The Influence of Changes in Dental Care Coverage on Dental Care Utilization Among Retirees and Near-Retirees in the United States, 2004–2006

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Objectives. We examined dental care utilization transition dynamics between 2004 and 2006 in the context of changing dental coverage status.

Methods. We used data from the Health and Retirement Study for persons aged 51 years and older to estimate a multivariable model of dental care use transitions with controls for dental coverage and retirement transitions and other potentially confounding covariates.

Results. We found that Americans aged 51 years and older who lost dental coverage between the 2004 and 2006 survey periods were more likely to stop dental care use between periods, and those who gained coverage were more likely to start dental care use between periods, than those without coverage in both periods.

Conclusions. Dental coverage transitions and status have a strong effect on transitions in dental care use. Given that retirement is a time when many experience a loss of dental coverage, older adults may be at risk for sporadic dental care and even stopping use, leading to worse dental and potentially overall health. (*Am J Public Health.* 2011;101:1882–1891. doi:10.2105/AJPH.2011.300227)

Regular dental care is imperative for maintaining good oral health. The likelihood of seeking dental care has been shown to be highly correlated with having dental insurance coverage, meaning that persons who experience changes in dental insurance status may have irregular dental care utilization patterns. Indeed, it has been shown that persons who expect a change in their dental insurance status modify their use patterns to stock up before losing coverage.[1]

For most in the United States, dental insurance coverage is job-based, meaning that those who change jobs or leave employment altogether are most at risk of changes in dental coverage status and, therefore, at highest risk of irregular utilization patterns. Working-age adults who lose dental coverage as a consequence of a change in employment status may be able to obtain coverage from a spouse or through another employer. However, older adults around the age of retirement may not have such options because the majority become eligible for Medicare coverage at 65 years of age, which apart from a small but growing percentage of beneficiaries in Medicare Advantage programs does not offer dental benefits.[2–4]

Previous evidence has shown that those who are retired have lower levels of dental care utilization and lower rates of coverage than have those who are not retired.[5–8] The transition from work to retirement is associated with a loss in dental coverage.[6] Taken together, these findings imply that the transition from work to retirement may lead to irregular patterns of dental care utilization. This irregular care could be problematic unless those at or near retirement age could avoid high-cost treatments later in life through regular preventive care.[9]

We examined dental care utilization transition dynamics in the context of changing dental coverage status among a population around the age of retirement. We used data from the Health and Retirement Study (HRS) to assess the characteristics of persons aged 51 years and older based on whether they had, maintained, or changed their dental care use status between the 2004 and 2006 waves of the HRS. In particular, we assessed how changes in dental coverage and changes in retirement status affected the relative likelihood of having irregular dental care utilization patterns.

METHODS

The HRS, administered by the Institute for Social Research at the University of Michigan and sponsored by the National Institute on Aging, is a longitudinal household survey useful for the study of aging, retirement, and health among older populations in the United States.[10] Response rates for the HRS are quite high; in 2004, the overall response rate for persons interviewed in previous waves was 95%, and the overall response rate (including among first-time sample members) was 88%.

The HRS contains a large battery of questions at the individual and household level, including information about demographics, income and assets, physical and mental health, cognition, family structure, social supports, health care utilization and costs, health insurance coverage, labor force status and job history, and retirement planning and expectations. The RAND Corporation has created an analytic file of key HRS variables that are consistent across waves of the HRS; we used those variables in this analysis when possible. The HRS identifier variables contained in that file ensured that our analysis across survey waves was based on the same individual in both periods.

Dental Coverage

We focused on dental insurance coverage reported in the HRS for the 2-year periods before the 2004 and 2006 surveys. We did not include earlier waves of the HRS in our analysis because dental coverage was not measured consistently before the 2004 HRS. Dental coverage in the 2004 and 2006 HRS was identified in 1 of 2 ways: either (1) the respondent reported seeing a dentist for dental

TABLE 1—Population Characteristics of Older Adults With and Without a Dental Visit in the Previous 2 Years: Health and Retirement Study, United States, 2004 and 2006

Population Characteristics	Total 2004 and 2006 Population in Thousands	Dental Care Utilization in the 2 Years Preceding the 2004 and 2006 Interviews		Dental Care Utilization in the 2 Years Preceding the 2004 Interview		No Dental Care Utilization in the 2 Years Preceding the 2004 Interview	
		Yes, % (SE)	No,[a] %, SE)	Population in Thousands	Stopped Utilization by 2006, % (SE)	Population in Thousands	Started Utilization by 2006, % (SE)
Total	74 047	58.14 (0.98)	24.69 (0.76)	49 758	13.47 (0.48)	24 289	24.72 (0.58)
Age, y							
51–64	38 921	62.46 (1.16)	20.22 (0.85)	27 753	12.40 (0.59)	11 168	29.55 (1.01)
65–69	10 087	57.81 (1.20)	26.81 (1.08)	6593	11.56 (0.78)	3494	22.59 (1.34)
70–74	8364	55.31 (1.64)	27.60 (1.37)	5408	14.45 (1.11)	2957	21.91 (1.50)
≥75	16 675	49.68 (1.20)	32.40 (1.08)	10 005	17.19 (0.92)	6670	18.99 (0.97)
Gender							
Men	33 713	56.41 (1.12)	25.33 (0.83)	22 223	14.43 (0.65)	11 490	25.68 (0.93)
Women	40 334	59.59 (1.01)	24.16 (0.86)	27 534	12.71 (0.52)	12 800	23.86 (0.86)
Ethnicity/race							
Black non-Hispanic	6668	35.12 (1.47)	39.57 (1.57)	3255	28.06 (1.87)	3412	22.67 (1.78)
Hispanic	5178	36.76 (3.16)	38.38 (2.68)	2607	27.00 (2.69)	2571	22.69 (1.91)
White non-Hispanic	60 317	62.77 (0.97)	21.81 (0.73)	42 700	11.33 (0.52)	17 617	25.34 (0.72)
Other non-Hispanic	1876	50.52 (3.74)	26.51 (3.50)	1195	20.69 (2.94)	681	26.96 (5.28)
Family income[b]							
Poor	5661	26.95 (1.55)	49.16 (2.12)	2281	33.13 (2.23)	3379	17.65 (1.96)
Low income	11 983	35.53 (1.41)	42.18 (1.28)	5681	25.05 (1.27)	6302	19.81 (1.13)
Middle income	21 605	52.89 (1.18)	27.72 (1.08)	13 743	16.85 (1.00)	7862	23.83 (1.16)
High income	34 799	74.26 (0.87)	12.82 (0.55)	28 052	7.88 (0.42)	6746	33.89 (1.36)
Education							
<high-school degree	13 054	26.29 (1.41)	51.50 (1.40)	5041	31.91 (1.83)	8013	16.10 (0.81)
High-school graduate	42 912	58.02 (0.90)	23.60 (0.71)	29 056	14.32 (0.67)	13 857	26.92 (0.95)
College graduate	18 019	81.55 (0.98)	7.84 (0.58)	15 622	5.93 (0.46)	2397	41.06 (2.69)
Marital status							
Married	49 340	63.49 (1.14)	20.39 (0.85)	35 439	11.61 (0.51)	13 902	27.64 (0.91)
Widowed or divorced	21 957	46.81 (1.12)	33.69 (0.97)	12 648	18.73 (1.03)	9309	20.54 (1.13)
Never married	2743	52.86 (2.46)	30.04 (2.45)	1669	13.13 (1.91)	1074	23.27 (3.77)
Household size							
1	15 790	51.50 (1.15)	30.20 (0.91)	9723	16.36 (1.02)	6067	21.41 (1.31)
2	39 363	63.14 (1.20)	21.16 (0.93)	28 084	11.50 (0.51)	11 279	26.16 (0.98)
≥3	18 894	53.28 (1.55)	27.46 (1.18)	11 951	15.76 (0.90)	6944	25.28 (1.20)
Health status							
Excellent or very good	32 090	71.33 (1.05)	15.17 (0.72)	25 043	8.60 (0.49)	7047	30.93 (1.18)
Good	22 186	56.68 (1.07)	24.77 (0.91)	14 716	14.55 (0.68)	7470	26.43 (1.25)
Fair or poor	19 682	38.36 (1.23)	40.18 (1.03)	9940	24.05 (1.23)	9741	18.82 (0.76)
Permanent teeth							
All missing	12 054	11.42 (0.66)	66.84 (1.08)	2898	52.48 (2.34)	9156	12.00 (0.98)
Not missing all	61 993	67.23 (0.97)	16.50 (0.72)	46 860	11.06 (0.45)	15 133	32.41 (1.06)

Source. RAND Health and Retirement Study Data, Version H.[10]

Note. Percentages across the rows sum to >100% because the base for the percentages in the last 2 panels is not the total population but rather subsets of the total for those with or without dental care use in the 2 y preceding the 2004 interview. Population characteristics were measured at the time of the 2006 interview, for the 2-y period preceding the 2006 survey interview, or between the 2004 and 2006 interviews where indicated. Persons with missing data for specific categories are included in the population total but excluded from the respective categories. The total sample size for the table is 16 345, which does not include 646 who were not respondents in both the 2004 and 2006 waves and 1478 who either had 0 weights or did not have dental visit data in both Health and Retirement Study waves.

[a]Person reported no dental care utilization in both 2-y periods preceding the 2004 and 2006 interviews.

[b]Low income refers to persons in families with incomes 101% to 200% of the poverty line; middle income, 201% to 400% of the poverty line; and high income, > 400% of the poverty line. Poor persons were at or <100% of the poverty line including persons in families with negative income.

TABLE 2—Labor Force, Retirement, and Dental Care Coverage Transition of Older Adults With and Without a Dental Visit in the Previous 2 Years: Health and Retirement Study, United States, 2004 and 2006

		Dental Care Utilization in the 2 Years Preceding the 2004 and 2006 Interviews		Dental Care Utilization in the 2 Years Preceding the 2004 Interview		No Dental Care Utilization in the 2 Years Preceding the 2004 Interview	
Population Characteristics	Total 2004 and 2006 Population in Thousands	Yes, % (SE)	No,[a] % (SE)	Population in Thousands	Stopped Utilization by 2006, % (SE)	Population in Thousands	Started Utilization by 2006, % (SE)
Total	74 047	58.14 (0.98)	24.69 (0.76)	49 758	13.47 (0.48)	24 289	24.72 (0.58)
Entering retirement 2006							
Total	10 651	56.93 (1.90)	26.38 (1.48)	7050	14.00 (1.14)	3600	21.95 (1.84)
Fully retired	7354	54.66 (2.08)	27.48 (1.89)	4722	14.87 (1.31)	2632	23.21 (2.37)
Partly retired	3297	61.97 (2.59)	23.93 (1.88)	2328	12.24 (2.11)	969	18.54 (3.62)
Leaving retirement 2006							
Total	2879	49.36 (2.52)	30.24 (2.18)	1741	18.36 (2.18)	1139	23.54 (2.98)
Labor force	1172	57.85 (4.28)	23.27 (3.28)	781	13.19 (3.43)	391	30.26 (5.75)
Not in labor force	1707	43.53 (3.00)	35.02 (2.83)	960	22.57 (3.25)	748	20.02 (3.50)
Retirement unchanged 2004 to 2006: retired							
Total	28 889	54.76 (1.11)	28.02 (0.91)	18 467	14.34 (0.71)	10 422	22.33 (0.89)
Fully retired	25 249	52.93 (1.17)	29.33 (0.99)	15 761	15.21 (0.78)	9488	21.94 (0.89)
Partly retired	3640	67.46 (2.10)	18.91 (1.87)	2706	9.24 (1.09)	934	26.33 (3.32)
Retirement unchanged 2004 to 2006: not retired							
Total	31 628	62.44 (1.25)	20.58 (0.89)	22 500	12.22 (0.69)	9129	28.69 (1.28)
In labor force	25 045	67.35 (1.19)	16.59 (0.75)	18 890	10.71 (0.72)	6155	32.50 (1.32)
Not in labor force	6583	43.77 (1.94)	35.78 (1.87)	3609	20.17 (1.81)	2974	20.80 (2.10)
Dental coverage							
Never covered	32 554	48.07 (1.22)	34.01 (1.00)	18 665	16.15 (0.73)	13 889	20.28 (0.70)
Lost coverage	6129	43.84 (1.72)	30.44 (1.38)	3857	30.33 (1.97)	2273	17.92 (1.89)
Gained coverage	5342	37.19 (2.12)	36.54 (2.03)	2525	21.34 (2.21)	2816	30.70 (2.24)
Always covered	30 022	75.71 (0.83)	11.31 (0.58)	24 711	8.02 (0.48)	5311	36.08 (1.56)

Source. RAND Health and Retirement Study Data, Version H.[10]

Notes. Percentages across the rows sum to >100% because the base for the percentages in the last 2 panels is not the total population but rather subsets of the total for those with or without dental care use in the 2 y preceding the 2004 interview. Population characteristics are measured at the time of the 2006 interview, for the 2-y period preceding the 2006 survey interview, or between the 2004 and 2006 interviews where indicated. Persons with missing data for specific categories were included in the population total but excluded from the respective categories. The total sample size for the table is 16 345, which did not include 646 who were not respondents in both the 2004 and 2006 waves and 1478 who either had 0 weights or did not have dental visit data in both Health and Retirement Study waves.

[a]Person had no dental care utilization in both 2-y periods preceding the 2004 and 2006 interviews.

care during the 2-year period preceding the survey and had expenses at least partially covered by insurance, or (2) the respondent did not see a dentist but reported that they would expect any costs to be covered by insurance if he or she did need to see a dentist. Using the coverage data that were available, we calculated national estimates of the number of those persons aged 51 years and older covered by dental insurance in both survey periods, and those gaining or losing dental coverage between survey periods by retirement status and other characteristics.

Dental Care Utilization

In each 2-year period, we used a binary measure of whether the individual had any dental care. To construct utilization transitions, we defined "stopping use" to include persons who had at least 1 dental visit in the 2-year period preceding the 2004 HRS interview but did not have use in the 2 years preceding the 2006 interview. "Starting use" was defined to be persons who did not have a dental visit in the period preceding the 2004 interview but did in the period between the 2004 and 2006 interviews. The other 2 potential transition categories included those reporting a visit in both periods preceding the 2004 and 2006 interviews and those reporting not having a visit in either period.

Retirement

Because dental insurance is often tied to one's employer, understanding how coverage relates to retirement is important. As a generally healthier older population with a longer lifespan than previous generations increases, gradual transitions to retirement have become more common.[11] For this reason, we split

TABLE 3—Characteristics of Older Adults by Labor Force Status: Health and Retirement Study, United States, 2004 and 2006

Population Characteristic	Total 2004 and 2006 Population in 000s	In the Labor Force 2004 and 2006[a]		Entered the Labor Force Between 2004 and 2006[b]		Not in the Labor Force 2004 and 2006[c]		Exited the Labor Force Between 2004 and 2006[d]	
		Population in Thousands	% (SE)	Population in Thousands	% (SE)	Population in Thousands	% (SE)	Population in Thousands	% (SE)
Total	72 931	31 085	42.62 (0.62)	2065	2.83 (0.14)	34 012	46.64 (0.61)	5770	7.91 (0.21)
Age, y									
51–64	38 499	25 360	65.87 (0.71)	1226	3.19 (0.23)	8487	22.04 (0.62)	3426	8.90 (0.36)
65–69	9987	3004	30.08 (1.13)	390	3.90 (0.48)	5536	55.43 (1.19)	1058	10.59 (0.66)
70–74	8228	1559	18.95 (0.97)	227	2.76 (0.36)	5768	70.10 (1.06)	674	8.19 (0.54)
≥75	16 216	1162	7.16 (0.41)	221	1.37 (0.17)	14 221	87.70 (0.59)	612	3.77 (0.28)
Gender									
Men	33 480	16 593	49.56 (0.81)	935	2.79 (0.22)	13 161	39.31 (0.76)	2791	8.34 (0.34)
Women	39 451	14 491	36.73 (0.69)	1130	2.86 (0.19)	20 851	52.85 (0.65)	2979	7.55 (0.34)
Ethnicity/race									
Black non-Hispanic	6434	2581	40.12 (1.51)	242	3.77 (0.47)	3039	47.23 (1.60)	571	8.88 (0.65)
Hispanic	4992	2065	41.37 (1.86)	89	1.78 (0.34)	2362	47.31 (2.15)	476	9.53 (1.08)
White non-Hispanic	59 668	25 536	42.80 (0.75)	1689	2.83 (0.18)	27 827	46.64 (0.74)	4616	7.74 (0.26)
Other non-Hispanic	1829	901	49.28 (3.78)	44	2.40 (0.99)	785	42.89 (4.09)	99	5.42 (1.27)
Family income[e]									
Poor	5351	813	15.19 (1.29)	156	2.92 (0.52)	3863	72.19 (1.63)	519	9.70 (0.99)
Low income	11 662	2185	18.73 (1.09)	385	3.30 (0.36)	8091	69.38 (1.18)	1001	8.58 (0.58)
Middle income	21 302	6951	32.63 (0.99)	624	2.93 (0.32)	11 934	56.02 (0.97)	1794	8.42 (0.45)
High income	34 617	21 136	61.06 (0.92)	900	2.60 (0.23)	10 125	29.25 (0.88)	2456	7.09 (0.33)
Education									
< high-school degree	12 548	2742	21.85 (0.91)	327	2.61 (0.32)	8553	68.17 (1.13)	925	7.38 (0.52)
High-school graduate	42 342	17 842	42.14 (0.83)	1302	3.08 (0.20)	19 818	46.80 (0.79)	3380	7.98 (0.33)
College graduate	17 980	10 489	58.34 (1.20)	433	2.41 (0.36)	5608	31.19 (0.97)	1450	8.07 (0.51)
Marital status									
Married	48 940	23 323	47.66 (0.82)	1494	3.05 (0.19)	20 109	41.09 (0.77)	4013	8.20 (0.31)
Widowed or divorced	21 328	6489	30.42 (0.76)	496	2.32 (0.27)	12 800	60.01 (0.74)	1544	7.24 (0.35)
Never married	2656	1267	47.72 (2.30)	75	2.82 (0.69)	1102	41.51 (2.12)	211	7.95 (1.30)
Household size									
1	15 383	4784	31.10 (1.08)	378	2.46 (0.29)	9107	59.20 (1.03)	1114	7.24 (0.45)
2	38 959	16 241	41.69 (0.75)	1110	2.85 (0.22)	18 309	46.99 (0.78)	3300	8.47 (0.36)
≥3	18 590	10 060	54.12 (1.19)	577	3.10 (0.28)	6596	35.48 (1.07)	1357	7.30 (0.45)
Health status									
Excellent or very good	31 890	17 836	55.93 (0.96)	1066	3.34 (0.24)	10 822	33.93 (0.84)	2167	6.79 (0.36)
Good	21 918	9173	41.85 (1.03)	650	2.97 (0.30)	10 203	46.55 (1.04)	1892	8.63 (0.44)
Fair or poor	19 038	4060	21.33 (0.75)	346	1.82 (0.29)	12 944	67.99 (0.81)	1688	8.86 (0.47)
Permanent teeth									
All missing	11 727	2677	22.83 (1.09)	383	3.27 (0.37)	7860	67.03 (1.13)	807	6.88 (0.50)
Not missing all	61 205	28 408	46.41 (0.67)	1681	2.75 (0.16)	26 152	42.73 (0.65)	4963	8.11 (0.26)

Continued

TABLE 3—*Continued*

Dental coverage									
Never covered	31 995	9312	29.10 (0.76)	934	2.92 (0.21)	19 424	60.71 (0.86)	2325	7.27 (0.31)
Lost coverage	6016	2272	37.78 (1.73)	212	3.53 (0.63)	2746	45.64 (1.71)	785	13.05 (1.08)
Gained coverage	5228	2206	42.20 (1.88)	153	2.93 (0.53)	2497	47.76 (1.68)	371	7.10 (0.82)
Always covered	29 692	17 294	58.24 (1.15)	765	2.58 (0.23)	9345	31.47 (1.07)	2288	7.71 (0.48)

Source. RAND Health Retirement Study Data, Version H.[10]

Note. Population characteristics were measured at the time of the 2006 interview, for the 2-y period preceding the 2006 survey interview, or between the 2004 and 2006 interviews where indicated. Persons with missing data for specific categories are included in the population total but excluded from the respective categories. The total sample size for the table is 16 061, which excludes 284 from the sample in Tables 1 and 2 who had missing labor force or retirement status data in at least 1 survey period.

[a]Persons in the labor force or partly retired in both periods.

[b]Persons becoming partly retired or in the labor force in 2006 from being not in the labor force or fully retired in 2004.

[c]Persons fully retired or not in the labor force in both periods.

[d]Persons becoming fully retired or not in the labor force in 2006 from being in the labor force or partly retired in 2004.

[e]Low income refers to persons in families with incomes 101% to 200% of the poverty line; middle income, 201% to 400% of the poverty line; and high income, more than 400% of the poverty line. Poor persons were at or below <100% of the poverty line including persons in families with negative income.

retirement status into 2 categories: fully or partly retired. Survey respondents were designated as fully or partly retired on the basis of employment, labor force, and self-reported retirement status variables in the RAND HRS.[10] Persons designated as fully retired in our study were screened to make certain that they were not self-employed or working for pay. Persons not identified as fully retired who reported being partly retired or who reported retirement and also reported either working or looking for work were defined as partly retired. Persons not classified as fully or partly retired were designated as either in or out of the labor force. Those classified as in the labor force reported working for pay or had a labor force status of working full-time, part-time, or unemployed. Those identified as not in the labor force reported being disabled, not in the labor force, or having never been in the labor force.

We estimated a multivariable model of dental care use transitions with control for dental coverage and retirement transitions and other potentially confounding covariates. Using Andersen's conceptual framework to guide the selection of these other covariates, we included self-reported 2006 HRS data for predisposing factors of age, gender, race/ethnicity, education, and household size; an enabling factor for income; and need factors of health and dentate status.[12] Given the dichotomous dependent variables for dental care use transitions, we used logistic regressions to measure the association of coverage status between survey periods on dental care use transitions with controls for potential demographic and other confounders.

Previous research[5] confirms the correlation between variables such as income, education, retirement, and dental care use.[13–15] To omit them could potentially bias our parameter estimates of the impact of dental coverage and labor force transitions on dental care use.

We omitted observations with any missing data from the regression analysis. The HRS core sample design is a multistage area probability sample of households, so all estimates and statistics reported were computed taking into account this design with the use of the software packages SUDAAN version 6.40 (Research Triangle Institute, Research Triangle Park, NC) and STATA version 7.0 (StataCorp, College Station, TX).

We used the 2006 respondent weights in the HRS for all the estimates. Our study was reviewed by the University of Maryland institutional review board, and it was determined that the protocol did not require institutional review board review.

RESULTS

Our sample consisted of 16 345 individuals interviewed in both the 2004 and 2006 HRS representing 74 047 165 members of the community-based population who were aged 51 years and older at the time of the 2004 interview. Excluded from this sample were 646 individuals who were not respondents in both 2004 and 2006 and 1478 persons who either had zero weights or did not have dental visit data in both HRS waves. More than half of the participants were women (57.6%; n=9410). Nearly 14% (n=2260) of the participants were non-Hispanic Black, and 9% (n=1471) were Hispanic. About 12% (n=1892) of the participants were aged 75 years or older, 36.4% (n=5952) were aged between 65 and 74 years, and 35.9% (n=5864) were aged between 51 and 64 years.

Overview

Dental care use transitions are reported by population characteristics (Table 1) and by retirement transitions and dental coverage transitions (Table 2). Labor force status and transitions are reported by population characteristics and by dental coverage and transitions in Table 3. Tables 4 and 5 show the adjusted and unadjusted odds ratio estimates of the probability of stopping and starting dental care use between the 2004 and 2006 survey periods. Unadjusted odds ratios were estimated from logistic equations without controls for other variables and provide a straightforward comparison with the adjusted logistic estimates incorporating controls. We focused on the adjusted estimates and point out that, unless otherwise noted, results for the unadjusted estimates did not differ from the adjusted estimates. Differences that do appear were typically caused by correlations between covariates present in the full regression models but omitted from the unadjusted models. Unless otherwise stated, all reported results are significant at least at the .05 level.

TABLE 4—Likelihood of Stopping Dental Care Use Among Older Adults: Health and Retirement Study, United States, 2004 and 2006

Population Characteristic	Unadjusted OR Point Estimate[a] (95% CI)	Adjusted OR Point Estimate[b] (95% CI)
Age, y		
51–64	0.685** (0.594, 0.791)	1.014 (0.818, 1.257)
65–69	0.628** (0.514, 0.768)	0.757* (0.607, 0.945)
70–74	0.818* (0.670, 0.999)	0.969 (0.783, 1.199)
≥75 (Ref)	1.000	1.000
Gender		
Women	0.875* (0.786, 0.974)	0.654** (0.571, 0.748)
Men (Ref)	1.000	1.000
Ethnicity/race		
Black non-Hispanic	3.025** (2.455, 3.728)	2.052** (1.624, 2.593)
Hispanic	2.897** (2.152, 3.900)	1.540* (1.059, 2.238)
Other non-Hispanic	1.943** (1.303, 2.898)	1.747** (1.157, 2.639)
White non-Hispanic (Ref)	1.000	1.000
Family income by poverty status[b]		
Poor	5.894** (4.687, 7.412)	2.390** (1.865, 3.064)
Low income	3.925** (3.348, 4.601)	2.086** (1.758, 2.476)
Middle income	2.384** (2.016, 2.818)	1.630** (1.360, 1.953)
High income (Ref)	1.000	1.000
Education		
< high-school degree	7.532** (6.007, 9.445)	2.815** (2.142, 3.701)
High-school graduate	2.669** (2.185, 3.261)	1.817** (1.467, 2.252)
College graduate (Ref)	1.000	1.000
Marital status		
Widowed or divorced	1.770** (1.513, 2.069)	1.342* (1.027, 1.752)
Never married	1.129 (0.787, 1.619)	0.936 (0.588, 1.490)
Married (Ref)	1.000	1.000
Household size		
2	0.669** (0.572, 0.782)	1.138 (0.880, 1.471)
≥3	0.974 (0.805, 1.179)	1.370* (1.023, 1.836)
1 (Ref)	1.000	1.000
Loss of permanent teeth		
All missing	8.982** (7.351, 10.974)	5.931** (4.830, 7.284)
None missing (Ref)	1.000	1.000
Health status		
Good	1.775** (1.511, 2.086)	1.363** (1.138, 1.633)
Fair or poor	3.340** (2.805, 3.978)	1.723** (1.430, 2.077)
Excellent or very good (Ref)	1.000	1.000
Retirement or labor force status 2004 and 2006		
Entered full retirement 2006	1.391* (1.060, 1.825)	0.832 (0.633, 1.094)
Entered partial retirement 2006	1.115 (0.724, 1.716)	0.950 (0.586, 1.541)
Entered labor force 2006	1.562 (0.956, 2.555)	1.185 (0.766, 1.831)
Entered not in the labor force, not retired 2006	2.221** (1.511, 3.263)	0.909 (0.594, 1.390)
Always fully retired, 2004 and 2006	1.457** (1.223, 1.735)	0.792* (0.634, 0.989)
Always partially retired, 2004 and 2006	0.832 (0.648, 1.069)	0.686* (0.500, 0.941)
Always not in the labor force, not retired, 2004 and 2006	1.865** (1.375, 2.530)	0.992 (0.713, 1.38)
Always in the labor force, 2004 and 2006 (Ref)	1.000	1.000

Continued

As shown in Tables 1 and 2, use patterns tended to be fairly consistent at the individual level. That is, the majority of persons who used dental care in 2004 also used care in 2006 (58.14%), although about 1 in 4 did not use care in either period (24.69%). However, there was also a fair amount of transition in utilization; approximately 13.5% of older adults with a dental visit in the 2 years before the 2004 survey did not have a visit in the 2 years before the 2006 survey (i.e., stopped use between the 2 survey waves). Approximately 25% of older adults without a dental visit in the 2 years before the 2004 survey did have a visit in the 2 years before the 2006 survey (i.e., started use between the 2 survey waves).

Table 3 shows that more than half of the older adults (55%) were out of the labor force in 2006. Most of them were out of the labor force in both 2004 and 2006 (47%), whereas another 8% of the older adults had left the labor force between periods. Table 3 also shows that a disproportionately high percentage of those who lost dental coverage between periods had exited the labor force (13.0%) between periods compared with those who were covered (7.7%) or not covered (7.3%) in both periods, or who had gained coverage between periods (7.1%).

Stopping Dental Care Use

In Table 4, the odds of stopping use between the 2004 and 2006 survey periods were lower for the group aged 65 to 69 years compared with the oldest group (aged 75 years and older). Compared with White non-Hispanics, Hispanics, Blacks, and other non-Hispanics were more likely to drop use. Women were found to be less likely to stop use than were men. The odds of stopping dental care use were higher for persons in the lowest 3 income groups compared with those with the highest incomes, and the odds of stopping use were higher for those persons aged 51 years and older with a high-school degree or less education compared with college graduates. Similarly, the likelihood of stopping use was higher for persons missing all of their permanent teeth, persons who were widowed or divorced, those in households of 3 or more persons (unlike the unadjusted estimate), and those in self-reported good or fair/poor health compared with persons not missing all of their

TABLE 4—*Continued*

Dental coverage status 2004–2006		
Always covered, 2004–2006	0.456** (0.385, 0.540)	0.533** (0.440, 0.646)
Lost coverage 2006	2.225** (1.840, 2.691)	2.230** (1.834, 2.710)
Gained coverage 2006	1.445** (1.093, 1.912)	1.348 (0.964, 1.886)
Never covered, 2004–2006 (Ref)	1.000	1.000

Source. RAND Health and Retirement Study Data, Version H.[10]

Note. CI = confidence interval; OR = odds ratio. Pseudo R^2 = 0.176 in adjusted regression. The sample consists of 15 787 observations, 10 116 in the stopping-dental-use equation and 5671 in the starting-dental-use equation. An original sample of 18 469 persons was reduced by 1514 persons with 0 weights, 547 persons with positive weights but not present in both 2004 and 2006, and 621 persons with missing values for any of the variables. Logistic estimates incorporated adjustments for the sample weights and the sample design. Unadjusted estimates did not control for other characteristics of the individual. Adjusted estimates included controls for other explanatory variables in the logistic equation.

[a]Odds ratio point estimate = estimate of [Probability of dropping use/Probability of always using] for persons with row characteristic divided by [Probability of dropping use/Probability of always using] for reference group (ref). Unadjusted point estimates computed directly from Tables 1 and 2 differ slightly from the unadjusted logistic estimates in this table because of the smaller sample size for the logistic estimates.

[b]Low income refers to persons in families with incomes 101% to 200% of the poverty line; middle income, 201% to 400% of the poverty line; and high income, > 400% of the poverty line. Poor persons are at or <100% of the poverty line including persons in families with negative income.

*P = .05; **P = .01.

permanent teeth, persons who were married, those in single-person households, and persons in excellent or very good health. Other household size and age effects found in the unadjusted estimates became statistically insignificant after we controlled for other explanatory variables in the logistic model.

Compared with the persons in our study who remained in the labor force between 2004 and 2006, the odds of stopping use were lower for those fully or partly retired over the 2 periods (unlike the unadjusted odds for both groups). Other retirement effects found in the unadjusted estimates became statistically insignificant after we controlled for other explanatory variables in the logistic model. The effect of coverage transitions was strong and persisted even after we controlled for other confounders. Compared with persons without dental coverage between 2004 and 2006, the odds of stopping use were higher for those losing coverage between periods, and lower for those with coverage in both periods.

Starting Dental Care Use

In Table 5 the odds of starting dental care use between the 2004 and 2006 survey periods were lower for individuals in families below the poverty line compared with high-income individuals, and for persons with a high-school degree or less education compared with college graduates. Persons without any permanent teeth were also less likely to start use than persons with any or all of their permanent teeth as were individuals in fair or poor health compared with those reporting excellent or very good health. Age, marital status, household size, retirement, and other income and health status effects found in the unadjusted estimates were no longer significant in the multivariable model.

Individuals who were covered in both periods or who gained coverage between the 2 periods were more likely to start use than persons without coverage in both periods.

In both the starting- and stopping-use models we tested for pairwise interaction terms between age, income, and dentate status and retirement status by using STATA stepwise logistic regression. In no case did we find any of the interaction terms, tested as a group, to be statistically significant at or below the .05 level.

DISCUSSION

The focus of our study was on transitions in dental care use among persons aged 51 years and older over a 4-year period between 2002 and 2006. Of the 74 million persons in this age group in the community population over this period, we found that three fourths had at least 1 dental care visit over this 4-year period. In most cases, persons who used dental services in one 2-year period also did so in the next, and those who did not use services in the first period did not use them in the second period. However, nearly 1 in 5 older Americans either started or stopped dental care use during our period of study, with about half stopping use and the other half starting use. Despite this finding, the likelihood that a person without dental care use in the 2 years before the 2004 interview would start dental care use in the 2 years before the 2006 interview was nearly twice the likelihood of a person with dental care use in the 2004 interview stopping dental care use by the 2006 interview.

Retirement Impact

Our findings show that after we adjusted for coverage transitions and other explanatory variables, retirement transitions did not have an independent effect on use transitions, either stopping or starting use, in most cases. The exception was for the fully or partly retired in both periods who were actually less likely to stop use than those continuously in the labor force. As retirees may have more time to seek dental care than those who are in the labor force, this result is not entirely unexpected.

Coverage Impact

A key finding from our study is the increased likelihood of stopping use among those losing coverage and the increased likelihood of starting use among those persons gaining dental care coverage relative to those who remained without coverage between survey periods. This finding is not surprising given our cross-sectional findings from the same data in our previous research on the correlation between dental coverage and use.[7] We also found that older adults with dental coverage in both periods were less likely to stop use and more likely to start use, relative to the same reference group. Correlations between losing and gaining coverage and respective exits from and entrances into the labor force from Table 3 and from our previous research suggest reasons for these coverage transitions.[6]

Interestingly, we also found an unexpected positive, although statistically insignificant, coefficient estimate for persons gaining dental coverage relative to those never covered in the stopping-use equation. For most, gaining

TABLE 5—Likelihood of Starting Dental Care Use Among Older Adults: Health and Retirement Study, United States, 2004 and 2006

Population Characteristic	Unadjusted OR Point Estimate[a] (95% CI)	AOR Point Estimate[a] (95% CI)
Age, y		
51–64	1.825** (1.544, 2.156)	1.076 (0.850, 1.363)
65–69	1.247* (1.037, 1.498)	0.981 (0.823, 1.169)
70–74	1.207 (0.956, 1.523)	1.082 (0.840, 1.393)
≥75 (Ref)	1.000	1.000
Gender		
Women	0.891 (0.770, 1.029)	1.171 (0.986, 1.391)
Men (Ref)	1.000	1.000
Ethnicity/race		
Black non-Hispanic	0.879 (0.701, 1.102)	0.892 (0.701, 1.136)
Hispanic	0.889 (0.699, 1.130)	1.044 (0.773, 1.409)
Other non-Hispanic	1.057 (0.621, 1.800)	0.997 (0.629, 1.580)
White non-Hispanic (Ref)	1.000	1.000
Family income by poverty status[b]		
Poor	0.421** (0.318, 0.556)	0.626* (0.434, 0.902)
Low income	0.498** (0.409, 0.605)	0.784 (0.610, 1.008)
Middle income	0.615** (0.503, 0.751)	0.832 (0.669, 1.036)
High income (Ref)	1.000	1.000
Education		
< high-school degree	0.280** (0.217, 0.360)	0.478** (0.363, 0.630)
High-school graduate	0.517** (0.396, 0.675)	0.685** (0.525, 0.894)
College graduate (Ref)	1.000	1.000
Marital status		
Widowed or divorced	0.678** (0.565, 0.813)	0.831 (0.614, 1.125)
Never married	0.800 (0.509, 1.257)	0.828 (0.488, 1.406)
Married (Ref)	1.000	1.000
Household size		
2	1.327** (1.091, 1.613)	0.978 (0.745, 1.283)
≥3	1.276* (1.049, 1.553)	0.904 (0.680, 1.200)
1 (Ref)	1.000	1.000
Loss of permanent teeth		
All missing	0.287** (0.226, 0.365)	0.327** (0.253, 0.422)
None missing (Ref)	1.000	1.000
Health status		
Good	0.796** (0.671, 0.944)	0.936 (0.792, 1.106)
Fair or poor	0.527** (0.454, 0.612)	0.760** (0.630, 0.916)
Excellent or very good (Ref)	1.000	1.000
Retirement or labor force status 2004 and 2006		
Entered full retirement 2006	0.641** (0.477, 0.863)	1.012 (0.735, 1.393)
Entered partial retirement 2006	0.473** (0.276, 0.810)	0.642 (0.370, 1.117)
Entered labor force 2006	0.916 (0.510, 1.646)	1.281 (0.691, 2.374)
Entered not in the labor force, not retired 2006	0.691 (0.473, 1.009)	1.326 (0.873, 2.012)
Always fully retired, 2004 and 2006	0.612** (0.517, 0.725)	1.136 (0.884, 1.460)
Always partly retired, 2004 and 2006	0.785 (0.544, 1.132)	1.000 (0.688, 1.453)
Always not in the labor force, not retired, 2004 and 2006	0.571** (0.418, 0.780)	1.066 (0.741, 1.535)
Always In the labor force, 2004 and 2006 (Ref)	1.000	1.000

Continued

coverage occurs through a job-based arrangement because Medicare, apart from Medicare Advantage programs, does not offer dental coverage, and Medicaid dental coverage is not uniformly available across states.[2–4] In fact, the State of California recently cut dental benefits under its Medicaid program for budgetary reasons. We looked at those gaining coverage in 2006 with dental care use in 2004 and found that of those not stopping dental care use in 2006, 57% were working for pay in 2006 whereas of those stopping dental care use in 2006, only 48% were working for pay during that period. Those who gained coverage were less likely to stop dental care use (19%) if they were working and were more likely to stop dental care use (25%) if they were not working, so it does not appear that work interfered with arranging dental care. We do not fully understand why there was a tendency to stop dental care use among those gaining coverage, so we will have to explore this finding in a future study. It may be that these individuals only seek dental care when it is needed. On the other hand, retirees may reenter the work force because of financial difficulties. Gaining coverage as a secondary benefit associated with returning to work may not be enough to outweigh the difficulty that caused the retiree to return to work.

In general, our regression results were unchanged when we subset our sample on the basis of dentate status, age, or income. The only exception we found was that the estimated coefficient for gaining dental coverage in the stopping dental care use regression became statistically significant but only for the subset of those aged 65 years and older.

Limitations

The model results could be biased from omitting unobserved relevant variables measuring access to care or supply constraints on dental care utilization. The lengthy 2-year recall period in the HRS could affect the accuracy of self-reporting dental care use and dental care use transitions. Without data on clinical oral health status, type of dental coverage, and number and type of dental procedures in the HRS, it is difficult to fully understand why individuals stop or start dental care use over a 4-year period. Further insight into dental care use transitions could be found by incorporating

TABLE 5—*Continued*

Dental coverage status 2004–2006		
Always covered, 2004–2006	2.233** (1.846, 2.702)	1.928** (1.566, 2.373)
Lost coverage 2006	0.864 (0.668, 1.117)	0.903 (0.694, 1.176)
Gained coverage 2006	1.738** (1.424, 2.121)	1.694** (1.369, 2.097)
Never covered, 2004–2006 (Ref)	1.000	1.000

Source. RAND Health Retirement Study Data, Version H.[10]

Note. AOR = adjusted odds ratio; CI = confidence interval; OR = odds ratio. Pseudo $R^2 = 0.091$ in adjusted regression. The sample consisted of 15 787 observations, 10 116 in the dropping dental care use equation and 5671 in the starting dental care use equation. An original sample of 18 469 persons was reduced by 1514 persons with 0 weights, 547 persons with positive weights but not present in both 2004 and 2006, and 621 persons with missing values for any of the variables. Logistic estimates incorporated adjustments for the sample weights and the sample design. Unadjusted estimates did not control for other characteristics of the individual. Adjusted estimates included controls for other explanatory variables in the logistic equation.

[a]OR point estimate = estimate of [Probability of starting use/Probability of never using] for persons with row characteristic divided by [Probability of starting use/Probability of never using] for reference group (ref). Unadjusted point estimates computed directly from the Tables 1 and 2 differ slightly from the unadjusted logistic estimates in this table because of the smaller sample size for the logistic estimates.

[b]Low income refers to persons in families with incomes 101% to 200% of the poverty line; middle income, 201% to 400% of the poverty line; and high income > 400% of the poverty line. Poor persons were at or <100% of the poverty line including persons in families with negative income.

*$P = .05$; **$P = .01$.

transitions in explanatory variables such as changes in dentate status or location, or by adding more waves of HRS data to the longitudinal model.

Further analysis is needed to identify the reasons for dental coverage changes and to assess the accuracy of measuring dental coverage in the HRS. We show an association between losing coverage and exiting from the labor force between periods, but there could have been other reasons for coverage losses from the retirement of a spouse or reductions in hours worked, income, or wealth that could be explored in the future. There may be confusion among Medicare beneficiaries regarding whether they have dental benefits under their Medicare coverage. We plan to analyze potential measurement error in dental coverage and its effect on our results when an improved HRS measure of dental coverage becomes available in the future.

Policy Implications

Although the transition to retirement did not have an independent effect on dental care use transitions, retirement has previously been shown to be strongly associated with a loss in dental coverage.[6] Therefore, the changes in dental care use identified in our study may highlight the vulnerabilities that those reaching retirement age face. Forty-five percent of the 74 million individuals in our HRS sample were in the labor force in 2006, assuming that the partly retired in our sample retained some attachment to the labor force. This estimate is comparable to the actual 48% labor force participation rate for the civilian population aged 50 years and older in 2008, and is in line with the projected 50% rate for the same population in 2015. For those aged 65 years and older, the actual labor force participation rate of 16% in 2008 is projected to increase to 20% by 2015.[16–18] This increase may mitigate to some degree the tendency our study shows for older adults to stop their dental visits as they exit the labor force and lose their dental coverage at retirement.

Currently, Medicare does not offer a dental benefit but covers the vast majority of retirees.[4] Although many current retirees have supplemental retiree health insurance coverage (and possibly dental coverage through such a plan), the offers of such coverage have declined precipitously in recent years, meaning that future retirees will be more dependent on Medicare. Recent estimates show that nearly one quarter of Medicare beneficiaries are enrolled in Medicare Advantage plans, with about 40% of these plans offering preventive dental care and close to 20% offering comprehensive dental care.[2,3] Although the full implementation status of health reform is unclear, at this point it does not seem likely that a dental benefit will be added to Medicare in the near future and may even be eliminated if Medicare Advantage plans are phased out. State budgetary pressures make the addition of a dental benefit to Medicaid highly unlikely and increase the possibility of such coverage being cut from state plans where it does currently exist.

Thus it is possible that in the future, many more older adults reaching retirement age will experience a loss in dental coverage. This loss is associated with stopping use. Although we were only able to look at a short time horizon with the HRS data and therefore do not know the longer-term use patterns of those who lose coverage around retirement age, even short-term lapses in preventive coverage can result in more invasive and costly procedures in the future.[9] For retirees on fixed incomes, the high cost of dental procedures could have important financial consequences, and the delay of care could lead to worse overall health status and affect more than only dental costs. ■

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Contributors

R.J. Manski originated and supervised the study and served as content expert on dental care. J.F. Moeller supervised the analyses and assisted with the writing of the article. P.A. St Clair and H. Chen assisted with analyses. J. Schimmel assisted with the writing of the article and served as content expert on health economics. J.V. Pepper served as content expert on economics.

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Human Participant Protection

Our study was reviewed by the University of Maryland institutional review board, and it was determined that the protocol did not require institutional review board review.

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