Demographic Factors Associated with Dental Utilization Among Community Dwelling Elderly in the United States, 1997

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Abstract

Objectives: *The purpose of this study was to characterize dental service utilization in 1997 by community dwelling Medicare beneficiaries.* ***Methods:*** *The Medicare Current Beneficiary Survey, or MCBS, is a continuous annual series of nationally representative surveys of Medicare beneficiaries. Univariate comparisons were made between dependent variables (dental utilization and types of dental services) by each of the independent variables (age group, gender, race, income, education, population density, marital status and US Census Bureau regions using weighted proportions to test for independence between dependent and independent variables.* ***Results:*** *Overall, an estimated 41% of the population had a dental visit. Although utilization declined with aging, 24% of those 85 and older visited a dentist.* ***Conclusions:*** *This descriptive study provides important information about dental utilization and services in the American elderly population. Younger, high income, white or educated elderly Americans had higher dental utilization.*

Key Words: dental utilization, elderly population, dental services

Introduction

Oral health care for the elderly is an impending issue for dental professionals. The importance of oral health on the well being of older Americans has been reinforced by several recent notable publications. The first Surgeon General's Report on Oral Health noted that the continued growth of the 65 and older population would have profound effects on oral health care needs in the twenty-first century (1). A 2001 Centers for Disease Control and Prevention report concluded that dental care for the elderly poses unique challenges because of a growing elderly population, third-party reimbursement issues and complexity of care (2). The age 65 and over US population, estimated at approximately 36 million in 2003, is projected to grow to 71.5 million persons by 2030, an increase from the current 13 percent to 20 percent of the US population (3). Oral health care will also be impacted by older adults retaining more of their teeth than previous generations and having greater treatment expectations. Secular trends in tooth loss indicate that both tooth loss and edentulism will continue to decline for all age groups (4).

The purpose of this article is to supplement the existing literature on dental services utilization by older Americans using data from a government sponsored nationally representative unique data set, the Medicare Current Beneficiary Survey (MCBS). MCBS has not been reported in the dental literature.

Methods

MCBS is an annual, continuous nationally representative survey of the Medicare population covering all beneficiaries age 65 years and older. The surveys are sponsored by the Centers for Medicare and Medicaid Services (CMS). Data are collected from CMS's Medicare enrollment file and disseminated through a contract with WESTAT Corporation (www.westat.com). The file creates a continuous, complete profile of demographic characteristics, health care service utilization, expenditures and health parameters. The profile reconciles information obtained from Medicare claims, other insurance claims, receipts and survey reported events.

The survey collects dental utilization data using visits as the basic unit of measurement. Data are collected in the following categories: 1) radiographs; 2) teeth cleaning; 3) examination; 4) fillings; 5) extractions; 6) root canals; 7) crowns; 8) bridges, complete and removable dentures; and 9) orthodontics. Services were categorized as preventive, restorative, oral surgery and other to simplify reporting. Preventive services included examinations, radiographs, teeth cleaning and all other periodontal therapies which MCBS collapsed into the teeth cleaning category. Restorative services included single tooth, fixed and removable restorations. Oral surgery services included all extraction and non-periodontal surgical procedures. All other services were categorized separately.

Replicate sampling weights were used to estimate the numbers of always-enrolled community dwelling elderly within each demographic and dental service category. Standard errors were estimated using balanced repeated replication methods (WestVar® Software). Each type of dental service (preventive yes/no, restorative yes/no, oral surgery yes/no, other yes/no) was tested against each of the independent variables (age group, gender, race, income, education, population density, marital sta-

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TABLE 1
Elderly Medicare beneficiary* utilization of dental services in 1997 by demographic characteristics (Estimated n=31,538,907; SE=79,812)**

Demographic Characteristics	Estimated Population				Dental Visits										
					None		One		Two		Three		More than Three		Total
	n	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE	%
Age															
65-69	6,022,539	76,175	19.1	0.2	52.7	1.2	11.9	0.6	14.2	0.7	7.9	0.5	13.4	0.9	100.0
70-74	8,757,499	77,641	27.8	0.3	53.6	0.9	12.6	0.5	13.2	0.6	7.9	0.4	12.7	0.5	100.0
75-79	7,183,453	86,467	22.8	0.3	56.1	0.9	12.3	0.5	13.0	0.6	7.0	0.4	11.6	0.5	100.0
80-84	5,103,689	65,864	16.2	0.2	64.1	0.7	11.2	0.5	9.9	0.5	5.2	0.4	9.6	0.4	100.0
85+	4,471,727	58,201	14.2	0.2	75.5	0.8	9.0	0.5	6.9	0.4	4.0	0.3	4.6	0.3	100.0
Gender															
Male	12,980,542	85,194	41.2	0.3	58.5	0.7	11.7	0.4	11.6	0.4	6.7	0.3	11.5	70.0	100.0
Female	18,558,365	92,023	58.8	0.3	59.0	0.6	11.7	0.3	12.1	0.3	6.7	0.3	10.5	0.3	100.0
Race															
Unknown	122,471	12,654	0.4	0.0	66.1	5.3	15.3	4.3	7.3	3.2	3.0	2.1	8.3	3.3	100.0
White	27,689,539	92,777	87.8	0.2	56.3	0.5	11.9	0.2	12.9	0.3	7.3	0.2	11.7	0.3	100.0
Black	2,452,999	35,975	7.8	0.1	79.3	1.1	8.7	0.8	5.1	0.6	2.1	0.4	4.8	0.6	100.0
Other	297,544	21,915	0.9	0.1	69.0	4.0	12.3	2.6	4.9	1.8	1.2	0.9	12.7	3.2	100.0
Asian	282,630	22,713	0.9	0.1	73.3	3.6	11.1	2.7	6.6	2.0	1.4	0.9	7.7	2.1	100.0
Hispanic	683,861	47,607	2.2	0.2	74.7	1.9	13.2	1.5	2.7	0.8	5.0	1.1	4.4	1.2	100.0
Native American	9,863	3,594	0.0	0.0	79.9	14.9	-	-	20.1	14.9	-	-	-	-	100.0
Income															
Unknown	7,835,664	124,384	24.8	0.4	41.2	0.9	14.8	0.6	18.4	0.7	9.8	0.5	15.8	0.7	100.0
0-$25,000	43,084	8,514	0.1	0.0	58.6	9.6	11.2	5.0	12.8	6.9	9.9	7.4	7.5	5.9	100.0
$25,001-$50,000	20,833,596	158,344	66.1	0.5	69.8	0.5	10.2	0.3	8.4	0.2	4.6	0.2	7.0	0.3	100.0
>$50,000	2,826,563	82,116	9.0	0.3	26.6	1.2	13.9	1.0	19.3	1.0	13.7	0.9	26.5	1.2	100.0
Education															
Unknown	4,713,177	98,523	14.9	0.3	43.6	1.0	13.2	0.6	18.1	0.9	9.7	0.6	15.5	0.8	100.0
<8th Grade	1,123,065	36,953	3.6	0.1	91.7	1.1	2.9	0.7	3.0	0.7	1.0	0.3	1.4	0.5	100.0
8th Grade	610,547	40,821	1.9	0.1	80.3	2.1	9.1	1.3	2.9	0.9	2.8	0.9	4.9	1.4	100.0
High School	20,617,714	173,380	65.4	0.5	65.7	0.5	11.3	0.3	9.4	0.2	5.5	0.2	8.2	0.3	100.0
College	4,474,404	100,442	14.2	0.3	32.1	1.0	14.6	0.8	20.1	0.8	11.3	0.7	21.9	0.9	100.0
Population Density															
Metropolitan	23,439,041	102,569	74.3	0.2	65.1	1.2	11.6	0.5	10.4	0.4	5.6	0.4	7.3	7.3	100.0
Non-metropolitan	8,099,866	72,678	25.7	0.2	56.7	0.5	11.7	0.3	12.4	0.3	7.1	0.3	12.2	12.2	100.0
Marital Status															
Unknown	25,490	6,359	0.1	0.0	100.0	-	-	-	-	-	-	-	-	-	100.0
Married	18,546,255	169,415	46.7	0.4	50.5	0.6	13.7	0.4	14.8	0.4	7.9	0.3	13.1	0.4	100.0
Widowed	3,683,082	73,910	42.3	0.4	69.4	0.7	9.4	0.3	8.3	0.4	5.0	0.3	8.0	0.4	100.0
Divorced	3,750,215	79,710	5.9	0.2	64.4	1.6	9.2	0.8	9.4	0.8	6.3	1.1	10.7	0.9	100.0
Separated	2,115,144	68,236	0.8	0.1	75.0	3.8	11.5	2.7	3.3	1.4	3.7	1.5	6.6	2.1	100.0
Never Married	3,444,211	81,093	4.2	0.1	57.6	1.6	9.9	1.1	12.5	1.2	8.9	1.1	11.2	1.2	100.0
United States Census Bureau Regions***															
Unknown	2,105	1,051	0.0	0.0	100.0	-	-		-		-			-	100.0
New England	1,058,576	324,707	3.4	1.0	56.7	1.6	11.0	1.0	14.0	2.0	5.9	1.0	12.5	1.2	100.0
Middle Atlantic	5,593,494	339,342	17.7	1.1	59.1	1.3	9.9	0.6	13.4	0.6	6.9	0.5	10.6	0.7	100.0
East North Central	5,525,337	243,720	17.5	0.8	57.3	1.2	11.3	0.7	13.0	0.7	7.9	0.5	10.5	0.6	100.0
West North Central	2,154,061	225,951	6.8	0.7	55.2	1.1	15.1	0.7	11.9	0.7	8.1	0.5	9.7	0.7	100.0
South Atlantic	6,021,521	329,853	19.1	1.0	59.7	0.9	11.5	0.5	10.4	0.5	7.0	0.5	11.5	0.5	100.0
EastSouthCentral	1,636,223	254,579	5.2	0.8	67.0	0.7	12.2	0.7	7.7	1.1	4.7	0.6	8.4	1.0	100.0
West South Central	3,327,797	233,742	10.6	0.7	63.9	2.4	11.1	1.0	10.3	0.9	5.1	0.7	9.6	0.9	100.0
Mountain	1,800,538	101,200	5.7	0.3	54.4	1.0	15.9	1.2	13.3	0.8	6.1	1.1	10.2	0.8	100.0
Pacific	4,036,164	108,136	12.8	0.3	53.5	0.9	12.1	0.6	13.0	0.9	6.8	0.6	14.6	0.6	100.0
Puerto Rico	383,007	13,658	1.2	0.0	84.9	2.5	7.0	1.2	3.6	1.7	2.3	0.6	2.3	1.2	100.0
Total	31,538,907	79,812	100.0		58.8	0.5	11.7	0.2	11.9	0.3	6.7	0.2	10.9	0.3	100.0

≥ 65 years of age, enrolled for the entire year of 1997

** Standard Error of the Estimate *** Source:http://www.census.gov/geo/www/us_regdiv.pdf

New England:	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
Middle Atlantic	New Jersey, New York, Pennsylvania
East North Central	Indiana,Illinois,Michigan,Ohio,Wisconsin
West North Central	Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
South Atlantic	Delaware, District of Columbia, Florida, Georgia, Maryland, N. Carolina,S. Carolina, Virginia, West Virginia
East South Central	Alabama, Kentucky, Mississippi, Tennessee
West South Central	Arkansas, Louisiana, Oklahoma, Texas
Mountain	Arizona, Colorado, Idaho, New Mexico, Montana, Utah, Nevada, Wyoming
Pacific	Alaska, California, Hawaii, Oregon, Washington
Puerto Rico	Puerto Rico

TABLE 2
Estimated number and percent of elderly Medicare beneficiaries* who received dental service(s) in 1997 by type of service and demographic characteristics (n=12,992,650; SE=161,045)**

Demographic Characteristics	Estimated Number of Beneficiaries Who Received Dental Services		Type of Service***							
			Preventive Service(s)		Restorative Service(s)		Oral Surgery(s)		Other Dental Service(s)	
	n	SE	%	SE	%	SE	%	SE	%	SE
Age										
65-69	2,849,069	84,176	87.3	1.0	55.4	1.6	13.0	1.0	15.8	1.1
70-74	4,063,386	91,657	88.6	0.7	52.9	1.1	12.6	0.7	14.0	0.7
75-79	3,151,761	70,500	87.9	0.7	56.3	1.1	12.4	0.8	13.1	0.9
80-84	1,834,291	43,108	86.7	1.1	57.6	1.4	13.9	0.9	11.0	0.9
85+	1,094,142	36,906	81.7	1.3	58.7	1.8	16.4	1.0	9.3	0.9
SS±			±						±	
Gender										
Male	5,382,932	100,910	85.2	0.7	59.6	1.0	15.3	0.6	13.4	0.6
Female	7,609,717	108,891	88.8	0.5	52.5	0.8	11.6	0.5	13.4	0.5
SS±			±		±		±		±	
Race										
Unknown	41,501	8,714	57.0	11.3	75.2	9.4	24.6	9.4	17.0	9.3
White	12,099,318	157,568	88.2	0.4	55.5	0.6	12.1	0.4	13.3	0.4
Black	508,913	24,975	72.3	2.4	55.5	2.9	32.0	2.3	14.1	2.0
Other	92,256	14,225	86.1	5.6	52.1	8.1	22.9	7.9	21.3	6.8
Asian	75,601	12,130	85.2	5.1	43.2	7.6	12.1	3.8	20.4	7.0
Hispanic	173,081	17,551	76.3	4.6	47.1	4.2	19.2	4.6	10.7	3.1
Native American****	1,979	1,437	100.0	0.0	100.0	0.0				
SS±			±				±			
Income										
0-$25,000	6,308,367	119,091	83.4	0.6	55.1	0.8	16.7	0.7	11.8	0.5
$25,001-$50,000	4,610,590	102,368	89.8	0.6	55.0	1.3	9.5	0.7	13.9	0.8
>$50,000	2,073,692	73,836	93.7	0.7	57.4	1.4	10.3	1.0	16.9	1.0
SS±			±				±		±	
Education										
Unknown	93,244	13,083	75.6	6.4	51.1	6.8	16.7	5.3	5.5	2.4
< 8th Grade	1,298,987	44,794	77.1	1.4	56.0	1.8	21.8	1.4	9.6	1.0
8th Grade	1,456,748	57,884	79.1	1.4	59.1	1.9	17.5	1.2	11.7	1.3
High School	7,105,390	128,286	88.6	0.6	54.3	0.9	12.5	0.6	13.7	0.6
College	3,038,280	88,403	93.0	0.7	56.2	1.4	8.7	0.6	15.2	0.9
SS±			±				±		±	
Population Density										
Metropolitan	10,161,771	122,235	87.9	0.5	55.6	0.7	12.9	0.5	13.8	0.4
Non-metropolitan	2,830,878	106,072	85.2	1.0	54.6	1.2	13.9	0.7	11.8	0.9
SS±										
Marital Status										
Married	8,146,722	122,724	88.2	0.6	55.6	0.7	11.7	0.5	13.3	0.5
Widowed	3,561,434	81,492	84.8	0.8	55.3	1.1	14.4	0.7	13.1	0.8
Divorced	653,066	37,439	87.3	1.8	59.8	2.5	18.8	2.3	14.7	1.8
Separated	70,280	11,078	76.6	7.3	53.4	7.9	34.8	7.3	4.1	3.0
Never Married	561,147	29,750	90.8	1.4	48.1	2.9	17.4	2.4	15.5	2.1
SS±			±				±			
US Census Bureau Regions										
New England	458,791	136,551	84.7	3.4	54.2	5.0	10.6	1.3	17.4	3.1
Middle Atlantic	2,287,212	115,941	84.2	1.2	58.0	1.7	14.9	1.0	14.8	1.1
East North Central	2,359,312	129,244	88.7	0.7	55.8	1.6	10.4	0.9	12.4	0.9
West North Central	964,977	109,053	86.8	1.3	55.7	2.2	11.8	0.8	10.7	2.1
South Atlantic	2,427,219	147,548	87.9	1.0	55.5	1.2	14.3	1.1	14.0	1.0
East South Central	539,703	83,409	79.5	2.8	53.8	4.3	17.7	2.6	13.1	1.3
West South Central	1,200,218	104,518	87.3	1.2	55.7	2.3	15.5	1.2	12.2	1.1
Mountain	821,660	48,334	88.3	2.2	49.8	3.3	16.8	1.3	10.0	1.7
Pacific	1,875,589	63,376	91.6	0.9	54.6	1.5	9.4	1.1	14.7	0.9
Puerto Rico	57,969	9,802	80.0	5.5	55.7	4.4	27.1	6.4	11.0	5.7
SS±			±				±			
Total n	12,992,650	161,045	11,343,291	160,566	7,198,059	121,629	1,705,227	59,505	1,735,159	56,318
Total %			87.3	0.4	55.4	0.6	13.1	0.4	13.4	0.4

≥ 65 years of age and enrolled in Medicare for the entire year of 1997
** Standard Error of the Estimate

TABLE 2
Continued

*** Types of service categories are not mutually exclusive; Medicare recipients may have more than 1 type of dental service
Preventive Services included exams, cleanings, other periodontal services or radiographs
Restorative Services included crowns, single restorations, bridges or removable prosthodontics
Other Services included orthodontics, endodontics or other dental service
Oral Surgery included extractions or other oral surgery procedures
****Small sample size
SS±: Statistically Significant (a was set at =0.001 due to large n size)
*** Source: http://www.census.gov/geo/www/us_regdiv.pdf

New England:	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
Middle Atlantic	New Jersey, New York, Pennsylvania
East North Central	Indiana,Illinois,Michigan,Ohio,Wisconsin
West North Central	Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
South Atlantic	Delaware, District of Columbia, Florida, Georgia, Maryland, N. Carolina,S. Carolina, Virginia, West Virginia
East South Central	Alabama, Kentucky, Mississippi, Tennessee
West South Central	Arkansas, Louisiana, Oklahoma, Texas
Mountain	Arizona, Colorado, Idaho, New Mexico, Montana, Utah, Nevada, Wyoming
Pacific	Alaska, California, Hawaii, Oregon, Washington
Puerto Rico	Puerto Rico

tus and U.S. Census Bureau regions). A modified chi-square statistic (RS3,WestVar® Software) was used to test for independence. The criteria for all tests of statistical significance were probability value < 0.001.

Results

Table 1 reports national estimates for dental visits by various socioeconomic and demographic variables. Gender was not associated with dental utilization in this elderly population. Whites utilized the dentist in far greater proportions than other races ($p<0.001$). Overall, 43.7 percent of whites visited a dentist. Both elderly with incomes greater than $50,000 and those with a college education were more likely to visit a dentist ($p<0.001$). Elderly living in metropolitan areas were more likely to go to the dentist ($p<0.001$). Widowed, divorced and separated elderly were less likely to visit a dentist ($p<0.001$). Those age 65 to 69 were far more likely to have multiple dental visits as compared to the oldest elderly. The highest percentage of Medicare beneficiaries visiting a dentist were in the Pacific (46.5%) region.

Table 2 shows the distribution of the elderly, with at least one dental visit, by type of services and demographic characteristics. Across all age groups there were differences in the percentages receiving preventive, restorative, oral surgery and other services ($p<0.001$). Females had more preventive services and fewer restorative and oral surgery services ($p<0.001$ respectively). Differences in the proportions receiving services across all races were evident ($p<0.001$). Blacks and Hispanics had the lowest percentages with a preventive service, 72.3 percent and 76.3 percent respectively, and the highest percentages with an oral surgery procedure, 32 percent and 19.2 percent respectively. Service utilization differences across income and education levels were found ($p<0.001$). Elderly with higher incomes had proportionately more preventive and fewer oral surgery services ($p<0.001$).

Dental service combinations were estimated. Among those visiting a dentist, 35 percent had only preventive services while 32 percent had both a preventive and restorative service. A combination of preventive, restorative, oral surgery and other services were provided to 2 percent of the population.

Discussion

Data interpretation needs to be made within the context of the survey's limitations. Some data are self or proxy-reported and subject to recall errors. However, periodic interviews and collection of visit receipts and claim forms lessen recall bias. The data presented could be somewhat incomplete and, therefore, underestimate dental utilization. The broadly defined service categories may result in inappropriate designation of services. Dentition status and edentulism are not reported. Nevertheless, the survey provides an opportunity to analyze how dental utilization in the elderly is associated with demographic and socioeconomic variables in five year increments based on an age stratification sampling methodology.

Manski and Moeller compared utilization data for 1977, 1987 and 1996 using national surveys (5). Utilization estimates were aggregated for all those age 65 and older. Comparisons found the proportions of those age 65 and older, with at least an annual dental visit, increased from about 30 percent in 1977 to 41.3 percent in 1996. In another study, Gift and Newman segmented the elderly into age 65 to 74 and 75 and older (6). Overall, 43 percent of those age 65 and older had visited a dentist within the past year. Differences in elderly utilization began to be observed when the elderly were segmented into two groups. Given the methodological differences among national surveys, these data confirm this trend toward higher dental utilization by the elderly with 41.2 percent reporting a dental visit. Increasing utilization may be the result of factors such as declining edentulism in the elderly (2, 4, 6, 7).

The complexity and frequency of dental care in the elderly is likely to increase in the future (7, 8). Although declining utilization was anticipated with aging, it is notable that approximately 36 percent of those age 80 to

84 and 24 percent of those age 85 and older visited the dentist. Approximately 17 percent of the Medicare beneficiaries and, specifically, 10 percent of those age 80 to 84 reported three or more dental visits. Only 12.4 percent of those receiving dental care did not have a preventive service indicating that many are receiving more than palliative or episodic care. While 34.9 percent reported only having a preventive service, more than one-half of the elderly had preventive and at least one other type of service. Additionally, 13.5 percent of those visiting the dentist had three or more types of services.

Payment for dental care will continue to be a barrier since many of the elderly are on fixed incomes and are not covered by private, state or federal dental insurance programs. Analysis of MCBS payer data found that only approximately 15 percent of all dental expenditures were covered by private or individual insurance and almost 75 percent of all expenditures were paid out-of-pocket. Similar private dental insurance coverage has been reported (9).

Conclusions

Dentistry faces challenges in meeting the oral health care needs of an aging American population that will likely demand more frequent and complex care. In addition to predicting treatment patterns, training dental professionals to meet the needs of an aging population will be an issue of greater concern among the recognized specialties and those involved in geriatric training programs (10). The MCBS can assist dentistry in planning for the future by improving our understanding of how the elderly utilize dental services at specific age increments.

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