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Dental Care in Programs of All-Inclusive Care for the Elderly: Organizational Structures and Protocols



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A B S T R A C T

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Objectives: This study uses a national model of community-based long-term services and supports, the Program of All-inclusive Care for the Elderly (PACE), to identify organizational structures and protocols that can facilitate the delivery of dental examinations.

Design: We developed an online survey instrument and conceptual model for this study representing 10 domains believed to characterize a quality PACE dental program.

Setting and Participants: The Qualtrics survey was distributed nationally to all 124 PACE programs in the 31 states PACE was available. Respondents in this study represented 35 programs (program response rate = 28.2%) in 23 states (state response rate = 74.2%).

Methods: Selected independent variables from each of the 10 domains were tested against the reported delivery of dental examinations variable using the Kendall τ and χ^2 . Twenty-nine programs were included in the final analysis.

Results: Most programs mandated a dental examination within 31–60 days of enrollment (63.6%). Few programs had a dental manual (15.6%) or any quality assurance for dental care (32.3%). A majority of programs (58.8%) stated that they had a protocol for enrollees to receive a cleaning every 6–12 months. Having a system for quality assurance for dental care, protocol for a cleaning every 6–12 months, mandating a comprehensive dental examination and providing preventive dental services onsite with built-in equipment, were all statistically associated with a higher reported delivery of dental examinations.

Conclusion and Implications: Organizations providing long-term services and supports, including PACE, can use these identified domains to develop minimal standards to ensure dental care is part of innovative models of community-based long-term services and supports. Implementing these domains can facilitate effective delivery of dental examinations that have the potential to support positive oral health and general health outcomes.

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Oral health-related diseases and pathogens have been implicated in the worsening of general health and well-being, as there are strong associations between periodontal disease and diabetes,¹ dental and denture plaque pathogens and aspirational pneumonia,² and the severe consequences of oral cancer.³ Despite these relationships, oral health in nursing homes is often reported to be poor and residents often have difficulty accessing dental care including financial and

transportation barriers to care.^{4–13} Many national trends are coming together that support the use of community-based long-term services and supports (LTSS); people are living longer with more active lives, the focus on reducing health care costs continues, and the population of adults who prefer to age in place and avoid nursing home placement is growing.¹⁴ Yet, there are no studies to gain an understanding of the provision of dental services to older adults in community-based LTSS programs¹⁵ and only 4% of home and community-based services programs provide dental care for older adults.¹⁶

This study uses a national model of community-based LTSS, the Program of All-Inclusive Care for the Elderly (PACE), to identify organizational structures and protocols that facilitate delivery of dental examinations. We also determined whether the priority placed on dentistry as a specialty service, compared with optometry, audiology, mental health, and podiatry, affected provision of dental examinations.

PACE is a national model of care providing the full spectrum of LTSS. PACE programs are required to provide and finance all medically necessary services, including dental care, medical care, therapies, noon meals, socialization, home care, nursing care, optometry, podiatry, mental health, and transportation.¹⁷ The goal of PACE is to keep individuals who are eligible for nursing home level of care in the community and maintain their quality of life.¹⁸ Governance of PACE is overseen by federal and state agencies and the PACE organization itself. As of February 2021, there were 138 programs serving 51,000 older adults,¹⁹ with nearly 90% of enrollees in PACE dually eligible for Medicare and Medicaid.²⁰ At the time of this study in January 2018, there were 124 PACE programs with 255 adult day health centers in 31 states, and in all 10 of the Centers for Medicare and Medicaid Services (CMS) regions.

PACE is an opt-in, capitated program where care is coordinated by an interdisciplinary team; however, oral health professionals are not required by the CMS to participate in the team. Upon enrolling in PACE, participants receive an initial comprehensive assessment that includes an oral health evaluation, but there is no prescribed assessment tool and is not required to be completed by a dentist or dental hygienist.²¹

Methods

Survey Development and Deployment

A description of the survey development and deployment is published elsewhere but will be briefly described here.²² Preliminary interviews with individuals who were knowledgeable with the rules, regulations, governance, and delivery of dental care at PACE were conducted. Interviews were conducted at all levels— federal, state, program (including program directors, dental directors, and dentists providing care at PACE sites), and the National PACE Association. Interviews and correspondence occurred over the phone or email and followed a standard set of questions to better understand the federal and state oversight, delivery, financing, and workforce for dental care at PACE. The interviews suggested that there is little oversight and guidance on the federal- and state-level regarding the delivery of dental care at PACE, and that some programs had a high programmatic focus on dental care as a specialty. The interviews, combined with the PACE manual¹⁷ and the Code of Federal Regulations regarding PACE,²³ were used to identify 10 domains (Table 1) that were thought to characterize a PACE dental program and develop a 56-question online Qualtrics survey instrument. Pilot testing of the survey was completed with current and former PACE administrators and researchers familiar with PACE. The survey was then distributed to 124 programs across the country. This study received Institutional Review Board approval from the University of Iowa as an exempt study.

Data Analysis

Completed surveys were reviewed and verified for accuracy and completeness. Data were then transferred from Qualtrics (Provo, UT) to SPSS (Version 25.0.; IBM Corp, Armonk, NY). Descriptive statistics were generated for all variables. Frequency distributions were used to verify data and to identify outliers, coding errors and missing information.

Nonresponse bias was evaluated by comparing responding programs to the overall population using cross tabulation tables and χ^2 analyses based on the following characteristics: CMS region, CMS contract effective date, tax status, enrollment size, and the Kaiser Foundation's Medicaid adult dental benefit classification.

Independent Variables

After the distribution of variables was analyzed, one variable was chosen to represent each domain in the bivariate analyses based on the normality of the distributions. These became the independent variables used in the analyses. The independent variables included variables from the 10 domains identified as influencing a PACE dental program. The chosen variable for each of the 10 domains can be seen in Table 1.

Dependent Variable

The main dependent variable—"reported delivery of dental examinations"—was composed of 3 levels derived from the reported percentage of new enrollees who receive a comprehensive dental examination and the percentage of continuous enrollees who receive a periodic dental examination. Programs that reported that $\geq 76\%$ of new and continuous enrollees received dental examinations were classified as having a "high reported delivery of dental examinations." Those with 51% to 75% receiving a dental examination were considered to have a "medium delivery of dental examinations," while those with 50% or fewer were considered to be in the "low" category.

The secondary dependent variable— dental focus score—reflected how focused the PACE program was on dental services compared with other specialty services. Each program was asked to rank the focus of its program on a scale of 1–5 (lowest to highest) with regard to 5 specialties: dentistry, mental health, optometry, podiatry, and audiology.

The independent variables were tested against the dental focus score to determine if there was an association between a program's reported dental focus and the degree to which they incorporated the 10 domains in their dental program. The independent variables and dental focus score were then tested against the dependent variable, the "reported delivery of dental examinations variable." The Kendall τ was used for independent variables with an inherent ranking within them because of the survey's response choices, and χ^2 tests were used for those variables without a ranking. Statistical significance for all tests was noted at the $P < .05$ level.

Results

Sample

Respondents in this study represented 35 programs (program-level response rate = 28.2%) in 23 states (state-level response rate = 74.2%). To check for bias between respondents and the overall PACE population, χ^2 tests were run on multiple variables which were readily available from CMS on the entire population. Responding programs were comparable with the overall population of programs for CMS contract effective date, enrollment size, and tax status. However, responding programs were significantly more likely to be

Table 1
Descriptive Statistics for Variables in 10 Domains* Characterizing the Delivery of Dental Care at PACE, and Dependent Variables: Reported Dental Delivery of Dental Examinations and Program's Reported Dental Focus Score

Domains* and Variables	Responses	%
Organizational Structure/demographics*		
Enrollment size (n = 35) [†]		
≤200	16	45.7
>200	19	54.3
Age of the program (n = 35)		
0–5 y	10	28.6
6–10 y	13	37.1
11–20 y	4	11.4
>21 y	8	22.9
Average length of enrollment (n = 33)		
1 to <2 y	5	15.2
2 to <3 y	9	27.3
3 to <4 y	10	30.3
4 to <5 y	5	15.1
>5 y	4	12.1
External regulations*		
Aware of guidelines from the state administering agency regarding delivery of dental care (n = 33) [†]		
Yes	7	25.7
No	26	74.3
Workforce*		
Presence of a dental director (n = 35)		
Yes	4	11.4
No	31	88.6
Dental/hygiene students rotate at PACE (n = 30)		
Yes	5	16.7
No	25	71.4
Other health profession students rotate at PACE (n = 35) [†]		
Yes	16	45.7
No	19	54.3
Dental providers have an academic appointment (n = 18)		
Yes	5	27.8
No	13	72.2
Cost/provider Reimbursement*		
No per enrollee cap for dental care (n = 32) [†]	30	93.8
Provision of care*		
Mandate for a comprehensive dental examination after initial comprehensive assessment (n = 35) [†]		
Yes	24	68.6
No	11	31.4
Length of time for comprehensive dental examination after initial comprehensive assessment (n = 11)		
Within 30 d of enrollment	3	27.3
Within 31–60 d of enrollment	7	63.6
Within 61–90 d of enrollment	1	9.1
Who provides the periodic dental assessment (n = 25)		
Dentist	22	88.0
Hygienist	3	12.0
Choice of dental provider (n = 35)		
Never	9	25.6
Sometimes	14	40.0
About one-half the time	1	2.9
Most of the time	3	8.6
Always	8	22.9
Availability of care*		
Prioritization for dental care (n = 35)		
Yes	25	71.4
No	10	28.6
Delivery location of preventive services (n = 35) [†]		
Offsite	13	37.1
Onsite with portable equipment	10	28.6
Onsite with built in equipment	8	22.9
Offsite and onsite	4	11.4

(continued)

Table 1 (continued)

Domains* and Variables	Responses	%
Quality assurance*		
Presence of a “dental manual” (n = 32)		
Yes	5	15.6
No	27	84.4
Dental is integrated in quality assessment and performance improvement program or has a separate quality assurance program for dental (n = 31) [†]	10	32.3
Interdisciplinary team*		
Ease of view of medical and dental records (n = 35) [†]		
Yes	17	48.6
No	18	51.4
Preventive protocols*		
Provides participants with oral hygiene products (n = 35)		
Yes	14	40.0
No	21	60.0
Presence of a protocol for cleaning every 6–12 mo (n = 34) [†]		
Yes	20	58.8
No	14	41.2
Marketing*		
Dental used as a marketing tool (n = 35) [†]		
A great deal	4	11.4
A lot	7	20.0
A moderate amount	10	28.6
A little	9	25.7
None at all	5	14.3
Reported dental Delivery of dental examinations (n = 33)		
High	10	28.6
Medium	13	37.1
Low	10	28.6
Dental focus score (n = 29)		
5 (Highest focus)	3	10.3
4	13	44.8
3	6	20.7
2	5	17.2
1 (Least focus)	2	7.0

*10 Domains: Organizational structures/demographics, external regulations, workforce, cost/provider reimbursement, provision of care, availability of care, quality assurance, interdisciplinary team, preventive protocols, marketing.

[†]Indicates that this variable represented the domain in the bivariate analysis.

overrepresented in the West and South CMS regions and underrepresented in the Eastern regions ($P = .039$). Responding programs were also more likely to be overrepresented in the comprehensive and emergency categories of adult Medicaid dental benefit and underrepresented in the limited category ($P = .031$).

Program Characteristics

In addition to the initial comprehensive oral assessment, most programs (68.6%) mandated a dental examination, which most frequently occurred within 31–60 days of enrollment (63.6%). Over two-thirds of programs had a protocol for a periodic dental assessment (71.4%), which most often occurred yearly (68.0%) and was most often provided by the dentist (88.0%). A majority of programs (58.8%) also stated that they had a protocol for enrollees to receive a cleaning every 6–12 months (Table 1).

Nearly 90% of programs did not have a dental director (88.6%). Only 5 programs (16.7%) had dental or hygiene clinical rotations for students at the PACE center, even though 16 programs (45.7%) responded that they provided nondental health profession rotations for students (Table 1).

Programs were asked if they had a dental manual, which may contain information regarding goals of dental treatment, guidelines for achieving these goals, service roles and responsibilities for

Table 2
Bivariate Analyses of Characteristics Associated with Higher Reported Delivery of Dental Examinations at PACE

Variables	Higher Reported Delivery of Dental Examinations	
	Kendall τ	P Value
Quality assurance		
Dental is integrated in quality assessment and performance improvement program or has a separate quality assurance program for dental	0.358	.024
Interdisciplinary team		
Easy view of medical and dental records	0.221	.162
Preventive		
Has protocol for cleaning every 6–12 mo	0.595	<.001
Provision of care		
Has comprehensive dental examination mandate	0.390	.007
Organizational structure/demographics >200 enrollees	0.295	.056
External guidelines		
Aware of guidelines from the state administering agency regarding delivery of dental care	0.148	.365
Workforce		
Other health profession students rotate at PACE	–0.294	.054
Availability of care		
Preventive care provided onsite with built in equipment	0.454	.001
Marketing		
Dental used as a marketing tool	0.245	.089
Variable	χ^2	P Value
Cost/provider reimbursement	5.66	.226

dentists, and other protocols for the delivery of dental care. Few programs (15.6%) had a dental manual or quality assurance program for dental care (32.3%). Nearly one-half of the programs (48.6%) responded that their providers did have easy access to each other's records (Table 1). Over 85% of programs reported using dental care as a marketing tool (Table 1).

Bivariate Analyses

Only the 29 programs that answered all questions were included in the bivariate analysis (Table 2). Statistically significant associations were noted between reported delivery of dental examinations and (1) having a system for quality assurance for dental care ($t = 0.358$, $P = .024$); (2) having a protocol that requires cleaning every 6–12 months ($t = 0.595$, $P < .001$); (3) mandating a comprehensive dental examination ($t = 0.390$, $P = .007$); and (4) providing preventive dental services onsite with built-in equipment ($t = 0.454$, $P = .001$). Dental focus score was not statistically significant with reported delivery of dental examinations, nor any of the other independent variables.

Discussion

Few studies have focused on dental care within PACE programs. This is believed to be the first study to propose domains that characterize dental care at PACE. This study has begun to identify organizational structures and protocols that influence delivery of a dental examination, which has the potential to support positive oral health outcomes and, thereby, general health outcomes. This study also

suggests that structures supporting positive outcomes are not necessarily reflective of a program's perceived dental focus.

The finding that most programs did not have a measurement for the quality of dental care provided, although not unique to PACE, presents an opportunity for PACE to lead the conversation in developing oral health care performance measures that relate to value and overall health measures.²⁴ Such measures would include ensuring that all participants receive (1) a dental examination by a dentist at enrollment, (2) yearly periodic oral assessments, and (3) yearly oral cancer examinations. Additional measures can be built around systemic conditions such as those with diabetes or those at risk for aspirational pneumonia ensuring targeted routine professional oral health care. Other quality measures include monitoring the number of emergency dental services provided and ensuring that necessary dental care is not neglected for acute pain or swelling within 8 days or within 35 days for chronic oral disease conditions (such as dental caries).²⁵ These suggested dental care quality metrics, along with the findings of this study of 4 identified organizational structures and protocols that influence dental examinations, and the 10 identified domains, can help PACE programs incorporate dental components into their arsenal of services to be a high quality program.

Limitations

This study has some limitations that highlight difficulties in conducting a national survey of PACE using the CMS Medicare Advantage Data, from a relatively small number of programs. The CMS Medicare Advantage data limited our ability to look at the urbanicity of programs, which could help to explain some of the variation in the results. It is unfortunate that this study was not able to incorporate an urban-rural variable because this is important to describe the community level factors (such as availability of dentists) that may affect the ability of a program to meet the needs of the population. The results of the bivariate analyses need to be considered cautiously due to the small sample size and, thus, a lack of statistical power. This suggests that future studies on PACE might be better served by a more intensive data collection technique, such as telephone or in-person interviews.

Conclusions and Implications

LTSS programs, including PACE, can use the identified domains to develop standards that ensure that quality dental care is provided to community-dwelling older people. Such standards might include having a system for quality assurance for dental care, a protocol for a dental cleaning every 6–12 months, mandating a comprehensive dental examination upon enrollment, and providing preventive dental services onsite with built-in equipment. Implementing these 10 domains (organizational structures/demographics, external regulations, workforce, cost/provider reimbursement, provision of care, availability of care, quality assurance, interdisciplinary team, preventive protocols, marketing) and identified standards, can facilitate effective delivery of dental examinations, which have the potential to support positive oral health and general health outcomes.

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References

1. Sanz M, Ceriello A, Buyschaert M, et al. Scientific evidence on the links between periodontal diseases and diabetes: Consensus report and guidelines of the joint workshop on periodontal diseases and diabetes by the International diabetes Federation and the European Federation of Periodontology. *Diabetes Res Clin Pract* 2018;137:231–241.
2. van der Maarel-Wierink CD, Vanobbergen JN, Bronkhorst EM, et al. Oral health care and aspiration pneumonia in frail older people: A systematic literature review. *Gerodontology* 2013;30:3–9.
3. Valdez JA, Brennan MT. Impact of oral cancer on quality of life. *Dent Clin North Am* 2018;62:143–154.
4. Scannapieco FA, Amin S, Salme M, et al. Factors associated with utilization of dental services in a long-term care facility: A descriptive cross-sectional study. *Spec Care Dentist* 2017;37:78–84.
5. Kelly MC, Caplan DJ, Bern-Klug M, et al. Preventive dental care among Medicaid-enrolled senior adults: From community to nursing facility residence. *J Public Health Dent* 2018;78:86–92.
6. Nunez B, Chalmers J, Warren J, et al. Opinions on the provision of dental care in Iowa nursing homes. *Spec Care Dentist* 2011;31:33–40.
7. MacEntee MI, Thorne S, Kazanjian A. Conflicting priorities: Oral health in long-term care. *Spec Care Dentist* 1999;19:164–172.
8. Hinton E, Paradise P. Access to Dental Care in Medicaid: Spotlight on Non-elderly Adults. Menlo Park, CA: The Kaiser Commission on Medicaid and the Uninsured; 2016.
9. Johnson TE, Lange BM. Preferences for an influences on oral health prevention: Perceptions of directors of nursing. *Spec Care Dentist* 1999;19:173–180.
10. Smith BJ, Ghezzi EM, Manz MC, et al. Perceptions of oral health adequacy and access in Michigan nursing facilities. *Gerodontology* 2008;25:89–98.
11. Berkey DB, Call RL, Gordon SR, et al. Barriers influencing dental care in long-term care facilities. *Gerodontics* 1988;4:315–319.
12. Chalmers JM, Hodge C, Fuss JM, et al. Opinions of dentists and directors of nursing concerning dental care provision for Adelaide nursing homes. *Aust Dent J* 2001;46:277–283.
13. Pyle MA, Jasinevicius TR, Sawyer DR, et al. Nursing home executive directors' perception of oral care in long-term care facilities. *Spec Care Dentist* 2005;25:111–117.
14. Keenan TA. Home and Community Preferences of the 45+ Population. Washington, DC: AARP Research and Strategic Analysis; 2010.
15. Oishi MM, Childs C, Gluch JI, et al. Delivery and financing of oral health care in long term services and supports: A scoping review. *J Am Dent Assoc* 2021;152:215–223.e2.
16. National Association of States United for Aging and Disabilities. Medicaid HCBS Settings Regulations and Adult Services. Arlington, VA: National Association of States United for Aging and Disabilities; 2016.
17. US Department of Health and Human Services. Programs of All-Inclusive Care for the Elderly (PACE) Manual. Baltimore, MD: Centers for Medicare and Medicaid Services; 2011.
18. Chávez EM, Lederman B. On lok PACE: Where oral healthcare is an integral part of healthcare. *Generations* 2016;40:104–107.
19. National PACE Association. PACE in the States, 2021. Available at: <https://www.npaonline.org/pace-you/pacefinder-find-pace-program-your-neighborhood>. Accessed February 6, 2021.
20. Hirth V, Baskins J, Dever-Bumba M. Program of all-inclusive care (PACE): Past, present, and future. *J Am Med Dir Assoc* 2009;10:155–160.
21. Oishi MM, Gluch JI, Collins RJ, et al. An oral health baseline of need at a predominantly African American Program of All-Inclusive Care for the Elderly (PACE): Opportunities for dental-nursing collaboration. *Geriatric nursing* 2019;40:353–359.
22. Oishi MM, Momany ET, Cacchione PZ, et al. Setting the PACE for frail older adults in the community: An underused opportunity for furthering medical-dental integration. *J Am Dent Assoc* 2020;151:108–117.
23. Programs of All-Inclusive Care for the Elderly (PACE). 42 C.F.R. § 460. Washington, DC: U.S. Department of Health and Human Services; 2009.
24. Damiano P, Reynolds J, Herndon JB, et al. The patient-centered dental home: A standardized definition for quality assessment, improvement, and integration. *Health Serv Res* 2019;54:446–454.
25. Katz RV, Smith BJ, Berkey DB, et al. Defining oral neglect in institutionalized elderly: A consensus definition for the protection of vulnerable elderly people. *J Am Dent Assoc* 2010;141:433–440.