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A Research Note on Transitions in Out of Pocket Spending on Dental Services

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Abstract

Objective—We analyze correlates of the direction and magnitude of changes in out of pocket (OOP) payments for dental care by older Americans over a recent 4-year period.

Methods—We analyzed data from the 2006 and 2008 waves of the Health and Retirement Study (HRS). We estimated multinomial logistic models of the direction and linear regression models of the amounts of OOP changes over survey periods.

Results—Financial-based factors were more strongly associated with the direction and magnitude of changing self- payments for dental care than were health factors.

Discussion—Findings suggested that dental coverage, income, and wealth and changes in these financial factors were more strongly correlated with the persistence of and changes in OOP payments for dental care over time than were health status and changes in health status. The sensitivity to dental coverage changes should be considered as insurance and retirement policy reforms are deliberated.

Keywords

Dental Insurance; Coverage; Dental Use; Self Payments

Introduction

While oral health is necessary for mastication, speech and self-esteem, it is now commonly recognized that oral health is also an essential component of overall health as well. (DHHS, 2000) Unfortunately, oral health is not universal and too many Americans, especially the poor and the elderly, suffer from dental disease. (DHHS, 2000; IOM, 2011a; IOM, 2011b). Though dental care is the ingredient most often recommended to maintain oral health, it is often viewed as costly and difficult to pay for. (DHHS, 2000; IOM, 2011a; IOM, 2011b) The ability to pay for dental care is made more difficult for many elderly who lose their dental insurance when they retire. (DHHS, 2000) Furthermore, dental services are not covered by Medicare and minimally provided for by Medicaid (DHHS, 2010; CMS, 2014) Even when Medicaid does provide coverage for adults, reimbursements are low resulting in few providers available to offer dental care. (DHHS, 2000; CMS, 2014)

A lack of coverage in Medicare and limited Medicaid coupled with losses of employer coverage from retirement have resulted in higher dental out of pocket (OOP) costs for the elderly than for any other age cohorts in the nation. (AHRQa, 2014) Furthermore, OOP costs represent 16.2% of total OOP spending for health care by the elderly. This is disproportionately greater than the 3.35% that dental expenses represent of total health care costs for this age group. (AHRQa, AHRQb, 2014) Out of pocket costs are not expected to decrease any time soon. According to recent studies, rising dental costs for the elderly have been flattening since the recession began but remain higher than for any other age group in the U.S. population. (Wall, Nasseh, and Vujicic, 2013; Vujicic, 2013)

Previous research with the 2006 HRS identified mean 2-year out of pocket spending of \$951 for those older Americans with dental expense. For the nearly fifty-six percent this population with dental coverage, mean out of pocket spending was \$776 compared to \$1,126 for those with dental expense. (Manski, et al., 2010a, 2010b) In 2006, mean annual dental expense for the 42.5% of those 65 and over with such expense was \$694, 73.3% of which was spent out of pocket. Mean expense for those ages 45 to 64 was \$672, 49.3% of which was spent out of pocket. (AHRQ 2014a)

The focus of our current study is on transitions in out of pocket spending. Specifically, we analyze the determinants of the direction and magnitude of changes in self-payments for dental services controlling for socioeconomic, demographic and health factors with data available from the Health and Retirement Study. At the outset we expect changing financial and health factors to be associated with changes in household outlays for dental care. We anticipate that changes in dental coverage will be the most closely associated with the direction and magnitude of changes in out of pocket spending on dental services over this period. Increases in income or wealth can also provide needed funding of long overdue dental work. Worsening health may create a greater need for dental care, but also may also limit access to dental providers for those older persons with serious health limitations. We also expect older persons living in households with higher levels of income and wealth to better afford higher payments for dental services regardless of the presence or generosity of their coverage. Individuals in poor health to begin with may have greater need for dental services yet their health may limit their access to dental providers.

Methods

The HRS is a nationally representative longitudinal household survey in the United States that collects self-reported data from interviews with individuals older than 50 years and their spouses every 2 years. We used the 2006 and 2008 waves of the HRS for our study, which contain 18,469 and 17,217 sampled persons, respectively. Administered by the Institute for Social Research at the University of Michigan and sponsored by the National Institute on Aging, the HRS is useful for the study of aging, retirement, and health among older populations in the United States.(RAND, 2008; St. Clair, Blake, and Bugliari, 2010)

Each HRS respondent is asked a battery of questions about demographics, income and assets, physical and mental health and cognition, family structure and social supports, health care utilization and costs, health insurance coverage, labor force status and job history, and retirement planning and expectations. The HRS is an appropriate data source for this study because of the breadth of data available and the large sample of older Americans in the survey. Each wave of the HRS contains self-reported information about medical and dental care use since the previous survey wave, which was approximately 2 years earlier. Respondents who reported having seen a dentist for dental care, including dentures, in the past 2 years and who did not have their dental expenses completely covered by insurance, were asked how much they paid out of pocket over that period.

Our analysis consisted of multinomial logistic regression models for increases, declines, or no change in dental out of pocket spending between the 2006 and 2008 HRS waves covering the periods 2004–2006 and 2006–2008, respectively. For those with non-zero changes in OOP dental spending, we estimated separate linear regressions for the log of the magnitude of the change for those with positive changes and (unsigned) negative changes.

As shown in Figure 1, we restricted the sample to 9,603 individuals who were in both waves of the HRS and had appropriate weights, no household composition changes between waves, no missing values of variables used in the regression models, and had dental use in at least one of the waves.

To guide our analysis, we leaned heavily on the Andersen behavioral model of health service use, which in its original form posited that health services use is determined in part by a combination of the predisposing, enabling, and need factors.(Andersen, 1995) We included our regression covariates in accordance with this conceptual framework. Our measures of need included self-reported health status in the 2006 wave and changes between the 2006 and 2008 waves, the number of doctor-diagnosed chronic health conditions in the 2006 wave and changes between the 2006 and 2008 waves, body mass index in the 2006 wave, and the number of difficulties with activities of daily living (ADLs) in the 2006 wave and the change between the 2006 wave and the 2008 wave.

Our measures of enabling factors included household wealth and wealth change, household income and income change, health insurance coverage and coverage change, and labor force and retirement status between periods. Medical coverage refers to supplementary coverage for those on Medicare. For ease of interpretation, we collapsed raw household income and wealth data into categories. (Manski, et al., 2012, Manski, et al., 2014) Finally, our models

also contained predisposing covariate factors, including age, gender, race/ethnicity, education, household size, and marital status.

The HRS core sample design is a multistage area probability sample of households, so we computed all estimates and statistics reported taking into account this design with the use of the software packages SUDAAN version 6.40 and Stata version 7.0. (RTI, 1995; Statacorp 2001) For ease of interpretation across multiple models, we have discussed only results that are significant at least at the .05 level.

Results

Forty-two percent of our sample had increases in out of pocket (OOP) outlays on dental services between waves 8 and 9 of the HRS. Another 41% reduced these outlays while the remaining 17% reported no change. In Table 1 we report multinomial logistic regression estimates for the population characteristics distinguishing each of these groups from the other. The sample size for the multinomial logistic regressions contains 9,603 persons with dental use in at least either the 2006 or 2008 wave of the HRS and with positive weights and without missing values for any variables in the model. There were 4,028 persons (41.9%) with OOP spending changes > 0 ; 3,910 persons (40.7%) with OOP spending changes < 0 ; and 1,665 persons (17.3%) with no change in OOP spending in the sample. The adjusted odds ratio point estimate for dichotomous covariates in, for example, column 1 is the estimate of [probability of OOP higher in 2008 wave than in 2006 wave / probability of lower OOP between waves] for persons with row characteristic divided by [probability of OOP higher in 2008 wave than in 2006 wave / probability of lower OOP between waves] for persons in the reference group (ref.). For continuous covariates the odds ratio point estimate is based on a one-unit change in the variable. The “adjusted” value refers to the inclusion in the regression of the control variables listed in the rows of the table. The reference group for the regression in the first column is persons with negative changes in OOP spending between waves and is persons with no change in OOP spending in the last 2 columns. In Table 2 we report linear regression equations for the log of the unsigned change in dental OOP spending separately for persons with increased and decreased spending between periods.

Increased v. Decreased Spending

All of the estimates in the first column of Table 1 compare older Americans with increased out of pocket (OOP) spending on dental services between 2004-2006 and 2006-2008 to those reducing their spending over the same period.

Needs Factors—The odds of having increased OOP spending compared to decreased OOP spending were about one-third lower for older Americans without any of their permanent teeth than for those who are dentate. None of the other needs factors were statistically significant.

Enabling Factors—Having an increase in household wealth between 10 and 50% between periods provides 17% higher odds of increased OOP spending than having a change in household wealth in either direction of 10% or less. As expected, losing dental coverage

increases by close to 50%, and gaining coverage decreases by about one-third, the likelihood of increased OOP spending compared to having no dental coverage in both periods. Dental OOP spending is also less likely to increase by about 20% after becoming fully retired than by remaining in the labor force between periods.

Predisposing Factors—Females are 14% more likely than males, and widowed or divorced persons are 24% less likely than married persons, to have increased dental outlays.

Increased v. No Change in Spending

All of the estimates in the second column of Table 1 contrast the population characteristics of those with increased dental OOP spending to those with no change in spending between periods.

Needs Factors—The odds of higher dental OOP spending compared to no change in OOP spending are 75% lower for edentate than dentate persons and are nearly 50% lower for underweight than normal weight individuals. Increased dental spending is about 20% more likely for persons whose health worsened than stayed the same between periods.

Enabling Factors—As expected, persons living in poor or low-income households are about 40% less likely than those in high-income households to increase dental OOP spending. Those living in households with income changes of 50% or greater are 27% more likely to increase their OOP outlays for dental services than those in households with a 10% or less change in income in either direction between periods. Having dental coverage in both periods or gaining coverage between periods is associated with about 50% lower odds of increased spending compared to remaining uncovered in both periods.

Predisposing Factors—The likelihood of an increase in dental OOP spending between periods is one-third lower for black non-Hispanics and other non-Hispanics than white, non-Hispanics; between about 25 and 50% lower for those persons without a college degree than for those with a college degree; and one third lower for those in households with 3 or more persons than for those living in households with only 1 person.

Decreased v. No Change in Spending

Every estimate in the third column of Table 1 compares the population characteristics of those with decreased dental OOP spending to those with no change in spending between periods.

Needs Factors—Edentate persons are nearly two-thirds less likely than dentate persons to have a decline in dental OOP spending between periods compared to no change in OOP spending. No other needs factor was statistically significant.

Enabling Factors—Unexpectedly, persons living in poor or low-income households are about 50% less likely than those in high-income households to reduce their dental OOP spending between periods. Those living in households with income changes of 50% or greater are 28% more likely to decrease their OOP outlays for dental services than those in

households with a 10% or less change in income in either direction between periods. Having dental coverage in both periods or losing coverage between periods is associated with 40 to 53% lower odds of decreased spending compared to remaining uncovered in both periods.

Predisposing Factors—The odds of reducing dental OOP spending between periods are about two-thirds lower by not being white, non-Hispanic; and are nearly 50% lower by not graduating from high school compared to being a college graduate. Widowed or divorced individuals are nearly two-thirds more likely than married persons of reducing their spending between periods.

Amount of Increased Spending

The estimates in the first column of Table 2 are from a linear regression of the log of the change in OOP dental spending for persons increasing their outlays between periods. The sample size for the regression contains 4,028 persons with OOP spending in the 2008 wave greater than their OOP spending in the 2006 wave of the HRS. The mean log of OOP spending change for those with increased spending is 5.953 or approximately \$385. To interpret the estimated regression coefficients, a value of 0.189 in the first column of the table indicates that the log of the positive change in OOP dental spending is greater by that amount for persons reporting better health between periods compared to persons in the reference group with no change in their health between periods.

Needs Factors—Increases in dental OOP spending are greater the larger the number of difficulties with activities of daily living (ADLs) a person has and by having improved health compared to those with no change in their health between periods.

Enabling Factors—Increases in dental OOP spending are lower for persons in households at the sixth or lower decile of the household wealth distribution than those at the highest decile, and in households with incomes increasing 10 to 50% or declining 50% or greater than income changes in either direction of 10% or less between periods. They are also lower for individuals with dental coverage in both periods or who gain coverage between periods than for those with no coverage in either period, and for persons either fully retired or not in the labor force, not retired in each period than for persons remaining in the labor force in both periods.

Increased dental OOP spending is higher for persons in households with wealth increases of 50% or more than for persons in households with wealth changes of 10% or less in either direction between periods.

Predisposing Factors—Dental OOP spending increases are greater for Hispanics than for white, non-Hispanics between periods. None of the other population characteristics were significantly associated with the magnitude of positive-valued change in spending.

Amount of Decreased Spending

The estimates in the second column of Table 2 are from a linear regression of the log of the unsigned change in OOP dental spending for persons with reduced outlays between periods.

The sample size for the regression contains 3,910 persons with OOP spending in the 2008 wave less than their OOP spending in the 2006 wave of the HRS. The mean log of the absolute value of OOP spending change for those with decreased spending is 5.909 or approximately \$388.

Needs Factors—Reductions in dental OOP spending between periods are greater for persons in worse health than for those with no change between periods and for edentate rather than dentate individuals.

Enabling Factors—When persons spent less out of pocket on dental care between periods, the declines were unexpectedly less if they were living in households at the sixth or lower wealth decile compared to those at the highest decile or in poor or middle income households rather than high income households. The decline in OOP spending was also less for persons with dental coverage in both periods than for persons without coverage the entire time.

Predisposing Factors—Decreases in dental OOP spending were smaller for black, non-Hispanics compared to white, non-Hispanics. No other population characteristics were significantly correlated with the magnitude of reduced spending between periods.

Discussion

Our study set out to determine correlates of changing household payments for dental services over time by older Americans. Given the relatively high level of OOP payments by the elderly on dental services, fluctuations in these payments can have important repercussions on household finances of lower- and middle-income individuals. Apart from dentate status, marital status, gender, and narrowly defined changes in wealth and retirement status, changes in dental coverage between periods appeared to best distinguish persons with higher spending from those with lower spending between periods.

Distinguishing those with changes in OOP spending from those with no change found some anomalous results, especially comparing reductions to no changes in spending. We therefore took a closer look at the “no change” sample. Nearly 60% of the 1,665 persons in our sample with dental use in at least one period but with no change in spending between periods had zero OOP payments in both periods. This suggests that the majority of these persons were fully covered by insurance for whatever dental procedures they purchased, a characteristic that set them apart from those dental patients who had swings in OOP payments in either direction over time. Indeed, we found that persons with coverage in both periods were more likely than persons without coverage in either period to have zero change in OOP payments rather than having spending spikes in either direction. Older persons gaining coverage were more likely to have no change than an increase in payments, but unexpectedly persons losing coverage were more likely to have no change in dental payments than a decrease in dental payments. Despite evidence suggesting that the “no change” group had generous dental coverage, their other characteristics such as lower education lower household income seems to contradict this conclusion.

Maintaining dental coverage over the entire period helps mitigate the magnitudes of swings in spending in either direction, but other financial factors often appear contradictory. For example large increases in wealth over time are associated with larger increases in spending but moderately large increases in income tend to dampen these increases. The relatively large declines in spending experienced by persons with worsening health suggest that other medical needs may be crowding out necessary dental services. The relatively smaller declines of lower income and wealth families may reflect their inability to afford to purchase more generous dental coverage.

Our study may be limited by potential measurement errors from collecting unverified self-reports of data on dental OOP spending in the HRS. Sampled individuals are asked to recall OOP spending over a lengthy 2-year survey period in each wave of the HRS without requiring documentation to verify the self-reports. We examined the records of dental users reporting zero OOP payments in each period and found that over half of them did not report that dental insurance completely covered their expenses in each period. We re-ran our models by dropping dental users with reported zero OOP payments without full coverage but failed to identify any substantive changes to our results. The relatively weak results of the needs factors in our models could have been strengthened had the HRS explicitly asked respondents about their oral health status and changes thereof, in addition to their general health status.

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Figure 1. Derivation of Analytic Sample

Table 1
Multinomial Logistic Regressions Showing Transitions in Out of Pocket Spending on Dental Services: Health and Retirement Study, United States, 2004-2008

	Increase Compared to Decrease in OOP Spending Adjusted OR (95% CI)	Increase Compared to No Change in OOP Spending Adjusted OR (95% CI)	Decrease Compared to No Change in OOP Spending Adjusted OR (95% CI)
<u>Needs Factors</u>			
<i>Health Status</i>			
Fair/Poor	1.05 (0.88, 1.25)	0.95 (0.74, 1.23)	0.91 (0.73, 1.13)
Good	1.02 (0.90, 1.15)	0.97 (0.81, 1.16)	0.96 (0.81, 1.13)
Very Good/Excellent (ref)	1.00	1.00	1.00
<i>Change in Health Status</i>			
Worse	1.05 (0.91, 1.20)	1.21 (1.01, 1.45)*	1.15 (0.96, 1.38)
Better	1.02 (0.80, 1.30)	1.02 (0.75, 1.41)	1.01 (0.76, 1.33)
Same (ref)	1.00	1.00	1.00
<i>Permanent Teeth</i>			
All Missing	0.64 (0.50, 0.82)**	0.25 (0.19, 0.31)**	0.38 (0.31, 0.48)**
Not All Missing (ref.)	1.00	1.00	1.00
<i>Number of Chronic Conditions</i>	1.01 (0.97, 1.06)	1.00 (0.95, 1.06)	0.99 (0.94, 1.04)
<i>Change in Number of Conditions</i>	1.03 (0.92, 1.16)	0.97 (0.84, 1.13)	0.94 (0.80, 1.10)
<i>Body Mass Index</i>			
Underweight	0.70 (0.43, 1.14)	0.53 (0.30, 0.94)*	0.75 (0.42, 1.36)
Overweight	1.00 (0.87, 1.15)	1.04 (0.88, 1.23)	1.04 (0.89, 1.23)
Obese	0.94 (0.80, 1.10)	0.85 (0.71, 1.02) ^c	0.90 (0.74, 1.10)
Normal (ref)	1.00	1.00	1.00
<i>Number of ADLs</i>	0.95 (0.85, 1.05)	0.90 (0.80, 1.02) ^c	0.95 (0.86, 1.06)
<i>Change in ADLs</i>	1.02 (0.92, 1.13)	0.94 (0.85, 1.05)	0.93 (0.82, 1.04)
<u>Enabling Factors</u>			
<i>Household Wealth Decile</i>			
One to three	1.16 (0.89, 1.51)	0.91 (0.63, 1.32)	0.79 (0.54, 1.15)
Four to six	1.07 (0.90, 1.28)	1.10 (0.86, 1.42)	1.03 (0.809, 1.33)

	Increase Compared to Decrease in OOP Spending Adjusted OR (95% CI)	Increase Compared to No Change in OOP Spending Adjusted OR (95% CI)	Decrease Compared to No Change in OOP Spending Adjusted OR (95% CI)
Seven to nine	1.13 (0.96, 1.34)	1.13 (0.85, 1.50)	1.00 (0.72, 1.38)
Ten (ref.)	1.00	1.00	1.00
<i>Household Wealth Change</i>			
Increase >= 50%	1.08 (0.88, 1.32)	1.16 (0.94, 1.43)	1.08 (0.90, 1.43)
Increase 10-50%	1.17 (1.00, 1.38)*	1.16 (0.88, 1.52)	0.98 (0.75, 1.29)
Decrease 10-50%	1.01 (0.85, 1.21)	0.98 (0.81, 1.18)	0.97 (0.77, 1.22)
Decrease >= 50%	0.88 (0.73, 1.06)	1.03 (0.80, 1.33)	1.17 (0.89, 1.55)
10-10 ^a (ref.)	1.00	1.00	1.00
<i>Household Income^b</i>			
Poor	1.16 (0.79, 1.72)	0.59 (0.40, 0.86)**	0.50 (0.33, 0.76)**
Low income	1.10 (0.94, 1.30)	0.66 (0.49, 0.87)**	0.59 (0.44, 0.80)**
Middle income	1.01 (0.86, 1.19)	0.96 (0.79, 1.17)	0.95 (0.79, 1.16)
High Income (ref.)	1.00	1.00	1.00
<i>Household Income Change</i>			
Increase >= 50%	0.99 (0.83, 1.19)	1.27 (1.01, 1.59)*	1.28 (1.03, 1.59)*
Increase 10-50%	1.02 (0.88, 1.19)	1.02 (0.86, 1.22)	1.00 (0.80, 1.25)
Decrease 10-50%	0.98 (0.82, 1.18)	0.97 (0.83, 1.14)	0.99 (0.79, 1.25)
Decrease >= 50%	1.03 (0.87, 1.23)	0.99 (0.74, 1.33)	0.96 (0.70, 1.33)
10-10 ^a (ref.)	1.00	1.00	1.00
<i>Coverage Change</i>			
Always Covered	1.03 (0.88, 1.20)	0.49 (0.41, 0.58)**	0.47 (0.39, 0.58)**
Lose coverage	1.44 (1.13, 1.84)**	0.87 (0.63, 1.20)	0.60 (0.44, 0.82)**
Gain coverage	0.64 (0.49, 0.84)**	0.51 (0.37, 0.70)**	0.79 (0.57, 1.11)
Never Covered (ref.)	1.00	1.00	1.00
<i>Labor Force/Retirement Status</i>			
Always Fully Retired	0.93 (0.77, 1.12)	0.85 (0.69, 1.05)	0.91 (0.71, 1.16)
Always Partially Retired	1.09 (0.88, 1.35)	0.91 (0.68, 1.22)	0.84 (0.63, 1.11)

	Increase Compared to Decrease in OOP Spending Adjusted OR (95% CI)	Increase Compared to No Change in OOP Spending Adjusted OR (95% CI)	Decrease Compared to No Change in OOP Spending Adjusted OR (95% CI)
Always Not in LF, Not Retired	0.83 (0.64, 1.07)	0.80 (0.53, 1.20)	0.96 (0.64, 1.43)
Became Fully Retired	0.78 (0.61, 0.98) [*]	0.79 (0.61, 1.02) ^c	1.02 (0.73, 1.42)
Became Partially Retired	0.93 (0.69, 1.26)	0.75 (0.51, 1.12)	0.81 (0.55, 1.21)
Joined the Labor Force	0.83 (0.60, 1.16)	0.99 (0.62, 1.58)	1.19 (0.74, 1.91)
Became Not in LF, Not Retired	0.88 (0.62, 1.25)	1.19 (0.72, 1.95)	1.34 (0.82, 2.19)
Always In Labor Force (ref.)	1.00	1.00	1.00
<u>Predisposing Factors</u>			
<i>Age</i>			
65-69	1.02 (0.84, 1.25)	1.12 (0.88, 1.44)	1.10 (0.90, 1.33)
70-74	1.13 (0.95, 1.36)	1.12 (0.89, 1.40)	0.98 (0.81, 1.20)
75-79	1.04 (0.84, 1.29)	0.97 (0.76, 1.24)	0.93 (0.74, 1.17)
80+	0.97 (0.76, 1.23)	0.96 (0.70, 1.32)	1.00 (0.74, 1.35)
51-64 (ref.)	1.00	1.00	1.00
<i>Sex</i>			
Female	1.14 (1.02, 1.28) [*]	1.02 (0.87, 1.20)	0.90 (0.77, 1.05)
Male (ref.)	1.00	1.00	1.00
<i>Race/Ethnicity</i>			
Black, Non-Hispanic	1.06 (0.86, 1.30)	0.66 (0.51, 0.86) ^{**}	0.63 (0.46, 0.86) ^{**}
Hispanic	1.05 (0.77, 1.42)	0.74 (0.54, 1.02) ^c	0.71 (0.50, 1.00) [*]
Other Non-Hispanic	0.92 (0.63, 1.32)	0.57 (0.42, 0.78) ^{**}	0.63 (0.44, 0.89) ^{**}
White, Non-Hispanic (ref.)	1.00	1.00	1.00
<i>Education</i>			
Less than High School	1.01 (0.82, 1.24)	0.56 (0.44, 0.71) ^{**}	0.55 (0.43, 0.72) ^{**}
High School Graduate	0.96 (0.85, 1.08)	0.78 (0.64, 0.96) [*]	0.82 (0.67, 1.00) ^c
College Graduate (ref.)	1.00	1.00	1.00
<i>Marital Status</i>			

	Increase Compared to Decrease in OOP Spending Adjusted OR (95% CI)	Increase Compared to No Change in OOP Spending Adjusted OR (95% CI)	Decrease Compared to No Change in OOP Spending Adjusted OR (95% CI)
Widowed, Divorced	0.76 (0.62, 0.92)**	1.25 (0.92, 1.69)	1.65 (1.22, 2.23)**
Never Married	0.809 (0.58, 1.11)	1.42 (0.85, 2.36)	1.76 (1.00, 3.13) ^c
Married (ref.)	1.00	1.00	1.00
<i>Household Size</i>			
Two	0.86 (0.68, 1.09)	0.75 (0.53, 1.06)	0.87 (0.63, 1.20)
Three or more	0.79 (0.61, 1.01) ^c	0.66 (0.44, 0.97)*	0.84 (0.60, 1.17)
One (ref.)	1.00	1.00	1.00

NOTE: ADL = activity of daily living; OR = odds ratios; CI = confidence intervals; HRS = Health and Retirement Study; OOP = out of pocket spending on dental services. The pseudo $R^2 = 0.035$ for both multinomial logistic regressions.

^a 10-10 indicates an increase of 10 percent or less or a decline of 10 percent or less.

^b Where low income refers to persons in families with incomes 101 percent to 199 percent of the poverty line; middle income, 201 percent to 400 percent of the poverty line; and high income, over 400 percent of the poverty line. Poor persons are at or below 100 percent of the poverty line including persons in families with negative income.

^c Approached statistical significance at $P < .10$

* indicates statistically significant at $P \leq .05$

** indicates statistically significant at $P \leq .01$

Table 2
Linear Regression Models Showing the Magnitude of Changes in Out of Pocket Spending
on Dental Services: Health and Retirement Study, United States, 2004-2008

	Increase in OOP Spending (S.E.)	Decrease in OOP Spending (S.E.)
<u>Needs Factors</u>		
<i>Health Status</i>		
Fair/Poor	0.129 (0.093)	0.086 (0.103)
Good	-0.025 (0.072)	0.016 (0.066)
Very Good/Excellent (ref)	0	0
<i>Change in Health Status</i>		
Worse	0.023 (0.073)	0.129 (0.062)*
Better	0.189 (0.065)**	0.128 (0.098)
Same (ref)	0	0
<i>Permanent Teeth</i>		
All Missing	-0.003 (0.116)	0.480 (0.105)**
Not All Missing (ref.)	0	0
<i>Number of Chronic Conditions</i>	0.025 (0.023)	0.009 (0.020)
<i>Change in Number of Conditions</i>	-0.019 (0.055)	0.062 (0.054)
<i>Body Mass Index</i>		
Underweight	0.552 (0.332)	-0.448 (0.272) ^c
Overweight	0.044 (0.069)	-0.069 (0.074)
Obese	-0.036 (0.080)	-0.024 (0.091)
Normal (ref)	0	0
<i>Number of ADLs</i>	0.096 (0.047)*	-0.005 (0.063)
<i>Change in ADLs</i>	-0.058 (0.041)	-0.041 (0.048)
<u>Enabling Factors</u>		
<i>Household Wealth Decile</i>		
One to three	-0.567 (0.117)**	-0.517 (0.096)**
Four to six	-0.316 (0.103)**	-0.377 (0.088)**

	Increase in OOP Spending (S.E.)	Decrease in OOP Spending (S.E.)
Seven to nine	-0.180 (0.097) ^c	-0.094 (0.071)
Ten (ref.)	0	0
<i>Household Wealth Change</i>		
Increase >= 50%	0.292 (0.079) ^{**}	0.169 (0.093) ^c
Increase 10-50%	0.078 (0.081)	-0.052 (0.087)
Decrease 10-50%	0.060 (0.075)	0.038 (0.084)
Decrease >= 50%	0.069 (0.086)	0.091 (0.097)
10-10 ^a (ref.)	0	0
<i>Household Income^b</i>		
Poor	-0.042 ((0.181)	-0.324 (0.172) [*]
Low income	-0.083 (0.111)	-0.110 (0.114)
Middle income	-0.041 (0.077)	-0.181 (0.079) [*]
High Income (ref.)	0	0
<i>Household Income Change</i>		
Increase >= 50%	-0.117 (0.089)	-0.007 (0.085)
Increase 10-50%	-0.187 (0.067) ^{**}	-0.016 (0.088)
Decrease 10-50%	-0.166 (0.085) ^c	0.062 (0.071)
Decrease >= 50%	-0.281 (0.113) [*]	0.062 (0.108)
10-10 ^a (ref.)	0	0
<i>Coverage Change</i>		
Always Covered	-0.423 (0.063) ^{**}	-0.381 (0.067) ^{**}
Lose coverage	0.174 (0.115)	-0.069 (0.132)
Gain coverage	-0.227 (0.134) ^c	0.081 (0.098)
Never Covered (ref.)	0	0
<i>Labor Force/Retirement Status</i>		
Always Fully Retired	-0.180 (0.077) [*]	-0.053 (0.069)
Always Partially Retired	-0.000 (0.115)	-0.069 (0.104)

	Increase in OOP Spending (S.E.)	Decrease in OOP Spending (S.E.)
Always Not in LF, Not Retired	-0.221 (0.108)*	0.022 (0.165)
Became Fully Retired	-0.219 (0.115) ^c	-0.020 (0.115)
Became Partially Retired	-0.077 (0.124)	-0.066 (0.155)
Joined the Labor Force	-0.133 (0.132)	-0.051 (0.207)
Became Not in LF, Not Retired	-0.231 (0.188)	-0.003 (0.156)
Always In Labor Force (ref.)	0	0
<u>Predisposing Factors</u>		
<i>Age</i>		
65-69	0.121 (0.077)	0.095 (0.081)
70-74	0.090 (0.098)	0.069 (0.095)
75-79	0.028 (0.108)	0.104 (0.093)
80+	0.119 (0.104)	0.069 (0.111)
51-64 (ref.)	0	0
<i>Sex</i>		
Female	0.101 (0.066)	-0.064 (0.063)
Male (ref.)	0	0
<i>Race/Ethnicity</i>		
Black, Non-Hispanic	-0.088 (0.106)	-0.314 (0.123)*
Hispanic	0.293 (0.116)*	-0.158 (0.120)
Other Non-Hispanic	0.363 (0.224)	-0.151 (0.130)
White, Non-Hispanic (ref.)	0	0
<i>Education</i>		
Less than High School	-0.129 (0.107)	-0.114 (0.076)
High School Graduate	-0.031 (0.074)	-0.134 (0.053) ^c
College Graduate (ref.)	0	0
<i>Marital Status</i>		
Widowed, Divorced	-0.181 (0.110)	-0.076 (0.117)

	Increase in OOP Spending (S.E.)	Decrease in OOP Spending (S.E.)
Never Married	-0.342 (0.245)	0.078 (0.147)
Married (ref.)	0	0
<i>Household Size</i>		
Two	-0.079 (0.121)	-0.007 (0.119)
Three or more	-0.098 (0.144)	0.079 (0.142)
One (ref.)	0	0
<i>Intercept</i>	6.505 (0.166) **	6.380 (0.162) **

NOTE: ADL = activity of daily living; S.E. = estimated standard error of regression coefficient; HRS = Health and Retirement Study; OOP = out of pocket spending on dental services. $R^2 = 0.054$ for the increase in spending regression. $R^2 = 0.058$ for the decrease in spending regression.

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^c Approached statistical significance at $P < .10$

* indicates statistically significant at $P \leq .05$

** indicates statistically significant at $P \leq .01$