

## Oral health policy in Brazil between 2003 and 2014: scenarios, proposals, actions, and outcomes

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**Abstract** *This study examined the implementation of Brazil's National Oral Health Policy by the three governments during the period 2003 to 2014. It provides a general overview of oral health care scenarios and examines institutional proposals and actions developed by the executive branch based on the components of the health care system. A documental analysis was conducted using documents produced by key government agencies. The findings show that there was an increase in the provision and coverage of public dental services between 2003 and 2006 and that rates were maintained to a certain degree in subsequent periods (2007 to 2010 and 2011 to 2014). There was an expansion in government funding, human resources and infrastructure. The amount of funds transferred to state and local governments increased from 83.4 million in 2003 to 916 million in 2014, equivalent to a 10.9 fold increase. However, the use of public dental services remained stable, with only a slight increase from 29.7% in 2003 to 30.7% in 2008, while private service utilization increased from 64.4% in 2003 to 74.3% in 2013. The care model component was given lowest priority by the three governments. This shortcoming influences policy effectiveness and requires the adoption of future measures by healthcare managers and officials to correct the situation.*

**Key words** *Health policy, Oral health, Dental care, Health services*

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## Introduction

Recent years have witnessed major changes in oral health policy in Brazil, which has gone from being a secondary concern to assume a prominent position on the government's agenda<sup>1</sup>. The National Oral Health Policy (*a Política Nacional de Saúde Bucal* - PNSB), known as *Brasil Sorridente* (smiling Brazil), published in 2004, is built around the following core elements: reorganization of primary care, especially through the creation of Oral Health Teams (*Equipes de Saúde Bucal* - ESB) within the Family Health Strategy (*Estratégia Saúde da Família* - ESF); organization of specialist care through the implementation of Dental Specialty Centers (*Centros de Especialidades Odontológicas* - CEO) and Regional Dental Prosthetics Laboratories (*Laboratories Regional de Protheses Dentárias* - LRPD); health promotion and protection through health education; collective actions and fluoridation of public water supplies; and oral health surveillance, focusing on monitoring trends by conducting periodic epidemiological studies<sup>2</sup>. In January 2014, the 10th anniversary of *Brasil Sorridente* was celebrated at the 32nd São Paulo International Dental Meeting (*Congresso Internacional de Odontologia de São Paulo* - CIOSP), the largest and most important event of the year for the Brazilian dental sector.

Several published studies have analyzed these core elements, focusing particularly on oral health services provided through the ESF<sup>3-5</sup> and CEOs<sup>6-8</sup>. These studies have persistently shown regional inequalities<sup>10</sup> and a number of funding challenges<sup>11,12</sup> facing collective actions<sup>13</sup>. In addition, findings highlight the importance of local government in the implementation of oral health policy<sup>14-17</sup>.

The majority of publications reviewed by this study adopt a quantitative approach, focusing on the description and analysis of health service coverage indicators, health status, and other associated variables<sup>3,4,6,7</sup>. The performance of different governments, including mapping of governmental actors and decisions emanating from the executive branch, has yet to be systematized.

The present study examines changes in oral health policy in Brazil between 2003 and 2014. It provides a general overview of the oral health-care scenario during each government by characterizing the epidemiological profile, Brazilian dentist labor market and training and professional development, and use of public and private dental services in each period. In addition, we outline the main institutional actions and

proposals developed by the executive branch under the National Oral Health Policy in each government during the study period.

## Methodology

A documental analysis was conducted to gain an insight into the development of oral health policy in Brazil during the period 2003 to 2014. The three presidential terms analyzed by this study were as follows: president Lula's first and second terms (Lula I and Lula II, 2003/2006 and 2007/2010, respectively), and president Dilma's first term (Dilma I, 2010/2014). For comparative and analytical purposes, we adopted the policy cycle model<sup>18</sup>, specifically focusing on the implementation phase<sup>19</sup>.

We identified the main governmental and nongovernmental actors. Governmental actors are those comprising the administrative agencies of government, including the president and his/her team, staff, and political posts in government departments. Nongovernmental actors include interest groups, such as researchers, unions, professional bodies, public interest associations, and businessmen<sup>18</sup>. The following nongovernmental actors (associations and movements) were identified: the Federal Dental Council (*Conselho Federal de Odontologia* - CFO), the Brazilian Dental Association (*Associação Brasileira de Odontologia* - ABO), the Brazilian Association of Public Oral Health (*Associação Brasileira de Saúde Bucal Coletiva* - Abrasbuco), the National Dental Federation (*Federação Nacional de Odontologistas* - FNO), and the Interstate Dental Federation (*Federação Interestadual dos Odontologistas* - FIO). Special attention is given to decisions taken within the Oral Health Coordinating Office of the Ministry of Health (*Coordenação Geral de Saúde Bucal do Ministério da Saúde* - CGSB) during the study period.

The main data sources used to characterize the oral health care scenario (epidemiological profile, dentist labor market, provision/availability public services, and use of public and private dental services) were documents produced by key government agencies available on their websites, including publications in the field of oral health care, such as: the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística* - IBGE); the portal "Strategic Management Support Room" (*Sala de apoio à Management Estratégica*) and database DATASUS, both of the Ministry of Health; and the Federal Dental

Council (*Conselho Federal de Odontologia - CFO*) (Chart 1).

The analysis of decision-making within the CGSB during the study period (institutional proposals and actions, and results) presented in Chart 2 is based on the following documents: 1) Minutes of meetings of the National Health Council (*Conselho Nacional de Saúde*) outlining goals and targets and the site of the Primary Health Care Directorate of the Health Ministry (*Diretoria da Atenção Básica/CGSB*); 2) Ministerial orders and regulations published in the Official Gazette of the Union; and 3) reports on the findings of national epidemiological surveys (*SB Brasil 2003* and *SB Brasil 2010*) and outpatient data sets obtained from the *DATASUS/TABNET*.

The proposals and actions developed by each government through the CGSB were categorized according to the components of a well-functioning health care system adapted by Souza and Bahia<sup>22</sup>, as follows: *infrastructure* (establishments, equipment, medication, and knowledge); *human resources* (health workers); *funding* (funds allocated to the program from the federal budget, as well as social security, social insurance, and private insurance); *management and organization* (organization of service provision, networks, and the execution of actions and programs); and *care model* (approach to service delivery and work processes involving health care professionals and developing care delivery models that promote welcoming care settings and meet the healthcare needs of a specific population) (Chart 2).

With respect to federal funding, we examined the annual budget laws plus their annexes to identify the funds allocated to oral health care in the function 010 pertaining to health, available at [www.orcamentofederal.gov.br](http://www.orcamentofederal.gov.br) and [www.planalto.gov.br](http://www.planalto.gov.br).

We calculated the percentage growth in the number of ESBs and CEOs in each period of government based on the difference between the number of teams and centers in the first and last year of each period (Lula I, Lula II, and Dilma I). Service provision was regarded as available funding, while coverage by ESBs was considered as potential coverage or, in other words, the proportion of the population that potentially benefits from the intervention<sup>23</sup> (Chart 1). Nominal growth in funding for oral health was calculated by comparing the amount in 2015 divided by the nominal amount allocated in 2003.

The category 'policy outcomes' compared the coverage of first dental appointment in the public health system as a proxy for increase in use

of services, as shown in Figure 1. Trends in the proportion of restorations in the Dental Caries, Tooth Loss, and Restorations rate (*Dentes Cariados, Perdidos e Obturados/Restaurados - CPO-D*) based on the findings of national epidemiological surveys was used as a proxy for access to restorative care. We also analyzed the provision of specialist dental care under the public health system, focusing on endodontic therapy.

## Results

### The oral health care scenario

Chart 1 shows the oral health care scenario in each government period. At the end of the 1990s, the prevalence and severity of dental caries among 12-year-olds (CPO-D 6.7) and edentulism among adults was very high (72% of the urban population aged between 50 and 59 years had already extracted all teeth from at least one jaw), which earned Brazil the nickname *o país dos banguelas* (country of the toothless). The epidemiological profile began to improve in the 21st century. A national study focusing on prevalence and severity of dental caries and related tooth loss observed a downward trend in prevalence and severity of dental caries among school children (aged 12 years) and young adults (aged between 15 and 19 years), while average tooth lost reached 25.8 among older adults (aged between 65 and 74 years) in 2003.

In 2010, the most recently available survey shows a downward trend in prevalence and severity of dental caries among children and adolescents, while among pre-school children (aged five years) the target (50% of 5-6 year-olds free of dental caries) has yet to be met. There was slight reduction in the prevalence and severity of caries among adults (CPO-D 17.2), while no significant change was observed among older people (CPO-D 27.5). The rate of tooth loss remained extremely high among adults and older people: 53.7% of Brazilians aged between 65 and 74 years are toothless and 22.4% of people aged between 35 and 44 years do not have functional dentition (less than 21 natural teeth). Regional inequalities related to human development are significant. The prevalence and severity of dental decay is highest in towns in the interior of the north and north east, followed by the state capitals of the Northeast Region.

With regard to the dentist labor market, the number of dentists in Brazil grew from 201,100 in 2005 to 219,600 in 2009. It is estimated that the

**Chart 1.** Oral health care scenario based on the epidemiological profile, dentist labor market, provision (availability) of dental services, and use of public and private dental services in Brazil in the three periods of government: Lula I (2003-2006), Lula II (2007-2010), and Dilma (2011-2014).

Oral health care scenario	Government		
	Lula I (2003-2006)	Lula II (2007-2010)	Dilma I (2011-2014)
<b>Epidemiological profile 1</b>	First major national survey conducted in 2000, published in 2003, showing WHO target for CPO-D at 12 years (2.78) reached. CPOD 35-44 years: 20.12 (2003). Only 54% of adults and 10.2% of older adults have at least 20 natural teeth, a national scourge. Social and regional inequalities.	Improvements among school-age children (CPO-D=2,1), but target not achieved for pre-school children. Rates of edentulism remain very high; no significant improvements. CPOD 35-44 years (16.3); 65-74 years (27.5). Persistent regional and social inequalities. Prevalence of severity greater in small towns in the interior of the north and northeast. Improvements in performance against indicators in state capital and medium-sized towns in the South and Southeast region.	National survey not conducted (every 10 years - 2020).
<b>The dentist labor market and training and professional development 2</b>	2005: country has 201,100 dentists; Dentists in the SUS: 29.2% 2003: 170 colleges, 68.8% of which private; 37% of dentists have average monthly salary of between 1,000 and R\$2,000, and 5% between 4,000 and R\$5,000 (2003)*.	2009: country has 219,600 dentists. Dentists in the SUS: 27.0%. 2009: 197 colleges, 72% of which private 35% of dentists have average monthly salary of between 1,000 and R\$2,000 and 9% between 4,000 and R\$5,000 (2007)*.	2014: country has 264,500 dentists. Dentists in the SUS: 30% 2012: 203 colleges, 72.9% of which private. Average monthly dentist's salary is R\$4.238.65 **
<b>Provision (availability) of dental services 3</b>	15,086 ESBs in 2006: 254.04% increase compared to 2002). 100 CEOs in 2004 increasing to 498 at the end of the government (increase of 398%).	20,424 ESBs in 2010 (35.4% increase compared to 2006). 853 CEOs (increase of 71.3% compared to 2006). 676 LRPDs.	24,243 ESBs in 2014 (18.7% increase compared to 2010). 1,995 LRPDs. 10 year anniversary of Brasil Sorridente celebrated at the CIOSEP. 1,030 CEOs (increase of 20.8% only compared to 2010).
<b>Use of public and private dental services 4</b>	In 2003, 84.1% of the population (147.9 million) went to the dentist, 38.8% in previous 12 months (PNAD, 2003). 15.9% (27.9 million) had never been to the dentist. 64.4% used private services: 48.2% paid out-of-pocket and 16.2% used health insurance. 30.7% used the SUS (PNAD, 2003). Around 14% of adolescents, 3% of adults, and 5.8% of older adults had never been to the dentist (SB 2003)	In 2008, 88.5% of the population (168 million) went to the dentist, 40.4% in previous 12 months 11.7% had never been to the dentist (22.1 million). 69.6% used private services: 53.5% paid out-of-pocket and 17.1% used health insurance. 29.7% used the SUS (PNAD, 2008).	74.3% used private services. 19.6% of the population used the SUS. Inequalities in access to services associated with education level: use of services was 67.4% among people with higher levels of education compared to 36.6% among those with little or no formal education (IBGE. PNS, 2013).

Sources: <sup>1</sup>SB Brasil, 2003; SB Brasil, 2010. <sup>2</sup>Morita et al.<sup>22</sup>; Bleicher<sup>27</sup>; IPEA, 2013\*\*; CFO, 2014. <sup>3</sup>Portal "Strategic Management Support Room" of the Ministry of Health (Sala de Gestão Estratégica do Ministério da Saúde) and SIA/SUS/DATASUS/TABNET. <sup>4</sup>PNAD 2003; SB Brasil, 2003; PNAD 2008; PNS, 2013 (IBGE).

**Chart 2.** Proposals and institutional actions of the executive branch in the three periods of government (Lula I, 2003-2006, Lula II, 2007-2010), and Dilma, 2011-2014) and results based on public dental service indicators.

Period	Lula I (2003 a 2006)
<b>Proposals<sup>1</sup></b>	<p>Formulation and approval of the National Oral Health Policy (PNSB) directives, with for basic elements: expansion of Oral Health Teams (ESBs) and training and development, creation of Dental Specialty Centers (CEOs), fluoridation of public water supplies; and oral health surveillance (monitoring of performance against indicators) (BRASIL, 2004).</p> <p>Targets 2005: a) creation of 265 CEOs; b) creation of 484 dental surgeries for ESB modality II; c) support for 500 fluoridation systems; d) 12,000 teams by 2005, with 82.8% population coverage and 4,000 municipalities with dental health care; e) 82 million people by the end of the term, 100% population coverage (CNS, 2004).</p> <p>Budget proposal 2005: R\$ 125 million (CNS, 2004).</p>
<b>Institutional actions<sup>2</sup></b>	<p><b>Infrastructure:</b> creation of referral centers for specialized dental care (CEO I and CEO II) and licensing of LRPDs in 2004.</p> <p><b>Human resources:</b> emphasis on bringing ESB in line with ESF (2003), establishing a ceiling of 1ESB to 1 ESF; discussion and approval of policy directives for the PNSB in a meeting of the CIT (2004).</p> <p><b>Funding:</b> creation and maintenance of a specific budget category for oral health (2004); increase of 20% in financial implementation incentives transferred to the ESB (2004); funding determination for CEO and dental prosthesis (2004).</p> <p><b>Management and organization:</b> ministerial order enables funding advances for the implementation of CEO (2005), definition of activities undertaken by the UNACON and CACON (2005); approval of the Primary Health Care Policy (2006); publication of ministerial order determining the maximum allowable concentration of fluoride per mg/L of water (2004); creation of the Technical Advisory Committee (<i>Comitê Técnico Assessor</i>) to set up and implement oral health surveillance strategy within the PNSB (CTA-VSB); definition of criteria, regulations, and requirements for the implementation and licensing of CEOs and LRPDs (2004). Composition of a group to define technical and regulatory instruments as support for the elaboration and development of oral health care actions (2004).</p>
<b>Results<sup>3</sup></b>	<p><b>Access to restorative care</b></p> <p>% of dental fillings from the CPOD at 12 years: 33.0% (0.91)</p> <p>% of dental fillings from the CPOD 35-44 years: 22.0%(4.4)</p> <p><b>First programmatic dental appointment</b> (2006): 22.142.231. 12.5% of coverage (-4.7% compared to 2003).</p> <p><b>Specialized dental care</b> (2006): 7,328,968. Increase of 18.3% compared to 2002 (FHC government)</p> <p>Endodontic therapy, including all procedures (2006): 1,023,046</p>

it continues

percentage of dentists that work in the Unified Health System (*Sistema Único de Saúde – SUS*) was between 27 and 30% between 2003 and 2006<sup>20</sup>, while during the second term of president Lula 27% of dentists worked in the SUS. At the end of Dilma I (2014), the CFO registered 264,500 professionals, of which approximately 30% worked in the public system (Chart 1).

With respect to training and professional development, there was a gradual but consistent increase in the creation of new colleges of dentist-

ry during the study period, particularly private colleges. The number of colleges grew from 170 (113 private, 68.8% of total colleges) in 2003 to 203 (148 private, 72.9% of total colleges) in 2012, which is equivalent to a 19.4% increase in almost 10 years.

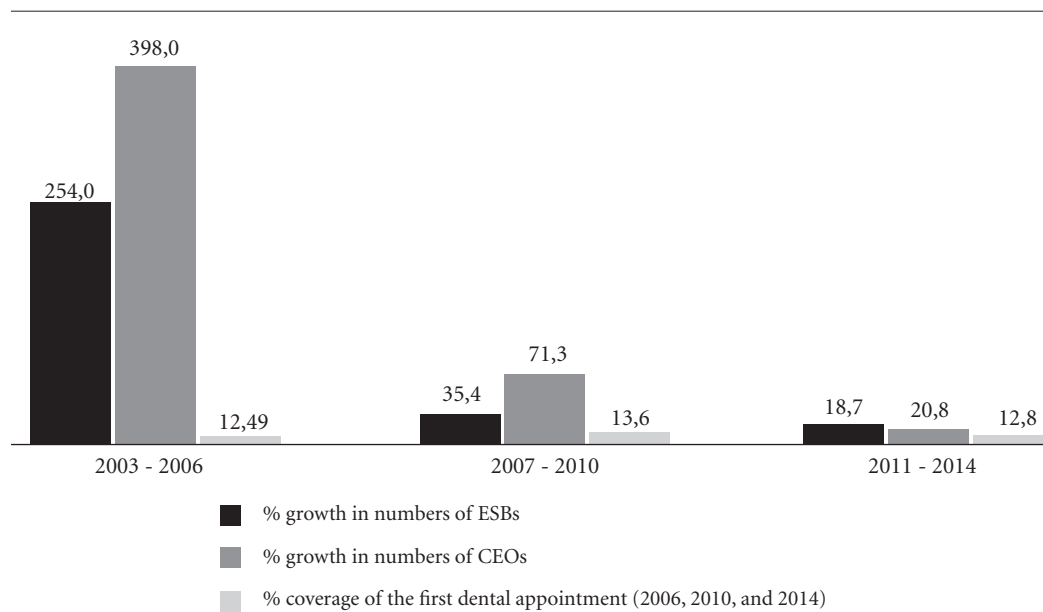
The percentage of dentists with a monthly income of between R\$ 4,000 and R\$ 5,000 increased slightly, from 5% in 2003 to 9% in 2007<sup>20</sup>. Specific surveys of dentist salaries were not carried out during Dilma I. However, in 2013, the Institute of

Chart 2. continuation

Period	Lula II (2007-2010)	Dilma I (2011-2014)
<b>Proposals<sup>1</sup></b>	Creation of the Technical Committee to advise the National Health Council (CNS) in relation to issues regarding oral health (BRASIL, 2006); Increase in inflation-adjusted funding for primary, specialized, and high complexity care (BRASIL, 2008; BRASIL, 2009; BRASIL, 2010; BRASIL, 2010); dental equipment supply plan for ESBs (BRASIL, 2009); Inclusion of dental prostheses; Oral health incorporated into the of the Health Training and Development Program for Mid-level Professionals (PROFAPS) (BRASIL, 2009); Publication of the main findings of the national oral health survey (BRASIL, 2010).	Launch of the policy directives of the indigenous component of the PNSB (BRASIL, 2011); Launch of the Brazil Without Poverty Plan including an oral health directive (BRASIL, 2011). National program Improving Access and Quality in Primary Health Care (BRASIL, 2011) and PMAQ-CEO in 2014; approval of the National Primary Care Policy (BRASIL, 2011); Oral health included in the National Plan of Rights of People with Disabilities (2011-2014); Launch of “GraduaCEO” (BRASIL, 2014).
<b>Institutional actions<sup>2</sup></b>	<p><b>Infrastructure:</b> creation dental equipment supply plans for ESBs in the ESF (2009).</p> <p><b>Human resources:</b> creation of regulations for TSB and ASB professionals and inclusion of dental prostheses and oral health as priority technical area of the Health Training and Development Program for Mid-level Professionals (2009);</p> <p><b>Funding:</b> ministerial orders increasing funding for running costs of ESB and dental prostheses (2008) creation of a funding category for oral health care at hospital level (2010).</p> <p><b>Management and organization:</b> creation of the Mobile Component of Oral Health Care and Mobile Dental Unit (UOM) (2009); possibility of linkages between the ESB and Community Health Agent Teams (AECS) (2009); creation of new procedures capable of being implemented in the CEO (2010). Creation of the Intersectoral Commission on Oral Health to advise the CNS on issues relating to oral health (2008) integration of the CGSB into the structure of the Ministry of Health (2010).</p> <p>Implementation of 603 new public water supply fluoridation systems between 2003 and 2010, covering 458 municipalities in 11 states, and reaching around 5.2 million people (SBBrasil, 2010).</p> <p><b>Care model:</b> implementation of the School Health Program (PSE) in 2007.</p>	<p><b>Care model:</b> PMAQ-AB and PMAQ-CEO implemented in an attempt to improve care quality and promote self-assessment of contracted teams and centers.</p> <p>The finds suggest problems in adopting the care model originally proposed for the ESF.</p>
<b>Results<sup>3</sup></b>	<p><b>Access to restorative care</b></p> <p>% of dental fillings from the CPOD at 12 years: 35.3% (0.73).</p> <p>% of dental fillings from the CPOD 35-44 years: 43.8 % (7.33)</p> <p><b>First programmatic dental appointment</b> (2010): 26,043,708; 13.6% of coverage (8.5% increase compared to 2006).</p> <p><b>Medium and High Complexity Dental Treatment</b> (2010): 3,298,376</p> <p>Endodontic therapy (2010): 635,341</p>	<p><b>Access to restorative care*</b></p> <p><b>First programmatic dental appointment</b> (2014): 26,199,247 (0.6% increase compared to 2010)</p> <p><b>Medium and High Complexity Dental Treatment</b> (2014): 3,743,408; increase of 15.3% compared to previous government.</p> <p>Endodontic therapy (2014): 633,471.</p> <p>Reduction of 0.29% in procedures.</p>

Source: <sup>1</sup>Information from the site of the Primary Health Care Directorate, Oral Health Coordinating Office, and National Health Council.

<sup>2</sup>Description and analysis from the Official Gazette of the Union. <sup>3</sup>SB Brasil 2003 and SB Brasil 2010; and also outpatient data sets from DATASUS/TABNET. \*Information not available because epidemiological surveys were not conducted during this period (2011-2014). \*\*High Complexity Care Units (Unidades de Assistência de Alta Complexidade - UNACON) and High Complexity Cancer Care Centers (Centros de Assistência de Alta Complexidade em Oncologia - CACON).



**Figure 1.** % growth in the number of oral health teams in the Family Health Strategy and Dental Specialty Centers by government and % coverage of the first dental appointment under the SUS (2006, 2010, and 2014) between 2003-2014. Brazil.

Source: Brasil. Ministério da Saúde. Datasus, 2015.

Applied Economic Research (*Instituto de Pesquisa Econômica Aplicada* - IPEA) reported that the average dentist salary was R\$ 4,238.65 (Chart 1). It should be noted, however, that the minimum salary increased from R\$ 240 to R\$ 380 between 2003 and 2007. These figures therefore suggest that the real salary actually declined: in 2003, R\$ 4,000 was equivalent to 16 minimum salaries, while in 2013 R\$ 4,238.65 represented only 6.3 minimum salaries.

At the end of Lula I, 15,086 ESBs had been implemented, with a total coverage of 40% of the population, representing a 254% increase compared to the last year of the government of president Fernando Henrique Cardoso (2002), which introduced incentives for the implementation of ESB/ESFs at the end of 2000. The number of ESBs reached 20,424 in 2010, with a coverage of 34% (an increase of 35.4% compared to 2006), while 853 CEOs (equivalent to an increase of 71.3% compared to 2006) and 676 LRPDs were functioning (Figure 1). The decrease in coverage despite an increase in the number of teams may be explained by the sample population, which was based on the demographic census. By 2014, 24,243 ESBs had been implemented, with 38% population coverage, equivalent to an 18.7% increase compared to the last year of president Lula's second term (Figure 1).

With regard to CEOs, 498 centers were already functioning two years after the publication of the ministerial order that provided for their implementation (2004), which is equivalent to an increase of 398%. The number of CEOs reached 1,030 at the end of 2014, an increase of 20.8% compared to 2006. Advances were made in the provision of prostheses on the public health service. At the end of 2014, there were 1,995 LRPDs, a twofold increase compared to the end of Lula II.

The analysis of the use of dental services based on the 2003 National Household Survey (*Pesquisa Nacional por Amostra de Domicílio* - PNAD) revealed that 15.9% of the Brazilian population (27.9 million people) had never been to the dentist. This percentage fell to 11.7% (22.1 million) in the 2008 PNAD. The surveys showed that 30.7% of people who sought dental services used the SUS in 2003, compared to 29.7% in 2008, showing that the percentage of the population seeking public dental services remained stable. In 2003, the majority of interviewees (64.4%) used private sector services, of which 48.2% paid out-of-pocket and 16.2% used private health insurance. In 2008, 69.6% of interviewees used the private sector, of which 53.5 paid out-of-pocket and 17.1% used private health insurance. The 2013 National Health Survey (*Pesquisa Nacional*

*de Saúde* - PNS), whose findings were published in 2015 by the IBGE, used a rather different methodology based on service use in the last 12 months, as opposed to the PNAD, whose basis was the last 15 days. The PNS revealed that private and public services were used by 74.3% and 19.6% of the population, respectively. The findings also pointed to inequalities in access to services associated with level of schooling, showing that use of services was 67.4% among people with higher levels of education compared to 36.6% among those with little or no formal education. A growing trend in the use of private services was therefore observed, together with significant inequalities between social classes (Chart 1).

### **Institutional proposals and actions of the executive branch**

Chart 2 shows the main proposals and actions developed by the executive branch during the period in question based on the components of a well-functioning health care system outlined above.

In Lula I, within the component *management and organization*, the CGSB was created with a mandate to develop technical and regulatory instruments to guide the development of oral health care actions and policy directives of the PNSB<sup>2</sup> built around four core actions: expansion of ESBs and training and development; creation of CEOs; fluoridation of public water supplies; and oral health surveillance (monitoring of performance against indicators).

During Lula II “new policy arrangements” were instituted through the creation of Mobile Dental Units (*Unidade Odontológica Móvel* - UOM) in 2009, enabling linkages between ESBs and Community Health Agent Teams (*Equipes de Agentes Comunitários de Saúde* - AECS), and the development of new procedures capable of being implemented in the CEOs in 2010.

Also during Lula II, the government sought to bring the number of ESBs in line with the ESFs, seeking to establish a one-to-one ratio, as a way of ensuring the provision of dental care through the primary care system. With respect to fluoridation of public water supplies, the government established a maximum allowable concentration of fluoride per mg/L of water. With regard to organization of specialist care, criteria, regulations and requirements were established for the creation and licensing of CEOs and LRPDs, thus laying the groundwork for the provision of specialized dental care.

In Lula II (2007 and 2010), it is worth highlighting the creation of the Intersectoral Commission on Oral Health (*Comissão Intersetorial de Saúde Bucal*), which was set up to advise the CNS on issues relating to oral health, and the integration of the CGSB into the structure of the Ministry of Health, thus defining the role of the CGSB in relation to the *management and organization* of the PNSB.

During Dilma I (2010 to 2014), measures included the creation of *Brasil Sorridente Indígena*, extending the actions of the PNSB to the indigenous population, the incorporation of oral health into the National Plan of Rights of Persons with Disabilities (*Plano Nacional dos Direitos da Pessoa com Deficiência*), and the creation of a new component of the National Oral Health Policy, *GraduaCEO - BRASIL SORRIDENTE*, which was integrated into the Health Care Network (*Rede de Atenção à Saúde*- RAS).

With respect to funding, in 2005, during Lula I, a specific budget category was created entitled oral health care, detailed as primary oral health care and specialized oral health care in the following year, thus guaranteeing legitimacy to the PNSB. In addition, the government increased financial incentives for the implementation of ESBs by 20% and granted a determination for funding for CEOs and dental prostheses. In the following period (2007 to 2010), the government increased funding for ESBs, dental prostheses, the implementation of CEOs, and oral health care at hospital level.

There was a significant increase in transfers of resources from the federal government to state and local governments during the period in question, from R\$ 83.4 million in 2003 to over R\$ 916 million in 2014, a 10.9 fold increase. The amounts transferred for primary oral health increased from R\$ 81.5 million in 2003 to R\$ 364.3 million in 2006, while funding of specialized care reached R\$ 81.1 million in 2010. At the end of Dilma I, amounts transferred for ESB/ESF reached R\$ 721.7 million (Table 1).

With respect to *infrastructure*, it is worth highlighting (Chart 1) the creation of referral centers for specialized dental care (CEO I and CEO II) and licensing of dental prosthesis laboratories in Lula I. During Lula II, the government created the dental equipment supply plan for the ESB/ESF and included oral health and dental prosthesis as priority technical areas of the health training and development program for mid-level professionals. By 2006, two years after the publication of the ministerial order that provided



**Table 1.** Transfers of resources in BRL made by the federal government to state and local governments for oral health, 2003-2014.

Year	Transfers Primary Care	Transfers Specialized Care	Investment	Total
2003	R\$ 81.522.276,62	R\$ 1.894.337,19	-	R\$ 83.416.613,81
2004	R\$ 193.630.800,00	R\$ 6.381.273,39	R\$ 3.050.000,00	R\$ 203.062.073,39
2005	R\$ 280.773.350,00	R\$ 23.293.246,44	R\$ 16.380.000,00	R\$ 320.446.596,44
2006	R\$ 364.319.950,00	R\$ 49.105.552,08	R\$ 13.050.000,00	R\$ 426.475.502,08
2007	R\$ 431.782.100,00	R\$ 66.355.547,99	R\$ 4.520.000,00	R\$ 502.657.647,99
2008	R\$ 471.964.150,00	R\$ 70.736.341,89	R\$ 4.690.000,00	R\$ 547.390.491,89
2009	R\$ 508.505.000,00	R\$ 85.205.814,84	R\$ 4.200.000,00	R\$ 597.910.814,84
2010	R\$ 593.761.400,00	R\$ 81.137.082,66	R\$ 286.860,00	R\$ 675.185.342,66
2011	R\$ 646.745.980,00	R\$ 102.914.482,88	R\$ 7.344.112,36	R\$ 757.004.575,24
2012	R\$ 779.014.555,00	R\$ 121.229.847,96	R\$ 5.513.920,88	R\$ 905.758.323,84
2013	R\$ 677.875.010,00	R\$ 146.541.329,54	R\$ 7.922.347,86	R\$ 832.338.687,40
2014	R\$ 721.771.074,00	R\$ 191.080.408,62	R\$ 3.180.000,00	R\$ 916.031.482,62

Source: The National Health Fund/Ministry of Health (*Fundo Nacional de Saúde/ Ministério da Saúde*).

for the implementation of specialist centers, 498 CEOs were already functioning, which is equivalent to an increase of 398%. In 2011, dentists were included in the Primary Health Care Professionals Valorization Program (*Programa de Valorização dos Profissionais da Atenção Básica - PROVAB*) (Chart 2).

The significant increase in the number of primary care and specialist establishments, together with the recruitment of dentists and support staff during Lula I (2003 to 2006), was not maintained throughout subsequent governments. In 2010, there were 20,424 ESBs (35.4% increase compared to 2006), 853 functioning CEOs (71.3% increase compared to 2006), and 676 LRPDs. During Dilma I, the numbers of ESBs and CEOs increased by 18.7% and 20.8%, respectively, compared to the previous government (Figure 1). Thus a certain “loss of momentum” with respect to the implementation of the policy was observed during Dilma I, despite advances in the provision of prostheses by public dental services, with a total of 1,995 LRPDs at the end of 2014.

The number of procedures classified as “specialized dental actions” grew from 6.1 million in 2002 to 7.3 million in 2006, which is equivalent to an increase of 18.3%. It is worth highlighting that the name given to this type of procedure in the DATASUS changed in 2008 to “medium and high complexity dental treatment”. Thus, data is only comparable from an outpatient production point of view from this date onwards: 3.2

million procedures were performed in 2010, increasing to 3.7 million at the end of Dilma I in 2014, equivalent to an increase of 15.3%. Growth was consistent, given that the number of specialist centers created during Dilma I increased by 20.8%. With respect to endodontic therapy, a key indicator of access to specialized dental services, data was comparable from an outpatient production point of view only in the last two governments, also due to changes in the codification of the procedure. In this respect, the number of procedures fell slightly, from 635,000 in 2010 to 633,500 in 2014, a reduction of 0.29%.

It is also important to note that since the publication of the oral health policy directives, the CGSB has entered into contracts and formal agreements concerning dental health education and research with a range of education institutions, which demonstrates a certain degree of communication and coordination between the government and researchers in relation to the promotion of research and technical cooperation in this area.

With respect to the *care model*, during Lula II, it is important to mention the School Health Program (*Programa Saúde na Escola - PSE*), an inter sectoral initiative created in 2007 that envisaged changes to the oral health care model oriented towards the development of school health services.

During Dilma I, efforts were made to promote coordination between oral health actions

and the PSE through the following initiatives: implementation of the program Improving Access and Quality in Primary Health Care (*Programa de Melhoria do Acesso e da Qualidade da Atenção Básica*) and CEOs (PMAQ/PMAQ-CEO), aimed at improving the quality of care by encouraging self-assessment by ESBs and CEOs and subsequent certification; creation of a new component of the National Oral Health Policy called *Grada-CEO*. It is evident that little emphasis was given to the care model component, with indicators of dental health care quality falling short of those related to access to services.

Coverage of first dental appointment was 13.1%, 12.5%, 13.6%, and 12.8% of the population in 2003, 2006, 2010 and 2014, respectively, totaling 26,199,247 in 2014 (increase of 0.6% compared to 2010). In other words, this indicator remained stable during the period despite the fact that the provision of services through ESBs and specialist centers increased (Figure 1). The indicators before 2000 (the year in which dentists were included in the ESF) shows little change, given that the rate in 1998 was 12.6%, which is very similar to the rate in 2014 (12.8%).

## Discussion

An increase in the provision and potential coverage of public dental services was observed between 2003 and 2006. These rates were maintained to a certain degree in subsequent periods (2007 and 2010, 2011 and 2014). It can therefore be assumed that, as Testa maintains<sup>24</sup>, the key aims of the government, defined as legitimization, growth or transformation, were met without reshaping the structure of power in the area of oral health in during the study period.

On the other hand, the successful implementation of a policy depends on a number of factors, such as the effective conveyance of a clearly formulated project to government teams capable of implementing it, funding, and the effective co-ordination of all state actors involved in the execution process<sup>19</sup>. Evidence suggests that implementation was more top-down than bottom-up, reflecting the values and interests of state agencies<sup>25</sup>. The present study suggests that the above conditions were met, given that the main body responsible for implementing the policy was relatively successful in the process of inducing and maintaining initial momentum over the study period<sup>26</sup>. Although the present study did not seek to analyze the policy formu-

lation process and public participation therein, the policy document incorporates a number of premises of the area meetings and National Oral Health Conferences (*Conferências Nacionais de Saúde Bucal*).

The oral health care scenario points to a declining trend in dental caries among the Brazilian population and the maintenance of regional and social inequalities, whereby vulnerable groups show a higher prevalence and severity of dental caries and related tooth loss<sup>27</sup>. However, the overall decline in the prevalence of caries may lead to a higher number of dentate adults in the future, with probable consequences for the dental service system that should be monitored. A reduction in the main oral complaint (dental caries) may also lead to changes in oral health needs and therefore the demand for services. Growth in the number of dentate adults and older adults may lead to a higher prevalence of other complaints such as periodontal disease and malocclusion.

Brazil has the largest number of dentists per capita in the world. Bleicher<sup>21</sup> highlights that the increase in the number of dentists between 1997 and 2007 was considerably greater than the population growth rate: 114% versus 18.6%, respectively<sup>21</sup>. A study published in 2010<sup>20</sup> revealed that Brazil is home to around 20% of the world's dentists. However, significant regional disparities exist in the distribution of these professionals, with three states (São Paulo, Minas Gerais, and Rio de Janeiro) accounting for over 57% of practitioners and around 40% of the countries colleges of dentistry. The gender distribution of dentists has changed radically over the last 50 years: in the 1960s, almost 90% of dentists were men, whereas currently the majority are women (54%). It may be assumed that nongovernmental actors and interest groups such as the CFO, ABO, and unions, exert significant pressure on the public labor market in order to reduce unemployment in the field. Further research is necessary, therefore, into how these groups influence policy to ensure the creation of more posts for dentists in this sector.

The proportion of dentists who provide services in the SUS is around 37.1%<sup>9</sup>. However, government figures for the period 2003 to 2014 show that this percentage varied between 29.2% in 2006 and 30% in 2014. It is important to stress that the increase in the number of ESBs did not automatically result in the creation of new posts, since many practitioners were reallocated from other public services, as shown by a study conducted in 1999, before dentists began to be incorporated into the ESF at the end of 2000, which

showed that 30,000 dentists worked in the public health sector<sup>21</sup>. The same study also showed that the majority of dentists working in the SUS also worked in the private sector under different types of arrangements including, traditional private practice, *aluguel de turno*, where dentists rent out surgeries and equipment in return for a percentage of earnings, partnerships, employment, etc..

The oral health policy initiatives developed after 2003 have two fundamental facets that are not mutually exclusive: the official stance, which suggests that epidemiological survey data, such as that showing the high prevalence of tooth loss among adults and the association between fluoridation of public water supplies and reduced tooth decay, were important inputs into decision-making that led to the formulation of PNSB<sup>28</sup>; and the other, which claims that placing oral health on the agenda and the formulation of alternative policies resulted from the actions of distinct interest groups<sup>29</sup>, including the active participation of the epistemic community, left-wing advocates, and researchers<sup>26</sup>.

A large part of the proposals adopted in the formulation of the PNSB were discussed during the national oral health conferences that preceded its implementation, the last of which was held in 2004 and whose proposals were partially incorporated into the PNSB. On the one hand, nongovernmental actors and professional bodies (the ABO, CFO, FIO, and FNO) demonstrated concerns about the labor market and employment, while left-wing party members, recognized as members of the epistemic community, participating in the national conferences at the beginning of Lula I significantly influenced the formulation of the policy<sup>26,29,30</sup>.

Brazil stands out among other developing countries for incorporating oral health into primary health care and the fluoridation of public water supplies, which are recognized as important strategies for preventing tooth decay<sup>31</sup>.

The findings show that the use of dental services provided through the SUS between 2003 and 2008 remained stable at around 30%, while the use of private dental services increased from 64.4% in 2003 to 74.3% in 2013. The current scenario, which remains pretty much the same as that observed in the 2000s, comprises two health subsystems: the public system, which is expanding in terms of infrastructure and human resources, but where levels of service use are stable; and the private system, which is expanding with unprotected working arrangements, but where the supply of qualified practitioners in the

labor market is greater than demand. Monitoring of these trends is essential for the formulation of future policies.

The findings show that, following an initial increase, the number of institutional actions directed at the provision of dental services leveled off. It is important to highlight that in all periods major emphasis was placed on improving infrastructure, including the purchase of new equipment for primary and specialized care and LRPDs and increased staffing levels (dentists and oral health support staff), which was made possible by a significant increase in funding during the period, including funds for investment and a budget category for capital acquisitions. The efforts made to increase funding, infrastructure and staffing levels did not produce the same results in relation to coverage of first dental appointment, a key indicator of access to health services. This is a problematic question that merits further study.

Despite a significant increase in funding for oral health, studies raise questions about the continuity and maintenance of policies due to funding shortfalls, lack of political coordination, and poor management<sup>12,30</sup>. Another point is that the effective implementation of the policy depends on triangulation between the project, government capacity, and governability at state and municipal level<sup>15</sup>.

The care model component was given lowest priority in institutional proposals and actions developed by the three governments. This short coming influences policy effectiveness and requires the adoption of future measures by health-care managers and officials to correct the situation. Furthermore, dentists often lack the essential skills and qualifications needed to work in the SUS and therefore depend on the local government for their success<sup>14,15</sup>. It is also important to highlight the existence of competition between the public sector, a setting of symbolic financial struggle, and the private sector, which is known for its dominant liberal tradition.

One of the main limitations of this study is that it did not perform a more comprehensive analysis of other nongovernmental and governmental actors, such as the National Health Council, nor did it explore the contribution of social workers employed in these government bodies. Furthermore, the analysis of funding addressed the amounts that are transferred (nominal amount), which are not inflation-adjusted. Another limitation is that the methodologies used for the PNAD and PNS differ considerably: the

former considers service use in the last 15 days, whereas the PNS covers the previous 12 months. Despite this limitation, however, the findings of these surveys provide important insights into implementation process since they help to identify trends in the use of public and private dental services by the Brazilian population.

The use of rates of coverage of first dental appointment, trends in the proportion of restorations in the CPO-D rate, and number of endodontic procedures provides an approximate idea of the probable policy outcomes and further studies are necessary to determine whether these associations are statistically significant.

This study provides a general overview of the implementation of a sectoral policy. Further studies should be undertaken to provide a deeper analysis of policy implementation and gain insight into future directions in each of the core areas from a perspective of struggle in defense of the SUS and protection of the right to oral health.

### **Collaborations**

SCL Chaves elaborated the research project, coordinated data collection and analysis, and drafted the final version of this manuscript. AMFL Almeida, SF de Santana, and CML Santos participated in data collection and analysis and in the drafting of the final version of this manuscript. SG de Barros and TRA Rossi participated in data analysis and in the final revision of this manuscript. The authors declare that there are no conflicts of interest.

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