

# Specialized Dental Care in the Brazilian Unified National Health System (SUS)

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## ABSTRACT

**Objective:** To analyze specialized dental care through access, demand and the work processes provided by the CEO's, using secondary data from the cycles of the PMAQ-CEO. **Material and Methods:** Cross-sectional study using public domain data. Variables of interest were selected from the external evaluation instrument data matrices and were grouped in categories. The categories were geographic distribution, structural, human resources, work processes and access and coordination. **Results:** The total of 932 CEO's were evaluated in 2014 and 1,042 in 2016, most of them type II, present in the Northeast region. In both cycles, the highest average of dentists worked in the endodontic specialty (2.4 professionals per CEO) and the lowest in oral medicine (0.8 professionals per CEO). Of the two cycles, 91.5% of the CEO's had a manager, 79.5% performed action planning activities and 74.5% realized internal self-assessment processes. There was an increase in the mean number of days to be seen at the CEO in all analyzed specialties ( $p < 0.001$ ) and 85.2% of the CEO's managers reported that there is a reference for oral cancer confirmed cases. **Conclusion:** Between the PMAQ-CEO cycles the number of CEO has increased, but there are still a big pent-up demand and the presence of care gaps. However, an expansion and improvement of the CEO's actions was evidenced, mainly related to the work processes.

**Keywords:** Dental Health Services; Health Care Quality, Access, and Evaluation; Specialties, Dental.

## Introduction

The oral health services in the Unified Health System (SUS) were historically linked to the difficulty of access to socioeconomically disadvantaged populations. The difficulty of access results in the precariousness of oral health conditions and in inequity in health [1-3]. As a strategy for the population's oral health care, the Oral Health Teams (ESB) were inserted into the Family Health Strategy Teams (ESF), resulting from several discussions between entities, managers, and professionals based on integrality and continuity of care. However, oral health services were only concentrated in Primary Health Care (PHC) [4].

Dental Specialty Clinics (CEO) were implemented as part of the National Oral Health Policy (PNSB) to expand secondary oral health care in the country. The CEO offers medium-complexity care for the specialties of endodontics, stomatology, minor oral surgery of soft and hard tissues, dentistry for special needs users and periodontics. They can also offer other specialties, serving as a primary strategy in maintaining integrality in oral health care. The Regional Dental Prosthesis Laboratories (LRPD) also came with the implementation of the PNSB, helping the ESB of the PHC, in order to carry out the manufacture of dental prostheses [1,5-7].

Since 2004, the year in which the PNSB was implemented, noted the need to evaluate CEO efficiency, work processes, user's satisfaction and establishments performances [8]. The scientific production about the performance of the CEO was restricted to the global achievement of goals or the performance of outpatient procedures [3,6,7,9]. There was no evaluation of substantial and standardized indicators and the self-assessment process [10].

In 2013, the Ministry of Health instituted the Program to Improve Access and Quality of Dental Specialty Clinics (PMAQ-CEO) with the objective of increasing and improving access and quality of care for CEO [11]. The PMAQ presented voluntary adherence. The evaluation methods induced the health establishments to promote a national standardization of the quality of care, establishing continuous processes of self-assessment and planning [12]. In addition, the PMAQ-CEO aimed to create a database, available for public access, which information on a considerable number of Brazilian CEO [10,12].

There is a lack of studies evaluating specialized oral health care in Brazil [4,10,12]. Previously published studies reported the results of the first cycle of the PMAQ-CEO [2,8,10,11,13-17]; however, data from the second cycle are still poorly known. Thus, the aim of the present study was to analyze specialized dental care through access, demand and the work process provided by the CEO's, using secondary data from the cycles of the PMAQ-CEO.

## Material and Methods

### Study Design and Data Collect

Cross-sectional study with data of the public domain. The variables were collected in field, in the 2014 and 2016 years by PMAQ-CEO's evaluators and the authors obtained the data from the Ministry of Health website (<http://aps.saude.gov.br/ape/pmaq>) [18]. Evaluators were selected and calibrated by higher education and research institutions throughout Brazil. The interviewers were dentists who used the same questionnaire. The questionnaire was available in electronic format, standardized and answered using portable computers (tablets) [13]. Exclusion criteria adopted by the PMAQ-CEO were: CEO under renovation, closed, those disabled by the Ministry of Health and those who refused to participate in the external evaluation of the PMAQ-CEO [13,19].

PMAQ-CEO External Evaluation Instrument (AVE PMAQ-CEO).

During the external evaluation of both PMAQ-CEO cycles, the instrument used was structured in three modules. Module I - observation in the CEO. Module II - interview with the establishment's manager and a dental surgeon who worked at the location. Module III - Interview with CEO users. The objectives of the three modules were: evaluate the establishment's structure conditions, equipment, instruments and supplies; work process and the organization of the service and to verify the users' satisfaction of the CEO with the service provided [17,20].

#### Interest's Variables

Comparisons were made between the first and second cycles of the PMAQ-CEO and according to the data scoring matrices, some variables were selected and grouped into the following categories:

- a) Geographic distribution: CEO's geographic region and federative unit where CEO was localized;
- b) Structural: CEO's type;
- c) Human resources: number of dentists who worked in minimal specialties and the sum of the working hours of professionals working in the specialties;
- d) Work processes: CEO's management; action planning activities; monitoring and analysis of established goals; self-assessment processes; support from other professionals in helping and supporting the resolution of complex cases; matrix support or support actions for the ESB by PHC in solving cases considered complex; actions carried out by the professionals of the CEO together with the ESB by PHC; use of clinical and electronic medical records; offer of other specialties;
- e) Access and coordination: Access to the CEO; organization of referral vacancies for care in a hospital environment; referral for oral cancer's confirmed cases; counter-referral to PHC's teams.

#### Statistical Analyses

Data were tabulated in the IBM Statistical Package for the Social Sciences® (SPSS) version 24.0. For the performance of appropriate statistical analyses and tests was accepted at 5% by significance level. The verification of normality sample was using the Kolmogorov-Smirnov test. To compare the means of numerical variables, Student's t and Mann-Whitney U tests were used. To identify associations between dichotomous nominal categorical variables between the first and second cycles of the PMAQ-CEO, the Pearson's chi-square test ( $\chi^2$ ) was used.

## Results

PMAQ-CEO's assessment was carried out with 932 CEO in the first cycle and 1,042 in the second cycle. Even though CEO adherence was higher in the second cycle, the distribution remained similar across Brazilian states. In both cycles, there was a higher concentration of CEO in Northeast region. However, São Paulo's state had the highest number of CEOs compared to other federative units (mean of 18.7% between the two cycles). Most were type II CEO (mean of 48.8%), followed by type I (mean of 38.8%) and III (mean of 12.3%). North's region shows significant inequality in terms of the availability of CEO. Even with a higher number of states than the South and Southeast regions, the North's region shows a mean of 62 establishments adhering to the program (mean of 6.3%) (Table 1).

Endodontics was the specialty with the highest number of working dentists (mean of 2.4 dentists per establishment in both cycles). Stomatology was the specialty with the lowest number of professionals working (mean of <1 dentist per CEO). Only periodontics showed a reduction in the number of professionals ( $p < 0.05$ ) (Table 2).

**Table 1. Distribution of Dental Specialty Clinics (CEO) by geographic region and federative unit according to the first and second cycles of the National Program for the Improvement of Access and Quality (PMAQ), 2014 and 2016.**

Geographic Region	Federative Unit	CEO's Type – 1° Cycle				Total N (%)	CEO's Type – 2° Cycle				Total N (%)
		Type I N (%)	Type II N (%)	Type III N (%)	Total N (%)		Type I N (%)	Type II N (%)	Type III N (%)	Total N (%)	
North	Acre	1 (0.1)	1 (0.1)	0 (0.0)	2 (0.2)	60 (6.3)	1 (0.1)	1 (0.1)	0 (0.0)	2 (0.2)	66 (6.4)
	Amazonas	2 (0.2)	8 (0.9)	1 (0.1)	11 (1.2)		2 (0.2)	8 (0.8)	3 (0.3)	13 (1.2)	
	Amapá	1 (0.1)	0 (0.0)	2 (0.2)	3 (0.3)		0 (0.0)	0 (0.0)	2 (0.2)	2 (0.2)	
	Pará	16 (1.7)	8 (0.9)	5 (0.5)	29 (3.1)		18 (1.7)	10 (1.0)	4 (0.4)	32 (3.1)	
	Rondônia	0 (0.0)	6 (0.6)	1 (0.1)	7 (0.7)		0 (0.0)	7 (0.8)	1 (0.1)	8 (0.8)	
	Roraima	0 (0.0)	1 (0.1)	0 (0.0)	1 (0.1)		0 (0.0)	2 (0.2)	0 (0.0)	2 (0.2)	
	Tocantins	4 (0.4)	2 (0.2)	1 (0.1)	7 (0.7)		4 (0.4)	1 (0.1)	2 (0.2)	7 (0.7)	
Northeast	Alagoas	11 (1.2)	10 (1.1)	1 (0.1)	22 (2.4)	357 (38.4)	16 (1.5)	9 (0.9)	0 (0.0)	25 (2.4)	410 (39.3)
	Bahia	29 (3.1)	38 (4.1)	8 (0.9)	75 (8.0)		31 (3.0)	40 (3.8)	7 (0.7)	78 (7.5)	
	Ceará	37 (4.0)	16 (1.7)	27 (2.9)	80 (8.6)		31 (3.0)	13 (1.2)	30 (2.9)	74 (7.1)	
	Maranhão	3 (0.3)	22 (2.4)	1 (0.1)	26 (2.8)		6 (0.6)	20 (1.9)	2 (0.2)	28 (2.7)	
	Paraíba	33 (3.5)	16 (1.7)	4 (0.4)	53 (5.7)		60 (5.8)	18 (1.7)	4 (0.4)	82 (7.9)	
	Pernambuco	17 (1.8)	21 (2.3)	2 (0.2)	40 (4.3)		26 (2.5)	26 (2.5)	6 (0.6)	58 (5.6)	
	Piauí	14 (1.5)	13 (1.4)	1 (0.1)	28 (3.0)		16 (1.5)	13 (1.2)	1 (0.1)	30 (2.9)	
	Rio Grande do Norte	0 (0.0)	21 (2.3)	2 (0.2)	23 (2.5)		1 (0.1)	22 (2.1)	2 (0.2)	25 (2.4)	
Sergipe	0 (0.0)	7 (0.8)	3 (0.3)	10 (1.1)	0 (0.0)	8 (0.8)	2 (0.2)	10 (1.0)			
Centre-west	Federal District	2 (0.2)	7 (0.8)	0 (0.0)	9 (1.0)	62 (6.7)	2 (0.2)	7 (0.7)	0 (0.0)	9 (0.9)	71 (6.8)
	Goiás	7 (0.8)	15 (1.6)	6 (0.6)	28 (3.0)		12 (1.2)	17 (1.6)	5 (0.5)	34 (3.3)	
	Mato Grosso do Sul	4 (0.4)	10 (1.1)	1 (0.1)	15 (1.6)		3 (0.3)	11 (1.1)	1 (0.1)	15 (1.4)	
	Mato Grosso	1 (0.1)	8 (0.9)	1 (0.1)	10 (1.1)		1 (0.1)	4 (0.4)	8 (0.8)	13 (1.2)	
South	Paraná	14 (1.5)	22 (2.3)	12 (1.3)	48 (5.1)	116 (12.4)	12 (1.2)	21 (2.0)	15 (1.4)	48 (4.6)	131 (12.6)
	Rio Grande do Sul	16 (1.7)	8 (0.9)	1 (0.1)	25 (2.7)		22 (2.1)	11 (1.1)	1 (0.1)	34 (3.3)	
	Santa Catarina	25 (2.7)	15 (1.6)	3 (0.3)	43 (4.6)		28 (2.7)	17 (1.6)	4 (0.4)	49 (4.7)	
Southeast	Espírito Santo	6 (0.6)	02 (0.2)	1 (0.1)	9 (1.0)	337 (36.2)	7 (0.7)	1 (0.1)	1 (0.1)	9 (0.9)	364 (34.9)
	Minas Gerais	27 (2.9)	54 (5.8)	2 (0.2)	83 (8.9)		31 (3.0)	54 (5.2)	6 (0.6)	91 (8.7)	
	Rio de Janeiro	16 (1.7)	44 (4.7)	6 (0.6)	66 (7.1)		19 (1.8)	47 (4.5)	8 (0.8)	74 (7.1)	
	São Paulo	63 (6.8)	99 (10.6)	17 (1.8)	179 (19.2)		69 (6.6)	100 (9.6)	21 (2.0)	190 (18.2)	
TOTAL		349 (37.4)	474 (50.9)	109 (11.7)	932 (100.0)	932 (100.0)	418 (40.1)	488 (46.8)	136 (13.1)	1042 (100.0)	1042 (100.0)

Dental prosthesis specialty was offered in 61.8% CEO's. However, there was a reduction in the number of dentists working in the dental prosthesis specialty. On the other hand, there was an increase in the sum of the weekly workload. There was a significant increase in the number of people on waiting lists for dental care in CEO's. Stomatology was the specialty that presented the shortest waiting time for attendance at the CEO. Dental prosthesis presented the longest time. There was an increase in the mean number of days to be seen at the CEO in all analyzed specialties ( $p < 0.001$ ) (Table 2).

**Table 2. Mean and standard deviation values of numerical variables measured by the External Assessment (AVE) of the National Program for Improving Access and Quality of Dental Specialty Clinics (PMAQ-CEO), 2014 e 2016.**

Variables	1° Cycle				2° Cycle				p-value
	N	Mean <sup>a</sup>	SD <sup>b</sup>	CI <sub>95%</sub>	N	Mean	SD <sup>b</sup>	CI <sub>95%</sub>	
Dentists by Specialty									
Oral Surgery	1.511	1.6	1.6	1.5-1.7	1.576	1.5	0.8	1.4-1.5	0.065
Endodontics	2.403	2.5	3.4	2.3-2.8	2.443	2.3	1.4	2.2-2.4	0.054
Oral Medicine	828	0.8	1.9	0.7-1.0	876	0.8	0.7	0.8-0.8	0.483
Dentistry for Special Needs Users	1.347	1.4	2.2	1.3-1.5	1.379	1.3	1.0	1.2-1.3	0.133
Periodontics	1.484	1.5	2.3	1.4-1.7	1.423	1.3	0.8	1.3-1.4	0.005 <sup>c</sup>
Dental Prosthesis	1.264	2.2	3.6	1.9-2.5	1.046	1.2	1.2	1.2-1.3	<0.001 <sup>c</sup>
Weekly workload <sup>e</sup>									
Oral surgery	932	30.6	20.3	29.3-32.0	1.024	32.6	20.5	32.0-35.5	0.034 <sup>c</sup>
Endodontics	932	49.2	33.8	47.0-51.4	1027	51.5	33.5	51.1-56.3	0.122
Oral Medicine	932	15.0	35.6	12.7-17.3	739	21.5	15.9	20.6-23.2	<0.001 <sup>c</sup>
Dentistry for Special Needs Users	932	26.4	18.2	25.2-27.5	958	31.1	24.5	30.5-34.7	<0.001 <sup>c</sup>
Periodontics	932	29.6	23.6	28.1-31.1	997	31.4	26.1	30.1-34.6	0.042 <sup>d</sup>
Dental prosthesis	541	31.7	19.7	30.0-33.3	609	36.5	28.3	34.2-38.8	0.001 <sup>c</sup>
Estimated Number of Days to be Attended <sup>e</sup>									
Oral surgery	441	35.9	65.8	35.7-49.4	961	58.1	107.9	51.3-65.0	<0.001 <sup>c</sup>
Endodontics	441	67.0	90.7	64.2-82.5	949	83.4	119.5	75.8-91.0	<0.001 <sup>c</sup>
Oral Medicine	441	7.1	11.9	6.1-8.0	829	7.9	16.4	6.8-9.0	<0.001 <sup>c</sup>
Dentistry for Special Needs Users	441	14.6	30.3	12.0-17.7	933	17.2	35.2	14.9-19.5	<0.001 <sup>c</sup>
Periodontics	441	28.0	57.3	24.5-35.6	936	34.6	79.1	29.5-36.6	<0.001 <sup>c</sup>
Dental prosthesis	441	111.2	127.0	97.9-121.1	690	118.4	180.4	104.9-131.8	<0.001 <sup>c</sup>

<sup>a</sup>Mean by Establishments; <sup>b</sup>Standart Deviation; <sup>c</sup>Student's t test; <sup>d</sup>Mann-Whitney U test; <sup>e</sup>Number of Dental Specialty Centers that Answered the Question.

Beyond of the five minimum specialties for the CEO implementation, 77.9% of the establishments offer other specialties: dental prosthesis, implantology, orthodontics/orthopedics, and pediatric dentistry, among others (Table 3). Of the two evaluation cycles, 91.5% CEO's have a manager ( $p < 0.001$ ), performed action planning activities (79.5%), analyzing analyzed the established goals (88.6%,  $p < 0.001$ ), and realized internal self-assessment processes (74.5%). Accession to the electronic clinical records is still low (mean of 13.3%), however has a increase to the first to the second cycle ( $p < 0.001$ ). Referenced offer to the service is predominant (59.2%) followed by the mixed offer (39.7%). There is no limited number for the hospital care reference (67.7%) and 85.2% of the CEO managers reported that there is a reference for oral cancer confirmed cases ( $p < 0.001$ ) (Table 3).

**Table 3. Dental Specialty Clinic's (CEO) work process, access, referral and counter-referral that participated in the first and second cycles of the National Program for the Improvement of Access and Quality (PMAQ), 2014 and 2016.**

Variables	1 <sup>st</sup> Cycle N (%)	2 <sup>nd</sup> Cycle N (%)	p-value <sup>a</sup>
<b>CEO's work process</b>			
CEO's management			
Manager with role accumulation	347 (37.5)	339 (43.0)	<0.001 <sup>a</sup>
Exclusive manager	464 (50.2)	403 (51.0)	
There is no manager in the CEO	114 (12.3)	48 (6.0)	
Offer of other specialties (except minimum specialties)			
Yes	728 (78.1)	813 (78.0)	1.000
No	204 (21.9)	229 (22.0)	
Action planning activities			
Yes	721 (77.7)	831 (82.0)	0.020 <sup>a</sup>
No	207 (22.3)	183 (18.0)	
Monitoring and analysis of established goals (By specialty)			
Yes	792 (85.3)	930 (91.7)	<0.001 <sup>a</sup>
No	136 (14.7)	84 (8.3)	
Team's periodic self-assessment			
Yes	678 (73.1)	761 (75.0)	0.325
No	250 (26.9)	253 (25.0)	
Support from other professionals to solving complex cases			
Yes	603 (65.0)	791 (78.0)	<0.001 <sup>a</sup>
No	325 (35.0)	223 (22.0)	
CEO's matrix support to the Primary care oral health teams in the resolution of complex cases			
Yes	656 (70.7)	878 (86.6)	<0.001 <sup>a</sup>
No	272 (29.3)	136 (13.4)	
Support frequency for Primary care oral health teams			
Often	230 (35.1)	361 (41.1)	0.017 <sup>a</sup>
Without frequency	426 (64.9)	517 (58.9)	
<b>CEO professionals' actions carried out with Primary care oral health teams</b>			
Discussion of difficult and challenging clinical cases and sentinel events			
Yes	482 (73.5)	776 (86.1)	<0.001 <sup>a</sup>
No	174 (26.5)	122 (13.9)	
Clinical actions shared with professionals from the Primary care oral health teams			
Yes	489 (74.5)	663 (75.5)	0.676
No	167 (25.5)	215 (24.5)	
Training detection of oral cancer with Primary care professionals			
Yes	358 (54.6)	627 (71.4)	<0.001 <sup>a</sup>
No	298 (45.4)	251 (28.6)	
Joint construction of therapeutic projects with Primary care oral health team professionals			

Yes	276 (42.1)	458 (52.2)	<0.001 <sup>a</sup>
No	380 (57.9)	420 (47.8)	
Continuing education activities together with Primary care oral health team professionals			
Yes	351 (53.5)	601 (68.5)	<0.001 <sup>a</sup>
No	305 (46.5)	277 (31.5)	
Clinical protocols construction and discussion			
Yes	483 (73.6)	706 (80.4)	0.002 <sup>a</sup>
No	173 (26.4)	172 (19.6)	
Reference's criteria agreement by specialty			
Yes	581 (88.6)	756 (85.1)	0.165
No	75 (11.4)	122 (13.9)	
When requested, the CEO's professionals carry out home care visits with primary care oral health teams			
Yes	315 (48.0)	461 (52.5)	0.089
No	341 (52.0)	417 (47.5)	
<b>Clinical record's use</b>			
Clinical record's use			
Yes	908 (97.8)	1003 (98.9)	0.070
No	20 (2.2)	11 (1.1)	
Electronic clinical record's use			
Yes	73 (8.0)	186 (18.5)	<0.001 <sup>a</sup>
No	835 (92.0)	817 (81.5)	
Electronic clinical records integrated with the others point network			
Yes	56 (76.7)	156 (83.9)	0.210
No	17 (23.3)	30 (16.1)	
<b>CEO' Access, reference and counter-referral</b>			
CEO's access			
Spontaneous demand	12 (1.3)	07 (0.7)	0.075
Referenced demand	531 (57.2)	625 (61.6)	
Mixed demand	385 (41.5)	382 (37.7)	
Referrals vacancy offer to care in hospital environment			
Quota system	121 (21.9)	148 (19.5)	0.375
Without limited number	364 (65.8)	548 (69.5)	
Others	68 (12.3)	84 (11.1)	
Pent-up demand for hospital-level care			
Yes	110 (19.9)	159 (20.9)	0.064
No	409 (74.0)	575 (75.7)	
Without knowledge	34 (6.1)	26 (3.4)	
Reference for oral cancer confirmed cases			
Yes	742 (80.0)	920 (90.7)	<0.001 <sup>a</sup>
No	186 (20.0)	94 (9.3)	

<sup>a</sup>Pearson's chi-square test.

## Discussion

The results of the present study show us the expansion and the improvement of the specialized dental care provided by the Brazilian's CEO. The inequality in the distribution of specialized establishments is visible. There is a predominant number of CEO in the Northeast and Southeast regions, concentrated in São Paulo's state (SP). This characteristic points to sociodemographic inequities with the presence of significant care gaps. Between 2015 and 2017, there was a 6.8% growth in the number of CEO [21]; however, just installing these establishments is not enough to guarantee specialized dental services for users [8].

There are some factors that can be interpreted as hindrances to access to the CEO services. Geographic's barriers, locomotion difficulties, social vulnerability and unique characteristics of each federative unit are variables that are capable to impact performances and use of services of CEO [9,4]. Difference performances were observed between the macro-regions. The South and Southeast CEO shows better indicators than the North and Northeast CEO [4,2]. Comparative ecologic study [22] with 2000's e 2010's data's showed that HDI lower cities represented access' indicators more satisfy. This results follow-up equality tendency in the oral health assistance services in poorly socioeconomically states. But, in this same study, it is seen that the proportion of specialized procedures were higher in states with higher HDI [22], as well as in a study [21] carried out with data available on institutional websites of the Ministry of Health, in the 2015 to 2017's period.

Hierarchy in health is a fundamental part of the provision of specialized health care. A study that evaluated changes in oral health policy [21] reinforced the need to add to the public health services scientific discussions of public health services the strengthening of regionalization to improve access, supply and performance of specialized oral health services.

Even with a high CEO number, there is an uneven distribution among Brazilian regions, reinforcing social inequities in the use of oral health services [21,23]. In a study that evaluated the first cycle of the PMAQ-CEO [2], it was seen that there is an incompatibility in the workload of oral health between assistants and technicians and dentists that affects the provision availability of service. The availability of the number of these professionals, as well as their workload, are factors that can also affect user access.

Results regarding the waiting time and number of people waiting for assistance at the CEO point to a significant pent-up demand. In the second cycle of the PMAQ-CEO, an increase in the mean of the number of days for service was observed (mean varies from 34 to 180 days). It is important to assess the presence of pent-up demand for specialties, as well as the absenteeism percentage. The presence of pent-up demand and high rates of absenteeism are crucial points in the evaluation of the resoluteness and integrality of secondary dental care [24]. In addition, the CEO's queues may depend of work processes organized and integrated with the care network, so referenced demand and counter-referral are essential.

From the first to the second cycle, there was an increase in referenced demand with a mean of 59.2%. It is necessary for CEO to provide predominantly elective and referenced care according to the organization of the network health care [22]. Care of the spontaneous demand can have a negative impact on the process of articulating the network and cause obstacles in the integrality of the care of users [8,25]. In addition, referred users are more likely to complete their treatments and be counter-referred to maintain care, ensuring the efficiency and effectiveness of the service provided [26,27].

In the second cycle of the PMAQ-CEO, the increase of monitoring and planning of actions and goals by the CEO strengthens need for constant realization of these practices to improve services [28]. A study with data from the first cycle of the PMAQ-CEO [8] exposed issues related to the planning of specialized clinics,

identifying the importance of the manager, analyzing the multiple work organizations and a lack of implementation of planning tools in all Brazilians' CEO.

Between the cycles was perceived an increase in the number of actions carried out by the CEO's professionals together with the Primary care oral health team's professionals; however, no studies were found that address joint actions with the ESF teams. With the exception of a study [29] that described the CEO's work process using results from the first cycle focused on the users with special needs specialty. This study [29] highlighted the importance of matrix support in solving complex cases and continuing education practices as an aggregator in the quality of care provided and the organization of CEO's services.

Oral medicine is the specialty with the greatest deficiency in the Brazilian CEO scenarios. States such as Acre (AC), Amazonas (AM) and Roraima (RR) did not have active professionals [30]. The availability of stomatology is the lowest among other specialties, with a mean of 0.2 professionals and 2.9 hours per week for every 10,000 inhabitants [8]. Such results imply considerable results in the precocious diagnosis in cases of mouth cancer [30]. The deficiency and disparity in the distribution of professionals working in CEO in oral medicine are indicators that may favor the late diagnosis of oral cancer, due to the lack of offer this service in establishments without active professionals. On the other hand, endodontics presents the best scenario within the CEO's specialties, with the highest mean of professionals working and with a greater weekly workload [10]. A limitation of the present study is the use of secondary data, which may be subject to registration errors, which may interfere with real results in the inferences of this study. However, the high adherence of specialized clinics to the PMAQ-CEO consists of a census of all these establishments, reducing potential risks of selection bias [10].

## Conclusion

Through the results of the PMAQ-CEO, it was possible to evaluate the Brazilian's CEO in two different moments. An unequal geographic distribution of specialized oral health establishments, the presence of care gaps mainly in the North region, a reduction in the number of professionals and an increase in pent-up demand were visualized. However, an expansion and improvement of the CEO's actions was evidenced. It needs the creation and implementation of strategies aimed at improving oral health indicators related to specialized services in users who need the CEO's services. Among the points that need attention are: access to the CEO, equitable distribution of establishments and a wider availability of professionals with longer and more flexible hours.

## Authors' Contributions

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## Conflict of Interest

The authors declare no conflicts of interest.

## Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

## References

- [1] Brasil. Ministério da Saúde. Coordenação de Saúde Bucal, Departamento de Atenção Básica, Secretaria de Atenção à Saúde, Ministério da Saúde. Diretrizes da Política Nacional de Saúde Bucal. Brasília: Ministério da Saúde; 2004. Available from: [https://bvsm.sau.gov.br/bvs/publicacoes/politica\\_nacional\\_brasil\\_sorridente.htm](https://bvsm.sau.gov.br/bvs/publicacoes/politica_nacional_brasil_sorridente.htm). [Accessed on June 12, 2021]. [In Portuguese].
- [2] Rios LRF, Colussi CF. Normative evaluation of Dental Specialties Centers, Brazil, 2014. *Saúde Debate* 2019; 43(120):122-36. <https://doi.org/10.1590/0103-1104201912009>
- [3] Freitas CHSM, Lemos GA, Pessoa TRRF, de Araújo MF, Forte FDS. Attention to oral health: evaluation of the dental specialty centers in Paraíba. *Saúde Debate* 2016; 40(108):131-43. <https://doi.org/10.1590/0103-1104-20161080011>
- [4] Andrade FB, Pinto RS, Antunes JLF. Trends in performance indicators and production monitoring in Specialized Dental Clinics in Brazil. *Cad Saúde Pública* 2020; 36(9):e00162019. <https://doi.org/10.1590/0102-311X00162019>
- [5] Brasil. Ministério da Saúde. Portaria nº 599. Define a implantação de Especialidades Odontológicas (CEO) e de Laboratórios Regionais de Próteses Dentárias (LRPDs) e estabelecer critérios, normas e requisitos para seu credenciamento. *Diário Oficial da União* nº 58, 2006-1. Available from: [https://bvsm.sau.gov.br/bvs/sauolegis/gm/2006/prt0599\\_23\\_03\\_2006.html](https://bvsm.sau.gov.br/bvs/sauolegis/gm/2006/prt0599_23_03_2006.html) [Accessed on June 12, 2021]. [In Portuguese].
- [6] Magalhães BG, Oliveira RS, Gaspar GS, Figueiredo N, Goes PSA. Evaluating the fulfillment of secondary attention in oral health care. *Pesq Bras Odontoped Clin Integr* 2012; 12(1):107-12. <https://doi.org/10.4034/PBOCI.2012.121.17>
- [7] Figueiredo N, Goes PSA. Development of secondary dental care: a study on specialized dental clinics in Pernambuco State, Brazil. *Cad Saúde Pública* 2009; 25(2):259-67. <https://doi.org/10.1590/S0102-311X2009000200004>
- [8] de Lucena EHG, de Lucena CDRX, de Goes PSA, de Sousa MF. Conditions Associated with Activity Planning in Dental Specialty Centers. *Univ Odontol* 2019; 38(80):1-27. <https://doi.org/10.11144/Javeriana.uo38-80.caap>
- [9] de Goes PAS, Figueiredo N, das Neves JC, Silveira FMM, Costa JFR, Pucca Junior GA, et al. Evaluation of secondary care in oral health: a study of specialty clinics in Brazil. *Cad Saúde Pública* 2012; 28(Sup):S81-S89. <https://doi.org/10.1590/S0102-311X2012001300009>
- [10] Galvão MHR, Roncalli AG. Performance of Brazilian municipalities in the supply of specialized oral health services. *Cad Saúde Pública* 2021; 37(1):e00184119. <https://doi.org/10.1590/0102-311X00184119>
- [11] Brasil. Ministério da Saúde. Portaria nº 261, de 21 de fevereiro de 2013. Institui, no âmbito da Política Nacional de Saúde Bucal, o Programa de Melhoria do Acesso e Qualidade dos Centros de Especialidades Odontológicas (PMAQ-CEO) e o Incentivo Financeiro (PMAQ-CEO), denominado Componente de Qualidade da Atenção Especializada em Saúde Bucal. *Diário Oficial da União* 2013; 22 fev. Available from: [https://bvsm.sau.gov.br/bvs/sauolegis/gm/2013/prt0261\\_21\\_02\\_2013.html](https://bvsm.sau.gov.br/bvs/sauolegis/gm/2013/prt0261_21_02_2013.html) [Accessed on August 01, 2021]. [In Portuguese].
- [12] Brasil. Ministério da Saúde. Portaria nº 1.599, de 30 de setembro de 2015. Dispõe sobre o Programa de Melhoria do Acesso e Qualidade dos Centros de Especialidades Odontológicas (PMAQ-CEO). *Diário Oficial da União* 2015, 02 out. Available from: [https://bvsm.sau.gov.br/bvs/sauolegis/gm/2015/prt1599\\_30\\_09\\_2015.html](https://bvsm.sau.gov.br/bvs/sauolegis/gm/2015/prt1599_30_09_2015.html) [Accessed on August 01, 2021]. [In Portuguese].
- [13] Condessa AM, de Lucena EHG, Figueiredo N, de Goes PAS, Hilgert JB. Specialized dental care for people with disabilities in Brazil: profile of the Dental Specialty Centers, 2014. *Epidemiol Serv Saude* 2020; 29(5):e2018154. <https://doi.org/10.1590/S1679-49742020000500001>
- [14] Sobrinho JEL, Martelli P, de Lucena EHG, de Oliveira TF, Werneck MAF, de Lorena SB. Centers of Dental Specialties in the Context of Oral Health Attention Regionalization in Brazil: PMAQ-CEO Results. *Pesqui Bras Odontopediatria Clin Integr* 2018; 18(1):e3163. <https://doi.org/10.4034/PBOCI.2018.181.40>
- [15] Nunes MF, França MASA, Werneck MF, Goes PS. PMAQ - CEO External evaluation: revealing indicators for planning services. *Pesq Bras Odontoped Clin Integr* 2018; 18(1):e3178. <https://doi.org/10.4034/PBOCI.2018.181.37>
- [16] Goes PAS, Cavalcanti RP, da Cruz DF, de Almeida LFD, Padilha WWN. The Regulation of Services in Secondary Oral Health Care in Brazil. *Pesqui Bras Odontopediatria Clin Integr* 2018; 18(1):e3537. <https://doi.org/10.4034/PBOCI.2018.181.61>
- [17] Figueiredo N, de Goes PAS, Martelli P. Relatório do 1º Ciclo da Avaliação Externa do Programa de Melhoria do Acesso e da Qualidade dos Centros de Especialidades Odontológicas (AVE/PMAQ/CEO): Resultados Principais. Recife, 2016. Available from: [https://www.ufpe.br/documents/1181966/0/RELAT%C3%93RIO\\_1%C2%BA+Ciclo+-+PMAQ\\_CEO.pdf/fede7926-f16e-4c6e-81ab-320ad01b30b5](https://www.ufpe.br/documents/1181966/0/RELAT%C3%93RIO_1%C2%BA+Ciclo+-+PMAQ_CEO.pdf/fede7926-f16e-4c6e-81ab-320ad01b30b5) [Accessed on May 02, 2022]. [In Portuguese].
- [18] Brasil. Ministério da Saúde. Secretaria de Atenção Primária a Saúde (SASP). Programa Nacional de Melhoria do Acesso e da Qualidade da Atenção Básica (PMAQ). Available from: <http://aps.sau.gov.br/ape/pmaq> [Accessed on June 12, 2021]. [In Portuguese].

- [19] Goes PSA, Figueiredo N, Martelli PJJ, Luvison IR, Werneck MAF, Ribeiro MAB, et al. Theoretical and methodological aspects of the external evaluation of the improvement, access and quality of centers for dental specialties program. *Pesqui Bras Odontopediatria Clin Integr* 2018; 18(1):e3433. <https://doi.org/10.4034/PBOCI.2018.181.60>
- [20] De Goes PAS, Figueiredo N, de Lucena EHG, Martelli PJJ. Relatório do 2º Ciclo da Avaliação Externa do Programa de Melhoria do Acesso e da Qualidade dos Centros de Especialidades Odontológicas PMAQ-CEO: resultados principais. São Paulo, 2021. Available from: [https://www.ufpe.br/documents/1181966/1205250/Relat%C3%B3rio+PMAQ\\_CEO.pdf/3d7a7674-6a75-4a63-b50d-dcc34d5ab59c](https://www.ufpe.br/documents/1181966/1205250/Relat%C3%B3rio+PMAQ_CEO.pdf/3d7a7674-6a75-4a63-b50d-dcc34d5ab59c) [Accessed on May 02, 2022]. [In Portuguese].
- [21] Chaves SCL, Almeida AMFL, dos Reis CS, Rossi TRA, de Barros SG. Oral Health Policy in Brazil: transformations in the period 2015-2017. *Saúde Debate* 2018; 42(spe2):76-91. <https://doi.org/10.1590/0103-11042018S206>
- [22] Fernandes JKB, Pinho JRO, Queiroz RCS, Thomaz EBAF. Evaluation of oral health indicators in Brazil: a trend towards equity in dental care?. *Cad Saude Publica* 2016; 32(2):e00021115. <https://doi.org/10.1590/0102-311X00021115>
- [23] Cascaes AM, Dotto L, Bomfim RA. Trends in the dental surgeon workforce in Brazil 2007- 2014: a time series study using data from the National Registry of Health Services. *Epidemiol Serv Saúde* 2018; 27(1):e201723615. <https://doi.org/10.5123/S1679-49742018000100015>
- [24] Thomaz EBAF, de Sousa GMC, Queiroz RCS, Coimbra LC. Evaluating productivity targets achievement in Dental Specialty Centers from Maranhão State, Brazil, 2011. *Epidemiol Serv Saúde* 2016; 25(4):807-18. <https://doi.org/10.5123/S1679-49742016000400014>
- [25] Soares FF, Chaves SCL, Cangussu MCT. Local government and public dental health services: an analysis of inequality in use. *Cad Saúde Pública* 2015; 31(3):586-96. <https://doi.org/10.1590/0102-311X00077214>
- [26] Souza GC, Lopes MLDS, Roncalli AG, Medeiros-Júnior A, Clara-Costa IC. Reference and counter-reference in oral health: regulation of access to specialized dental care centers. *Rev Salud Publica* 2015; 17(3):416-28. <https://doi.org/10.15446/rsap.v17n3.44305>
- [27] Magalhães MBP, de Oliveira DV, de Lima RF, e Ferreira EF, Martins RC. Evaluation of secondary care in endodontics at a Dental Specialties Center (DSC). *Ciênc Saúde Coletiva* 2019; 24(12):4643-53. <https://doi.org/10.1590/1413-812320182412.04112018>
- [28] Cabral DCR, Flório FM, Zanin L. Performance analysis of the specialized dental centers of the Brazilian southeast region. *Cad Saúde Colet* 2019; 27(2):241-7. <https://doi.org/10.1590/1414-462X201900020205>
- [29] Ottoni JLM, Martelli PJJ, Martelli Júnior H, Antunes CBA, Meira SM, Martelli DRB. Dentistry for patients with special needs: Analysis based on the external evaluation of the PMAQ/CEO, 2014, Brazil. *Temas em Saúde* 2021; 21(5):100-21. <https://doi.org/10.29327/213319.21.5-5>
- [30] Leal RVS, Emmi DT, Araújo MVA. Access and quality of secondary care and stomatology assistance in Brazil. *Physis* 2021; 31(2):e310205. <https://doi.org/10.1590/S0103-73312021310205>