico.ufpb.br

Cacilda Chaves Morais de Lima
Professor at the Professional and Technological Center, Technical School of Health, Federal University of Paraíba, João Pessoa, Paraíba, Brazil

Larissa Chaves Morais de Lima
State University of Paraíba, João Pessoa, Paraíba, Brazil

Maria Oliveira Alves Cavalcanti
Professor at the Professional and Technological Center, Technical School of Health, Federal University of Paraíba, João Pessoa, Paraíba, Brazil

José Moreira da Silva Neto
Professor at the Professional and Technological Center, Technical School of Health, Federal University of Paraíba, João Pessoa, Paraíba, Brazil

Geraldo Sávio Almeida Holanda
Professor at the Professional and Technological Center, Technical School of Health, Federal University of Paraíba, João Pessoa, Paraíba, Brazil

Thiago Miguel De Medeiros Coatti
Student of the dental prosthesis technical course, Federal University of Paraíba, João Pessoa, Paraíba, Brazil

Renata Coelho Navarro
Professor at the Professional and Technological Center, Technical School of Health, Federal University of Paraíba, João Pessoa, Paraíba, Brazil

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ABSTRACT

Objective: To analyze trends in outpatient dental service production within Brazil's Unified Health System (SUS) from 2011 to 2025, considering procedure volume, approved financial values, and levels of care complexity. Methods: An ecological, longitudinal study was conducted using national secondary data from the SUS Outpatient Information System (SIA/SUS). Annual

numbers of approved dental procedures and corresponding financial values were analyzed descriptively and stratified by primary, medium-, and high-complexity care. Due to inconsistencies in primary care financial records, financial analyses focused on medium- and high-complexity services. Results: Total outpatient dental production increased until 2015, followed by a sustained decline, reaching its lowest level in 2020. Although partial recovery occurred after 2021, production in 2025 remained well below pre-2016 levels. Primary care experienced the greatest absolute reduction and did not recover pre-pandemic volumes. In contrast, medium- and especially high-complexity care showed greater resilience, with high-complexity procedures exceeding pre-pandemic levels. Despite reduced service volume, approved financial values recovered and reached their highest levels after 2021, indicating increased average cost per procedure. Conclusion: The findings indicate a structural shift in SUS dental care, with reduced overall production and progressive reorientation of financing toward higher-complexity services, raising concerns about access, equity, and the central role of primary care.

Keywords: Dental care. Unified health system. Outpatient clinics. Hospital. Healthcare financing. Interrupted time series analysis.

INTRODUCTION

Dental care is a core component of Brazil's Unified Health System (SUS), delivered across different levels of complexity and strongly dependent on public funding for its maintenance and expansion[1]. Since the implementation of the National Oral Health Policy, the expansion of access to dental services has been associated with the strengthening of primary health care, the progressive incorporation of medium- and high-complexity procedures, and the reorganization of the care network at the national level[2,3].

Over the past decade, the Brazilian health system has undergone significant transformations, including changes in financing models, modifications to procedure recording criteria, and, more recently, the effects of the COVID-19 pandemic. These factors have heterogeneously affected the different levels of complexity of dental care, influencing both service volume and the allocation of financial resources[4].

Although primary health care has historically accounted for the majority of dental procedures performed within the SUS, evidence points to a growing

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relative contribution of medium- and high-complexity care to outpatient financing, associated with technological incorporation and increases in the average cost of procedures. In this context, analyses based solely on total financial values may mask important structural changes in the care profile, making stratification by level of complexity necessary[5,1].

Furthermore, studies based on historical series from the SUS Outpatient Information System (SIA/SUS) face methodological challenges related to record consistency, temporal comparability, and changes in data classification and processing procedures. Such limitations may compromise the traceability of certain financing components, particularly in primary care, requiring caution in the interpretation of results[6].

In this context, the present study aimed to analyze the temporal evolution of outpatient dental service production within the SUS between 2011 and 2025, considering both the volume of procedures and approved financial values, with an emphasis on comparisons across different levels of complexity. By exploring these trends, this study seeks to contribute to a better understanding of changes in the care profile and the financing of dental care within Brazil's public health system.

MATERIALS AND METHODS

Study design and analyzed period

An observational study with an ecological and longitudinal design was conducted, based on the evaluation of historical time series. The temporal scope covered the years from 2011 to 2025, a period chosen to allow analysis of different phases in the organization of dental care within the SUS, including structural changes in the Brazilian health system.

Data extraction

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The information used in this study was obtained from the SUS Outpatient Information System (SIA/SUS), accessed through the DATASUS platform. Consolidated national data on outpatient dental service production were analyzed. All data were publicly available and aggregated, with no individual-level information.

Definition of variables

The analytical variables considered were: the annual number of approved dental procedures, used as a measure of service production; the approved financial amount, expressed in Brazilian reais (R$), corresponding to the production recorded in the system; and the classification of procedures according to level of complexity, grouped into primary care, medium complexity, and high complexity.

Data collection and processing procedures

Data were extracted directly from the annual SIA/SUS tables related to outpatient dental production. After extraction, the information was organized into structured databases and subjected to checks for temporal coherence and internal consistency. During this stage, discontinuities were identified in the financial records attributed to primary care, with discrepancies between total approved values and the sum of values by level of complexity. Due to these inconsistencies, primary care financial values were not used directly in the main analyses and were restricted to exploratory assessments based on indirect estimates.

Analytical strategy

Data analysis was descriptive in nature, focusing on the identification of temporal patterns, fluctuations, and abrupt changes throughout the historical series. Analyses were conducted separately for: total dental service production; production stratified by level of complexity; total approved financial values; and financial values related to medium- and high-complexity care. Indirect estimates

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of primary care financial values were obtained by arithmetic subtraction of medium- and high-complexity values from the total approved amount. These estimates were used exclusively for exploratory purposes and for assessing data quality.

Presentation of results

Results were presented using time-series graphs designed to highlight trends and inflection points over the period analyzed. Each variable was represented individually to preserve clarity and facilitate interpretation of the findings.

Ethical considerations

As this study used secondary, publicly available, aggregated data with no possibility of individual identification, submission to a research ethics committee was not required, in accordance with current ethical guidelines for research using public-domain databases.

RESULTS

Total outpatient dental service production

Between 2011 and 2015, total outpatient dental production within the SUS increased from 84.9 million procedures in 2011 to 89.9 million in 2015, representing an absolute growth of approximately 5.0 million procedures (+5.9%). From 2016 onward, a progressive decline was observed, with production decreasing to 71.5 million in 2016 and 47.6 million in 2018. In 2020, the lowest point of the series was reached, with only 16.6 million procedures, corresponding to a reduction of 81.5% compared with the 2015 peak. In the post-pandemic period, a partial recovery occurred: 17.2 million in 2021, 33.6 million

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in 2022, and 26.5 million in 2025—a level still 70.5% lower than that observed in 2015 (Figure 1).

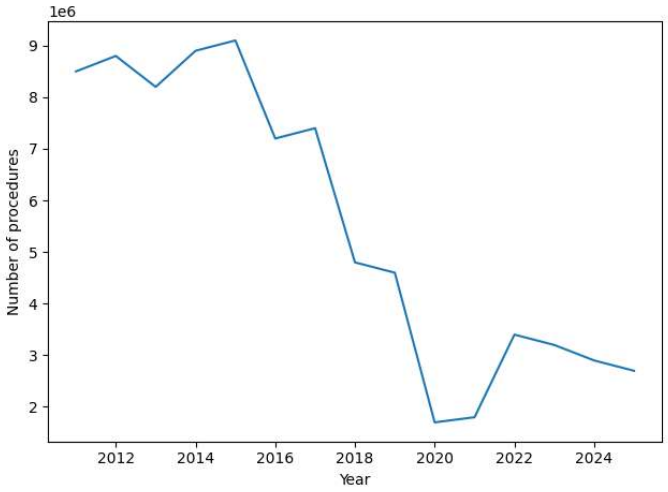


Figure 1. Total number of approved outpatient procedures within the Unified Health System (SUS), Brazil

Production by level of complexity – volume

Primary health care accounted for the largest share of production throughout the entire series. In 2011, 81.3 million procedures were recorded, increasing to 86.1 million in 2015. In 2020, this number fell to 15.1 million, corresponding to an absolute reduction of 71.0 million procedures (−82.5%) compared with 2015. In 2025, primary care production reached 23.1 million procedures, remaining 73.2% below the pre-2016 peak, as shown in figure 2.

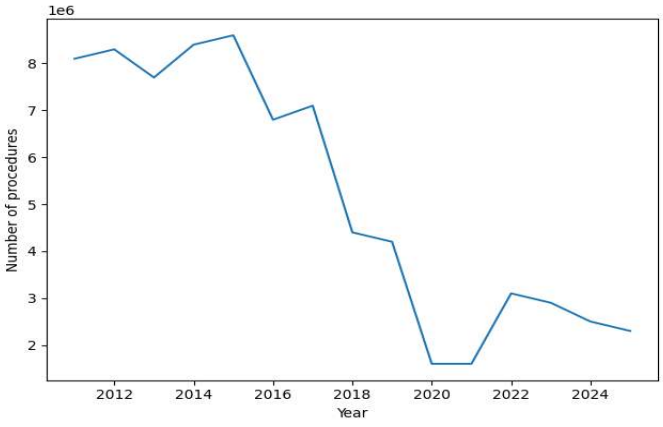


Figure 2. Number of outpatient procedures performed in Primary Health Care within the Unified Health System (SUS)

Medium-complexity care presented much lower absolute values but followed a distinct pattern. Between 2011 and 2015, annual volumes ranged from

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3.5 to 3.6 million procedures. In 2020, production declined to 1.35 million (−62.1% compared with 2015). However, in 2024, production reached 3.73 million procedures, surpassing pre-pandemic levels, before a new reduction to 3.13 million in 2025, as shown in figure 3.

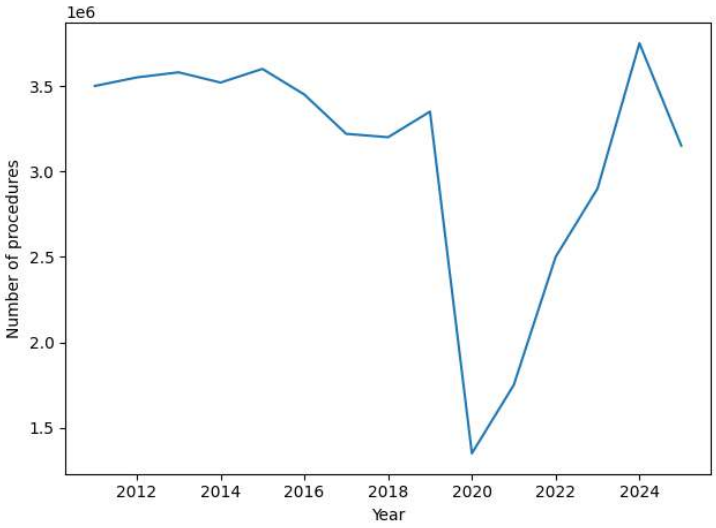


Figure 3. Number of outpatient procedures performed at medium complexity within the Unified Health System (SUS)

High-complexity care showed consistent growth at the beginning of the series, increasing from 98,000 procedures in 2011 to 280,900 in 2015 (+185.7%). In 2020, production decreased to 172,300 procedures, followed by a rapid recovery in subsequent years, reaching 301,600 procedures in 2024—the highest value in the series, as shown in the figure 4.

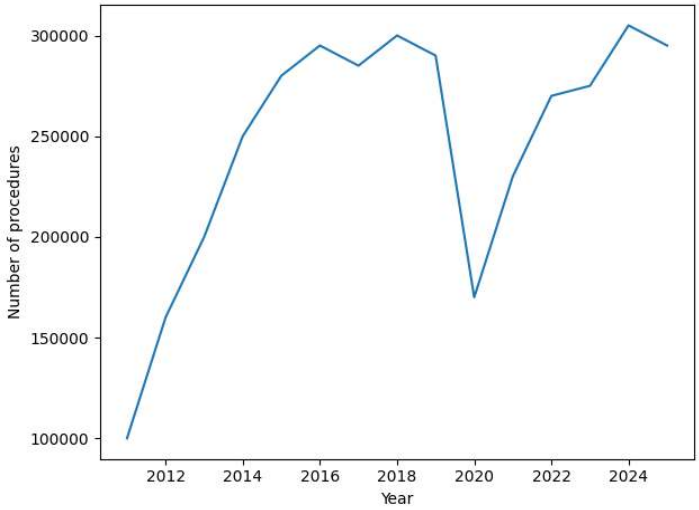


Figure 4. Number of outpatient procedures performed at high complexity within the SUS

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Approved financial values – total

The total approved financial value for dental procedures increased from BRL 14.85 million in 2011 to BRL 21.32 million in 2015 (+43.5%). In 2020, a sharp decline occurred, with values falling to BRL 10.63 million, representing a reduction of BRL 10.7 million (−50.1%) compared with 2015. After 2021, approved values increased again, reaching BRL 17.47 million in 2022 and BRL 21.63 million in 2024, the highest value observed in the historical series, as shown in figure 5.

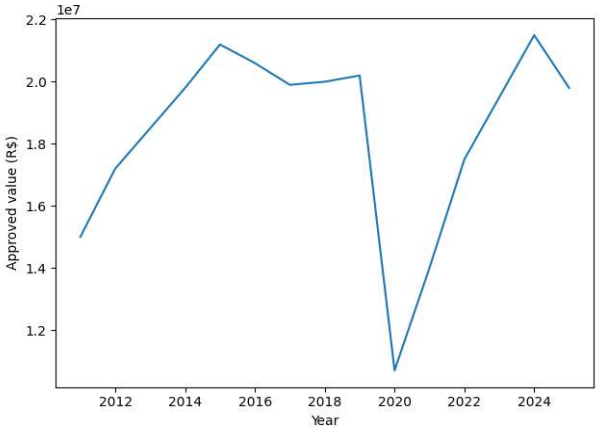


Figure 5. Total approved financial value for outpatient procedures within the Unified Health System (SUS)

Approved financial values by level of complexity

The approved value for medium-complexity care was BRL 9.59 million in 2011 and remained relatively stable until 2015 (BRL 9.56 million). In 2020, it declined to BRL 3.80 million (−60.2%), followed by a gradual recovery, reaching BRL 9.60 million in 2024. as shown in figure 6.

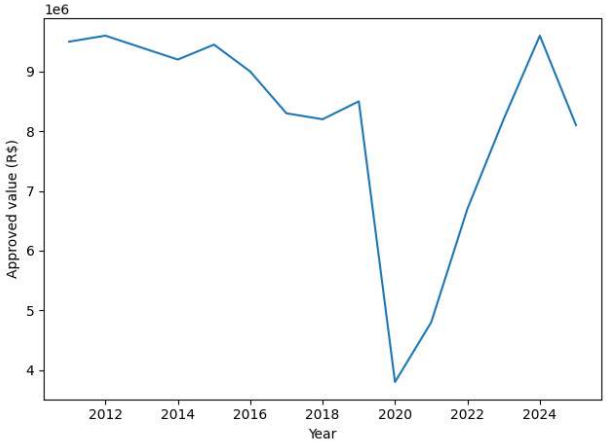


Figure 6. Approved financial value for outpatient procedures at medium complexity within the Unified Health System (SUS)

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In contrast, the approved value for high-complexity care showed marked growth throughout the series. In 2011, the value was BRL 5.26 million, increasing to BRL 11.77 million in 2015 (+123.8%). Despite the decline observed in 2020 (BRL 6.84 million), values increased again, reaching BRL 12.03 million in 2024, the highest value in the series, as shown in figure 7.

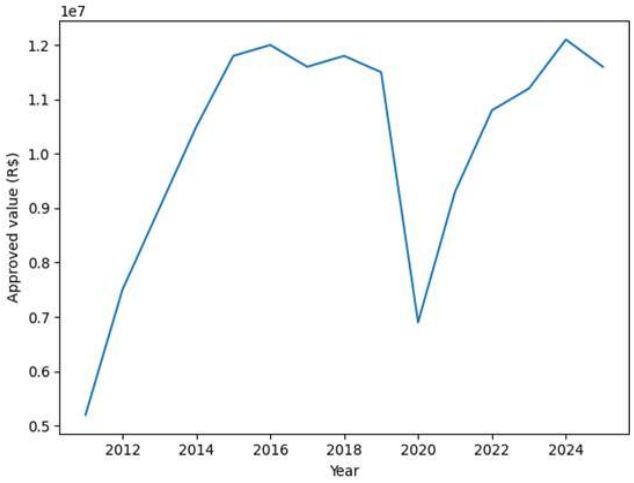


Figure 7. Approved financial value for outpatient procedures at high complexity within the Unified Health System (SUS)

Despite the relevance of primary health care in the organization of dental services within the SUS, financial values corresponding to this level of care were not presented in the Results section. This methodological decision resulted from consistent problems in extracting and tracking primary care financial data throughout the historical series analyzed. Attempts to estimate these values by subtracting medium- and high-complexity amounts from the total approved value produced numerical inconsistencies, loss of temporal continuity, and non-interpretable residual values in multiple years, indicating structural limitations of the SIA/SUS for this type of financial reconstruction. In light of these limitations, absolute values or financial trends for primary care were not reported to avoid potentially misleading inferences. Accordingly, the Results focused on levels of care for which the data showed internal consistency, temporal traceability, and analytical robustness, ensuring greater validity of the findings presented.

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DISCUSSION

The findings of this study indicate that outpatient dental service production within the SUS underwent a continuous process of reconfiguration from 2011 to 2025, marked by a substantial reduction in service volume, shifts in the relative weight of complexity levels, and a progressive dissociation between production and financing. Although the COVID-19 pandemic represents a major milestone in this trajectory, the data show that observed transformations predate 2020, suggesting broader structural determinants.

The decline in total production after 2015, which intensified until reaching its lowest point in 2020, cannot be interpreted solely as a conjunctural effect. The reduction already evident between 2016 and 2019 points to a gradual weakening of service provision capacity within the SUS, particularly in primary health care. This pattern suggests cumulative impacts of changes in financing, network organization, and prioritization of oral health actions over the past decade[7].

Primary health care emerges as the main axis of system fragilization, as it concentrated the largest absolute losses in procedures. The reduction of more than 80% in service volume in 2020, followed by only partial recovery in subsequent years, indicates that this level of care did not regain its previous response capacity even after the relaxation of sanitary restrictions[8]. This pattern suggests that the pandemic acted more as an accelerator of pre-existing trends than as an isolated disruptive factor[8].

In contrast, medium- and especially high-complexity care exhibited distinct trajectories. The relatively rapid recovery of medium complexity and the sustained expansion of high complexity—including levels surpassing those observed before the pandemic—indicate a reorientation of service provision toward more specialized procedures. This shift may reflect accumulated unmet demand, prioritization of more complex cases[6], and greater technological

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incorporation, but it also raises questions regarding network balance and the structuring role of primary care in organizing care[7].

The financial analysis reinforces this interpretation. Despite the sharp decline in the total number of procedures, approved financial values reached the highest levels of the historical series in the post-pandemic period, indicating an increase in average cost per procedure. The expansion of expenditures on medium- and high-complexity care—particularly the latter—suggests a progressive concentration of resources in higher-cost interventions, helping to explain the observed dissociation between service volume and financing[9].

The inability to present consistent primary care financial values, due to problems in extracting and tracking data within the SIA/SUS, represents a relevant limitation of this study. However, this limitation is itself an important finding, as it reveals weaknesses in the information system for monitoring financing at this level of care[8]. The lack of adequate financial traceability hampers more precise assessments of the role of primary care within oral health policy and may mask processes of relative underfunding[8].

Taken together, the results suggest that dental care within the SUS has progressively shifted away from a primary care–centered model toward a more specialized logic, both in service delivery and financing. This movement may have direct implications for access, equity, and comprehensiveness of care, given the central role of primary care in prevention, longitudinal follow-up, and reduction of oral health inequities[5].

Thus, rather than reflecting merely conjunctural fluctuations, the findings point to structural changes in the model of public dental care in Brazil, reinforcing the need to strengthen information systems, reassess financing strategies, and reexamine the role of primary care in organizing oral health care networks.

CONCLUSION

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The analysis of the historical series of outpatient dental service production within the Unified Health System (SUS) from 2011 to 2025 reveals a consistent process of reconfiguration of the care model, characterized by a sustained reduction in the volume of procedures, selective recovery of specialized services, and a relative increase in the financial weight of medium- and, especially, high-complexity care. The findings indicate that the contraction of dental care within the SUS is not limited to the pandemic period, as the downward trend precedes 2020 and persists in the post-pandemic years, particularly within primary health care. The partial recovery observed in subsequent years was insufficient to restore previous levels of service provision, suggesting a structural loss of service capacity at this level of care.

The dissociation between service volume and approved financial values supports the hypothesis of an increase in the average cost per procedure and a reorientation of financing toward more complex and costly interventions. Although direct analysis of primary care financial values was not feasible due to limitations in data extraction and tracking, the overall body of evidence points to a reduced centrality of primary care in the organization of public dental services. In summary, the results suggest that dental care within the SUS has progressively shifted from a primary care–centered model toward a more specialized arrangement, with potential implications for access, equity, and comprehensiveness of oral health care. Strengthening information systems, improving the monitoring of financing, and strategically revaluing primary health care are essential to support public policies capable of ensuring the sustainability and effectiveness of dental care within Brazil's public health system.

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