Living with Chronic Illness

Physical and Sensory Functioning over Time and Satisfaction with Care: The Implications of Getting Better or Getting Worse

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Objective. To determine whether those persons whose sensory or physical functioning improved or worsened over one year are more or less satisfied with their health care.

Data Sources. 1996 and 1997 Medicare Current Beneficiary Survey (MCBS).

Study Design. The MCBS surveys a nationally representative, longitudinal panel of Medicare beneficiaries about their sociodemographic attributes; vision, hearing, and various mobility functions; and 10 items representing satisfaction with and access to health care. Using multivariable logistic regression and controlling for sociodemographic factors, we computed adjusted odds ratios of dissatisfaction with care, examining the effects of changes in sensory or physical functioning. Analyses accounted for MCBS sampling weights.

Data Extraction Methods. We identified 9,974 community-dwelling respondents, 18 years old and over who answered the 1996 and 1997 MCBS. We assessed five categories of sensory or physical functioning (vision; hearing; walking; reaching overhead; and grasping and writing) and compared 1996 and 1997 responses to identify those whose functioning improved or worsened.

Principal Findings. Worsened functioning was strongly associated with older age, low income, and low educational attainment. Improved functioning was rarely significantly associated with satisfaction; an exception involved substantially lower rates of dissatisfaction with "ease and convenience" of getting to physicians. Worsened functioning was often statistically significantly associated with dissatisfaction, always with adjusted odds ratios > 1.0 . Across all five functional categories, persons whose functioning worsened displayed significantly greater dissatisfaction with overall quality, ease, and costs of care.

Conclusions. Persons whose functioning improved rarely reported better satisfaction than did those whose functioning did not improve, while those whose functioning worsened expressed more systematic reservations about their care.

Key Words. Sensory functioning, physical functioning, satisfaction with care, access to care

Cross-sectional surveys generally suggest that persons with disabling physical or sensory functional impairments are less satisfied with their health care than

other persons (Rosenbach 1995; Rosenbach, Adamache, and Khandker 1995; Iezzoni et al. 2002; Jha et al. 2002). One potential explanation is that people with greater needs for services interact with the health care system more often, producing more opportunities for mishaps or disappointments. However, functional deficits are rarely static, especially over months or years. Particularly among elderly persons or those with chronic health conditions, functional impairments often worsen over time, although improvements also occur. Clinical interventions generally aim explicitly to improve or maximize functional abilities or to compensate for their loss. Therefore, patients' perceptions of health care may reflect not only their current functioning but also their functional trajectories: are functional impairments getting better or worse?

In this study, we tracked respondents to the Medicare Current Beneficiary Survey (MCBS) between 1996 and 1997, examining trends in self-reported sensory and physical functioning. We examined the associations of improving and worsening functioning with various demographic characteristics and respondents' 1997 reports of satisfaction with their health care. We hypothesized that respondents with improved functioning would be more satisfied with their care while those with diminished functioning would report lower satisfaction.

METHODS

Database

We examined responses from 9,974 community-dwelling (noninstitutionalized) Medicare beneficiaries interviewed in both the 1996 and 1997. Medicare covers almost all elderly persons (age 65 and older) and people younger than age 65 who have met Social Security Administration (SSA) definitions of disability (unable to work for at least one year) and have received Social

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Security disability insurance (SSDI) cash payments for two years. As described elsewhere (Adler 1994, 1995), the MCBS is an ongoing, longitudinal survey of a representative panel of Medicare beneficiaries, with an oversampling of persons younger than age 65. From our initial 1996 sample, we eliminated 106 persons eligible for Medicare because of end-stage renal disease (ESRD), including the only respondents under age 18 ($n = 2$).

Persons typically remain empanelled in the MCBS for four years, with the sample replenished annually (e.g., to replace respondents who died). The MCBS conducts in-person interviews three times yearly, tracking participants wherever they reside and using two types of surveys: (1) computer-assisted community questionnaires for persons living in the community, and (2) facility questionnaires for respondents in long-term care or institutional settings (answered by administrators or designated staff). We used results only from the MCBS community survey, which asked about demographic characteristics, health status and functioning, and perceptions of care. We included both self- and proxy-reported responses. Proxies supplied responses for 22.4 percent of persons under age 65 and 9.0 percent of persons over age 64 years.

Our final sample included 9,974 individuals receiving community interviews in both 1996 and 1997. Of the original 16,403 community respondents in 1996: 2,219 had been sampled for a special supplemental survey on Medicare managed care (health maintenance organizations) and were not interviewed in 1997; 93 had died; 148 were institutionalized; 2,684 rotated off the MCBS having completed their four years; 13 shifted into ESRD eligibility; and 1,272 (7.8 percent of 16,403) were lost to follow up.

Indicators of Sensory and Physical Functioning

To identify persons with functional deficits, investigators often examine difficulties performing activities of daily living (ADLs) or instrumental ADLs (IADLs) or self-perceived overall health (Rosenbach 1995; Rosenbach, Adamache, and Khandker; Chan et al. 1999; Foote and Hogan 2001; Jha et al. 2002). Although these general measures are useful for many purposes, they do not indicate specific sensory or physical limitations that might be amenable to clinical intervention. We therefore focused on sensory and physical functional abilities that could offer opportunities for clinical actions. For example, cataract surgery might restore vision; hearing aids might ameliorate hearing; and rehabilitation services or surgery, like joint replacement for arthritis, might assist persons with mobility problems. These areas also vary in terms of Medicare fee-for-service coverage policies. For example, Medicare does not

pay for hearing aids or prescription eyeglasses, or for rehabilitative services for patients with worsening physical functioning (Pope and Tarlov 1991; Cassel, Besdine, and Siegel 1999).

During each September–December round of interviews, the MCBS asks about specific sensory and physical functional abilities. As described elsewhere (Iezzoni et al. 2002), we used these responses to identify five categories of sensory or physical functioning: vision; hearing; walking; reaching over-head; and grasping and writing. For each category, we created three levels based on the extent of difficulties reported (i.e., no, minor, and major difficulties), assigning people to the most severe level for which they qualified in each of the two years.

To examine change in functioning over time, we compared reported functional abilities between 1996 and 1997, identifying respondents who improved (among those who had a minor or major problem in 1996, persons who reported a less severe problem in 1997) and respondents who got worse (among those who had no problem or a minor problem in 1996, persons who reported a more severe problem in 1997). (Although we sometimes use the phrase “got better” this does not necessarily imply that the person no longer reported a problem; the respondent may just report less severe functional limitations). Some respondents did not answer *all* sensory and physical functioning questions in both years. Therefore, sample sizes vary slightly for each functional category, from 9,923 for vision analyses to 9,942 for hearing.

Respondents who died or were institutionalized between 1996 and 1997 certainly had “worsened” from critical perspectives. However, their sample sizes were small (93 and 148, respectively). We had no information about how their sensory or physical functioning had changed or contributed to their deaths or residential shift and their 1997 perceptions of care. We therefore eliminated them from our analyses.

Satisfaction with and Access to Care

The September–December MCBS interviews also include questions about satisfaction with and access to medical care, focusing on ten specific areas (full texts of questions appear in footnotes to Table 4). Although these measures are certainly highly correlated, each represents unique concerns and targets for quality improvement interventions. Response options were very satisfied, satisfied, dissatisfied, and very dissatisfied. For our primary analyses, we grouped dissatisfied and very dissatisfied responses to identify persons unhappy with their care. As a sensitivity analysis, we also dichotomized

responses as very satisfied or not very satisfied. We examined responses from the 1997 survey.

ANALYSES

All analyses and figures presented here employed MCBS sampling weights to produce nationally representative, Medicare population estimates. We used SAS-callable SUDAAN (Research Triangle Institute 2003).

For each sensory and physical functional category, we produced two multivariable, logistic regression models predicting either improvement or worsening in that category. These models controlled for age group (18–44, 45–64, 65–74, 75–84, and 85+ years), sex, race, ethnicity, education, household income (<\$25,000 and \$25,000+), marital status, household composition (living alone versus with others), residence location (urban versus rural), and having fee-for-service Medicare versus managed care. We aimed to adjust for respondent attributes that could affect functional status or perceptions of functioning. We report adjusted odds ratios with 95 percent confidence intervals (CI).

We computed Pearson correlation coefficients for each pair of dichotomized satisfaction measures. For each of the 10 satisfaction measures and adjusting for the sociodemographic and insurance characteristics listed above, we used multivariable logistic regression to compute the adjusted odds ratio of being dissatisfied associated with getting better. We performed similar analyses, instead computing the adjusted odds ratio of dissatisfaction when respondents worsened. To examine the sensitivity of findings to our choice of cutpoint for satisfaction, we also modeled the responses categorized as very satisfied or not. We repeated all these analyses adding each individual's 1996 satisfaction as covariates, hypothesizing that satisfaction expressed in 1996 might predict it in 1997 (Allen and Rogers 1997).

RESULTS

Our final sample included 9,974 respondents answering both the 1996 and 1997 MCBS community surveys. The mean (standard deviation) age in 1996 was 71.9 (9.0) years, with 10.8 percent under age 65. Other sociodemographic characteristics included: 56.0 percent women; 8.6 percent black, 6.1 percent Hispanic, and 2.2 percent other race/ethnicity; 63.2 percent > high school

education; 33.0 percent annual incomes $\geq$ \$25,000; 30.5 percent lives alone; 26.0 percent rural residence; and 84.9 percent fee-for-service. Table 1 presents levels of sensory and physical functioning reported in 1996 and the percent of respondents improving and worsening by 1997 for each of the five conditions. The most common difficulty reported in 1996 was minor hearing problems (36.9 percent). The most frequent major difficulty involved lower extremity mobility (13.2 percent). Among those reporting minor or major difficulties with vision, upper extremity mobility, and hand dexterity in 1996, more than half reported improved functioning in 1997. Almost 15 percent of persons reporting either no or minor difficulties with hearing or lower extremity mobility in 1996 said in 1997 that their functioning had worsened.

Characteristics Associated with Getting Better or Worse

Tables 2 and 3 show the results of the multivariable logistic regression models examining the associations of sociodemographic and insurance characteristics with improved or worsened functioning, respectively. Across the five conditions, no characteristic was uniformly significantly associated with improved functioning (Table 2). Persons aged 85 and older were significantly less likely to get better, except in the hand dexterity category. The hearing analyses produced the highest adjusted odds ratios, with racial and ethnic minorities statistically significantly more likely than whites to report improved hearing

Table 1: 1996 Functioning and Number (Percent) Getting Better or Worse in 1997

	<i>Sensory or Physical Function</i>				
	<i>Vision</i> <i>n</i> = 9,923	<i>Hearing</i> <i>n</i> = 9,942	<i>Lower extremity</i> <i>mobility</i> <i>n</i> = 9,931	<i>Upper extremity</i> <i>mobility</i> <i>n</i> = 9,934	<i>Hand dexterity</i> <i>n</i> = 9,939
Number of MCBS respondents (weighted percent)					
1996 Functioning					
No problem	8,944 (91.2%)	5,428 (56.0%)	6,811 (71.8%)	8,237 (84.6%)	8,524 (87.2%)
Minor problem	912 (8.2)	3,727 (36.9)	1,608 (15.0)	790 (7.4)	774 (7.2)
Major problem	67 (0.6)	787 (7.1)	1,512 (13.2)	907 (8.1)	641 (5.7)
Change 1996–1997					
Got better*	501 (52.4)	1,249 (29.1)	997 (33.1)	879 (52.6)	809 (57.7)
Got worse†	568 (5.2)	1,340 (14.5)	1,349 (14.6)	1,034 (10.3)	927 (8.8)

*Among those who had a minor or major problem in 1996, the weighted percent who reported a less severe problem in 1997.

†Among those who had no problem or a minor problem in 1996, the weighted percent who reported a more severe problem in 1997.

Table 2: Adjusted Odds Ratios of Sensory or Physical Functioning Getting Better between 1996 and 1997

Predictor variables	Sensory or Physical Function				
	Vision <i>n</i> = 940	Hearing <i>n</i> = 4,336	Lower extremity mobility <i>n</i> = 2,978	Upper extremity mobility <i>n</i> = 1,629	Hand dexterity <i>n</i> = 1,345
Adjusted odds ratio (95% confidence interval)					
Age group ^a					
18–44	1.1 (0.6, 2.1)	2.2 (1.5, 3.2)*	1.0 (0.7, 1.5)	0.6 (0.4, 1.1)	0.8 (0.5, 1.2)
45–64	0.9 (0.6, 1.4)	1.6 (1.2, 2.2) [§]	0.9 (0.7, 1.2)	0.5 (0.4, 0.8)*	0.7 (0.5, 1.0) [†]
75–84	0.8 (0.6, 1.1)	0.8 (0.6, 0.9) [§]	0.8 (0.6, 0.9) [§]	0.7 (0.6, 1.0) [†]	1.0 (0.7, 1.4)
85+	0.4 (0.3, 0.7) [#]	0.6 (0.5, 0.7)*	0.4 (0.4, 0.6)*	0.6 (0.5, 0.9) [§]	0.7 (0.5, 1.0)
Male	0.8 (0.6, 1.1)	0.8 (0.7, 0.9) [§]	1.1 (0.9, 1.3)	1.3 (1.0, 1.6)	0.9 (0.7, 1.2)
Race/ethnicity ^b					
Black	1.1 (0.7, 1.9)	2.1 (1.6, 2.8)*	1.1 (0.8, 1.5)	1.3 (0.9, 1.8)	1.3 (0.8, 2.1)
Hispanic	1.1 (0.6, 2.1)	2.7 (1.8, 3.9)*	1.7 (1.2, 2.4) [§]	1.1 (0.7, 1.7)	1.2 (0.7, 2.0)
Other race	5.3 (1.2, 22.6) [†]	2.1 (1.3, 3.2) [§]	1.0 (0.5, 2.1)	0.5 (0.2, 1.2)	0.7 (0.3, 1.6)
≥ High school education	1.2 (0.8, 1.8)	1.0 (0.9, 1.2)	1.2 (1.0, 1.4) [†]	1.2 (0.9, 1.5)	1.2 (0.9, 1.6)
Income ≥ \$25,000	0.9 (0.6, 1.4)	0.9 (0.7, 1.1)	1.2 (0.9, 1.5)	1.0 (0.7, 1.4)	0.8 (0.6, 1.2)
Not married	0.7 (0.5, 1.0) [†]	1.0 (0.8, 1.3)	1.0 (0.8, 1.3)	1.1 (0.8, 1.4)	1.1 (0.8, 1.5)
Lives with others ^c	0.6 (0.4, 0.8) [§]	1.1 (0.9, 1.4)	1.0 (0.8, 1.2)	0.9 (0.7, 1.2)	0.8 (0.6, 1.2)
Rural residence	1.0 (0.7, 1.4)	0.9 (0.7, 1.1)	1.0 (0.8, 1.2)	0.9 (0.7, 1.2)	1.2 (0.9, 1.6)
Fee-for-service Medicare ^d	1.0 (0.6, 1.8)	1.3 (1.0, 1.6) [†]	1.0 (0.8, 1.3)	1.1 (0.8, 1.5)	1.1 (0.7, 1.6)

* $p \leq 0.0001$;[#] $p < 0.001$;[§] $p < 0.01$;[†] $p \leq 0.05$.^aAge group 65–74 = reference category.^bWhite race = reference category.^cLives alone = reference category.^dHMO enrollment = reference category.

between 1996 and 1997. Persons with fee-for-service Medicare were 30 percent more likely than managed care enrollees to report improved hearing.

In contrast, three characteristics were generally associated with respondents' reports of getting worse (Table 3). Older persons were consistently more likely to report worsened functioning. Better-educated respondents were less likely to report worsening than less-educated respondents in four of the five conditions. Persons with incomes of at least \$25,000 were less likely to report worsening than respondents with lower incomes in four conditions. Insurance type did not affect reported worsening.

Table 3: Adjusted Odds Ratios of Sensory or Physical Functioning Getting Worse between 1996 and 1997

Predictor variables	Sensory or Physical Function				
	Vision <i>n</i> = 9,434	Hearing <i>n</i> = 8,760	Lower extremity mobility <i>n</i> = 8,059	Upper extremity mobility <i>n</i> = 8,635	Hand dexterity <i>n</i> = 8,898
Adjusted odds ratio (95% confidence interval)					
Age group ^a					
18–44	1.3 (0.8, 2.1)	0.6 (0.4, 0.8) [§]	0.7 (0.5, 0.9) [†]	1.3 (0.9, 1.8)	1.9 (1.3, 2.6) [#]
45–64	1.5 (1.1, 2.1) [§]	1.0 (0.8, 1.3)	2.0 (1.6, 2.6) [*]	3.1 (2.4, 4.0) [*]	2.4 (1.8, 3.2) [*]
75–84	1.7 (1.4, 2.1) [*]	1.3 (1.1, 1.4) [§]	1.6 (1.4, 1.8) [*]	1.4 (1.1, 1.7) [§]	1.7 (1.4, 2.1) [*]
85+	2.5 (1.9, 3.4) [*]	1.8 (1.5, 2.2) [*]	3.4 (2.8, 4.1) [*]	2.4 (1.9, 3.0) [*]	3.4 (2.6, 4.4) [*]
Male	0.9 (0.7, 1.0)	1.5 (1.3, 1.7) [*]	0.9 (0.8, 1.1)	0.9 (0.7, 1.0)	0.9 (0.7, 1.0)
Race/ethnicity ^b					
Black	1.2 (0.8, 1.7)	0.7 (0.5, 1.0) [†]	1.0 (0.8, 1.3)	1.2 (0.9, 1.6)	1.0 (0.7, 1.3)
Hispanic	1.2 (0.9, 1.7)	0.9 (0.7, 1.3)	0.7 (0.5, 0.9) [†]	1.0 (0.7, 1.4)	1.0 (0.7, 1.3)
Other race	1.8 (0.9, 3.5)	1.0 (0.6, 1.7)	0.8 (0.5, 1.3)	0.9 (0.6, 1.5)	0.6 (0.3, 1.2)
≥ High school education	0.8 (0.7, 1.0)	0.9 (0.8, 1.0) [†]	0.8 (0.7, 0.9) [#]	0.7 (0.6, 0.8) [*]	0.7 (0.6, 0.8) [*]
Income ≥ \$25,000	0.6 (0.5, 0.8) [#]	0.9 (0.8, 1.1)	0.7 (0.5, 0.8) [*]	0.7 (0.6, 0.8) [#]	0.8 (0.6, 1.0) [†]
Not married	1.0 (0.8, 1.3)	1.1 (0.9, 1.3)	1.0 (0.8, 1.2)	0.8 (0.7, 1.1)	0.9 (0.8, 1.2)
Lives with others ^c	1.3 (1.0, 1.7)	1.1 (0.9, 1.2)	0.9 (0.8, 1.1)	1.0 (0.8, 1.2)	1.2 (1.0, 1.5)
Rural residence	1.2 (0.9, 1.5)	1.0 (0.8, 1.2)	1.2 (1.0, 1.4)	1.2 (1.0, 1.5)	1.0 (0.8, 1.4)
Fee-for-service	1.1 (0.8, 1.5)	1.0 (0.8, 1.2)	0.9 (0.8, 1.2)	0.9 (0.7, 1.2)	1.1 (0.8, 1.5)
Medicare ^d					

* $p \leq 0.0001$;# $p < 0.001$;§ $p < 0.01$;† $p \leq 0.05$.^aAge group 65–74 = reference category.^bWhite race = reference category.^cLives alone = reference category.^dHMO enrollment = reference category.*Satisfaction with and Access to Care*

Across the 10 dimensions of care, fewer than 10 percent of respondents expressed dissatisfaction regardless of whether their sensory or physical functioning got better or worse (tables available upon request). The one exception involved costs of care. For most disabling conditions and functional trajectories, 14 to 20 percent of respondents reported dissatisfaction with costs. The 10 dimensions exhibited a low to moderate correlation, with median Pearson correlation coefficients of 0.30 (range 0.05 to 0.60) among those included in

the “getting better” analyses and 0.25 (range 0.10 to 0.53) among those in the “getting worse” analyses.

Tables 4 and 5 show the adjusted odds ratios of reporting dissatisfaction with care associated with getting better and getting worse, respectively. Getting better was relatively rarely significantly associated with reporting dissatisfaction, but when it was, adjusted odds ratios always fell significantly below 1.0: persons who improved were much less likely to be dissatisfied (Table 4). Statistically significant adjusted odds ratios appeared for six quality dimensions for upper extremity mobility; this happened for only one quality

Table 4: Adjusted Odds Ratios of Being Dissatisfied with Care for Respondents Who Got Better Compared to Those Who Did Not

<i>Aspect of care^a</i>	<i>Sensory or Physical Function</i>				
	<i>Vision</i>	<i>Hearing</i>	<i>Lower extremity mobility</i>	<i>Upper extremity mobility</i>	<i>Hand dexterity</i>
	Adjusted odds ratio ^b				
OVERALL	1.2 (0.7, 2.0)	1.3 (0.9, 1.8)	0.8 (0.5, 1.2)	0.5 (0.3, 0.8) [§]	0.8 (0.4, 1.4)
INFORMATION	0.9 (0.6, 1.4)	0.9 (0.6, 1.2)	0.9 (0.7, 1.2)	0.6 (0.4, 0.8) [§]	1.0 (0.6, 1.5)
FOLLOW-UP	1.1 (0.6, 1.9)	0.7 (0.4, 1.0)	0.8 (0.5, 1.2)	0.5 (0.3, 0.8) [§]	0.6 (0.3, 1.2)
CONCERN	1.2 (0.7, 2.0)	1.1 (0.8, 1.5)	1.2 (0.9, 1.6)	0.6 (0.4, 0.9) [§]	1.0 (0.7, 1.5)
SPECIALISTS	1.2 (0.5, 2.7)	0.7 (0.4, 1.1)	1.1 (0.6, 1.8)	0.7 (0.4, 1.2)	0.8 (0.5, 1.5)
AVAILABILITY	0.8 (0.4, 1.8)	0.5 (0.3, 0.9) [†]	1.0 (0.7, 1.4)	0.5 (0.3, 0.9) [†]	0.4 (0.2, 0.7) [§]
EASE	0.6 (0.4, 1.0) [†]	0.7 (0.5, 1.0) [†]	0.6 (0.5, 0.9) [§]	0.6 (0.4, 0.8) [§]	0.5 (0.3, 0.7) [#]
COSTS	0.6 (0.4, 0.9) [†]	0.9 (0.7, 1.1)	0.9 (0.7, 1.1)	0.8 (0.6, 1.0)	0.8 (0.6, 1.1)
LOCATION	1.8 (1.0, 3.2)	0.8 (0.6, 1.2)	0.8 (0.5, 1.1)	0.8 (0.5, 1.2)	0.8 (0.5, 1.3)
TELEPHONE	0.8 (0.4, 1.7)	0.6 (0.4, 1.0) [†]	1.0 (0.7, 1.4)	0.7 (0.4, 1.1)	0.7 (0.4, 1.2)

^aOVERALL = “overall quality of the medical services received in the last year”

INFORMATION = “information given about what was wrong with you”

FOLLOW-UP = “follow-up care received after an initial treatment or operation”

CONCERN = “concern of doctors for overall health rather than just for an isolated symptom of disease”

SPECIALISTS = “availability of care by specialists when needs it”

AVAILABILITY = “availability of medical services at night and on weekends”

EASE = “ease and convenience of getting to a doctor from where person lives”

COSTS = “out-of-pocket costs paid for medical services”

LOCATION = “getting all medical care needs taken care of at the same location”

TELEPHONE = “ease of obtaining answers to questions over the telephone about treatment or prescriptions”.

^bAdjusted for age, sex, race, ethnicity, education, income, marital status, household composition, rural resident, and insurance type.

* $p < 0.0001$;

[#] $p < 0.001$;

[§] $p < 0.01$;

[†] $p = 0.05$.

Table 5: Adjusted Odds Ratios of Being Dissatisfied with Care for Respondents Who Got Worse Compared to Those Who Did Not

Aspect of care ^a	Sensory or Physical Function				
	Vision	Hearing	Lower extremity mobility	Upper extremity mobility	Hand dexterity
	Adjusted odds ratio ^b				
OVERALL	2.6 (1.9, 3.5)*	1.5 (1.0, 2.1) [†]	1.6 (1.1, 2.3) [§]	1.5 (1.1, 2.1) [†]	1.8 (1.2, 2.6) ^c
INFORMATION	2.1 (1.6, 2.8)*	1.3 (1.0, 1.8)	1.5 (1.1, 1.9) [§]	1.8 (1.3, 2.4)*	1.6 (1.2, 2.2) [§]
FOLLOW-UP	2.1 (1.3, 3.2) [§]	1.8 (1.3, 2.6) [#]	1.4 (0.9, 1.9)	1.7 (1.3, 2.4) [§]	1.4 (1.0, 2.1) [†]
CONCERN	2.1 (1.4, 3.0) [#]	1.5 (1.1, 2.0) [†]	1.2 (0.8, 1.7)	1.5 (1.2, 2.0) [§]	1.2 (0.9, 1.7)
SPECIALISTS	1.2 (0.7, 2.0)	1.3 (0.9, 2.0)	1.2 (0.8, 1.9)	1.5 (1.0, 2.3)	2.0 (1.3, 3.0) [#]
AVAILABILITY	1.4 (0.9, 2.2)	1.5 (1.1, 2.1) [†]	1.5 (1.1, 2.0) [†]	1.9 (1.3, 2.7) [#]	1.6 (1.0, 2.7) [†]
EASE	1.7 (1.3, 2.3)*	1.5 (1.1, 2.1) [§]	1.8 (1.3, 2.4) [#]	2.0 (1.5, 2.8)*	2.0 (1.6, 2.6)*
COSTS	1.5 (1.2, 1.9) [§]	1.3 (1.1, 1.6) [§]	1.6 (1.3, 2.0)*	1.6 (1.3, 1.9)*	1.8 (1.4, 2.2)*
LOCATION	2.2 (1.6, 3.0)*	1.2 (0.8, 1.8)	1.3 (0.9, 1.9)	1.5 (1.0, 2.1) [†]	1.8 (1.3, 2.5) [#]
TELEPHONE	1.1 (0.7, 1.8)	1.3 (1.0, 1.8)	1.3 (1.0, 1.8)	1.5 (1.1, 2.1) [§]	1.4 (1.0, 1.9)

^aSee Table 4 for definitions.^bAdjusted for age, sex, race, ethnicity, education, income, marital status, household composition, rural resident, and insurance type.* $p < 0.0001$;# $p < 0.001$;§ $p < 0.01$;† $p = 0.05$.

dimension in the lower extremity mobility category. Just one quality dimension consistently showed substantially lower rates of dissatisfaction when respondents got better: "the ease and convenience of getting to a doctor from where the person lives." Models that included 1996 satisfaction levels as covariates produced qualitatively similar adjusted odds ratios as those in Table 4. In the vision, lower extremity mobility and upper extremity mobility groups, those who got better were generally more likely to be very satisfied with care than those who did not, although none of these differences were statistically significant. Paradoxically, in the other groups, respondents who got better were *less* likely to be very satisfied, with differences reaching significance in many of the aspects of care (overall, information, follow-up specialists, and ease in the hearing group, and overall, information, and telephone in the hand dexterity group). Details of findings from these analyses are in an online-only appendix available at <http://www.blackwell-synergy.com>.

As shown in Table 5, however, getting worse was often statistically significantly associated with expressing dissatisfaction with care: in all such instances, the adjusted odds ratios fell substantially above 1.0. Across the 10

quality dimensions, overall quality, ease, and costs generated statistically significant adjusted odds ratios for all five functional conditions. For two quality dimensions, significant adjusted odds ratios appeared for only one functional category: worsening hand dexterity for access to specialists; and worsening upper extremity mobility for telephone communication. These multivariable analyses also showed that persons with managed care were significantly more dissatisfied with access to specialists, while persons with fee-for-service Medicare expressed substantially higher dissatisfaction with costs. The models including 1996 satisfaction levels generally produced slightly lower adjusted odds ratios than those reported in Table 5, with somewhat higher but still significant *p*-values. Respondents who got worse were consistently less likely to be very satisfied, with these differences reaching statistical significance in several instances: information, follow-up, availability, ease, and location for vision; overall for hearing; availability for upper extremity, and follow-up for hand dexterity (see online-only appendix).

DISCUSSION

Persons whose sensory or physical functioning worsened were significantly more likely to report dissatisfaction with various aspects of their health care than persons whose functioning did not worsen. In contrast, among people whose functioning improved, only one aspect of care generated consistently significantly higher rates of satisfaction: Not surprisingly, these individuals seemed happier with the ease and convenience of getting to their health care provider than did persons whose functioning had not improved. Persons whose hearing and manual dexterity improved actually were less likely to report being *very* satisfied with various aspects of their care.

Our analyses only tested associations, not causality. Nevertheless, our findings suggest that persons whose functioning worsens over time express reservations about their health care providers' performance, perhaps holding their providers partially accountable for this worsening. On the other hand, when persons got better, they did not express significantly greater satisfaction with their care than did persons whose functioning had not improved. One possible explanation for this finding is that patients do not believe that health care produced their functional improvements. Another possibility is that our measure of better functioning did not capture actual improvements but instead persons' acceptance of or accommodations to impairments over time. Therefore, persons may not perceive improved outcomes for which they would

thank their clinicians. This study could not address the more fundamental question of whether changes in self-reported functioning over time *are* actually related to medical care.

Our findings about the associations of sociodemographic characteristics with changing functional status are consistent with results from other studies, although most such research is cross-sectional rather than longitudinal. Even within elderly populations, older age significantly predicts functional deficits (Tinetti et al. 1995; Markello 1997). An extensive literature documents the association between worse functional status and socioeconomic disadvantage, notably poor education and poverty (Ross and Wu 1996; Manton, Stallard, and Corder 1997; Lynch, Kaplan, and Shema 1997; Liao et al. 1999; Breeze et al. 2001). Unlike cross-sectional studies, however, we failed to find consistent associations between certain sociodemographic characteristics and changing sensory and physical function. Women and racial and ethnic minorities typically have higher rates of certain functional impairments than do men and white individuals (Gill et al. 2001; Iezzoni et al. 2001). However, our results parallel those of several longitudinal studies that have not found substantial associations between either sex (Tinetti et al. 1995; Stineman et al. 1997; Gill, Robison, and Tinetti 1997) or race (Tinetti et al. 1995) and future functional outcomes.

Our research hypothesis—that improved functioning would correlate with higher satisfaction—implicitly assumed that health services interventions can actually improve patients' functioning and that patients make this connection between the intervention and their functional improvement. Clear-cut examples include cataract surgery to improve vision, devices to aid hearing, and joint replacement surgery to reduce pain and restore mobility among patients with disabling arthritis. Patients may believe that medical care absolutely should improve functioning, so when improvements do occur, this does not raise satisfaction levels. Instead, improvements simply meet patients' expectations.

However, for many persons with progressive, chronic, debilitating conditions, restoring functional abilities is unrealistic. The focus shifts to preserving function, slowing its decline, and preventing secondary complications. Even if functional status remains unchanged, patients may nevertheless be disappointed: their hopes (even if unrealistic) for restoring function are dashed. This might reduce satisfaction and perhaps diminish remaining hopes or goals. In this setting, important interventions like rehabilitation services often require active motivation and participation by patients (Kane 1997; Lachs et al. 1990). Convincing patients to express satisfaction or give clinicians

credit when their functioning has declined less *than might otherwise have occurred* may prove challenging (Iezzoni 2003). Furthermore, especially when persons have communication problems or appear unmotivated, clinicians may reduce clinical interventions explicitly addressing functioning, like rehabilitation (Kramer 1997). This could exacerbate patients' dissatisfaction.

We also found that persons with worsened functioning were substantially less satisfied with their out-of-pocket costs. Given Medicare payment policies, this makes sense. Medicare explicitly denies payment for rehabilitative services when patients' functioning has plateaued or begins worsening (Vladeck et al. 1997; Cassel, Besdine, and Siegel 1999; Marmor 2000; Eichner and Blumenthal 2003). Medicare covers these services only when "the beneficiary's condition will improve materially in a reasonable (and generally predictable) period of time based on the physician's assessment of the beneficiary's restoration potential and unique medical condition" (42 C.F.R. Sec. 409.44[c][2][iii]). Otherwise, care is judged "not medically necessary." These and other Medicare policies prompted an Institute of Medicine committee to conclude:

Common to Medicare, Medicaid, and private policies . . . is the stipulation that reimbursement will continue only for as long as the person receiving rehabilitation services continues to show improvement in functional capacity. . . . This restriction . . . ignores the rehabilitation goal of maintaining capacity and of halting or slowing declines in function in people with degenerative conditions. (Pope and Tarlov 1991, p. 255)

Our study has important limitations. The MCBS provides only self-reports of sensory and physical impairments. While self-reports provide the most authentic information about persons' perceptions of their functioning, the clinical accuracy of these assessments is unknown. Other studies have raised questions about the objectivity of such self-reports (Kelly-Hayes et al. 1992; Mathiowetz and Lair 1994). Proxies provided more than one-fifth of the responses for persons under age 65, complicating interpretation of the findings (Andresen et al. 2000; Iezzoni et al. 2000; Todorov and Kirchner 2000). Studies comparing self- to proxy-reports generate varied conclusions, but most suggest that proxies rate physical functional status and emotional and social well-being as more impaired than do patients (Magaziner et al. 1988; Epstein et al. 1989; Rothman et al. 1991; Dorevitch et al. 1992; Andresen et al. 2000; Todorov and Kirchner 2000). In addition, our measures of getting better or getting worse faced substantial "floor" and "ceiling" effects. Although we explored more refined measures of change (e.g., creating multiple categories

by the extent of improvements or decrements), small sample sizes prevented us from using this approach. We did not examine what services respondents received between 1996 and 1997 (e.g., whether they had cataract or joint replacement surgery). Finally, the four-level MCBS approach for quantifying satisfaction provides an imperfect measure of dissatisfaction.

Our results suggest that patients whose functioning worsens are less satisfied with their health care, but those whose functioning improves do not necessarily express greater satisfaction with their care. These findings are not surprising, especially given the complexities of attributing sensory and physical functional improvements to specific health care services beyond such targeted surgical interventions. Nevertheless, these results raise yet another concern about interpreting ratings from satisfaction surveys. Recognizing that younger persons and those in worse health provide more negative evaluations of their care than older and healthier persons, prominent initiatives like the Consumer Assessment of Health Plans Study survey (CAHPS[®]) adjust their provider-specific results for respondents' age and health status (Zaslavsky et al. 2000).

Asking respondents whether their health has *recently* worsened or improved might provide additional insight for interpreting the outcomes of satisfaction surveys. For example, performance profiles using satisfaction ratings could risk adjust findings based on respondents' self-reported functional changes. Much more research is required, however, to determine whether this proposal has conceptual merit and is logistically feasible. One issue is how accurately changes in functional status should be determined: a simple question about recent functional changes may not prove sufficiently valuable because of recall bias. The fundamental question, though, is how respondents assign credit or blame for their improving or worsening function. What does satisfaction with health care really measure in the context of patients' changing functional abilities?

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APPENDIX: SENSITIVITY ANALYSIS INVOLVING SATISFACTION VARIABLE

Table 4B

Adjusted Odds Ratios of Being Very Satisfied with Care for Respondents Who Got Better Compared to Those Who Did Not

Aspect of care ^a	Sensory or Physical Function				
	Vision	Hearing	Lower extremity mobility	Upper extremity mobility	Hand dexterity
	adjusted odds ratio ^b				
OVERALL	0.9 (0.7, 1.3)	0.7 (0.6, 0.9)§	0.9 (0.8, 1.2)	0.9 (0.7, 1.2)	0.7 (0.6, 0.9)§
INFORMATION	1.4 (0.8, 2.2)	0.7 (0.5, 0.9)§	1.1 (0.8, 1.4)	1.0 (0.7, 1.3)	0.7 (0.6, 1.0)†
FOLLOW-UP	1.1 (0.7, 1.6)	0.7 (0.6, 0.9)§	1.2 (1.0, 1.6)	1.1 (0.8, 1.5)	0.8 (0.6, 1.2)
CONCERN	1.3 (0.9, 2.0)	0.7 (0.5, 0.9)§	1.0 (0.8, 1.2)	1.0 (0.8, 1.4)	0.8 (0.6, 1.1)
SPECIALISTS	1.0 (0.6, 1.6)	0.8 (0.6, 1.0)†	1.0 (0.8, 1.3)	1.2 (0.9, 1.6)	0.8 (0.6, 1.1)
AVAILABILITY	1.3 (0.8, 2.3)	1.0 (0.7, 1.3)	0.9 (0.7, 1.3)	1.2 (0.9, 1.6)	1.3 (0.8, 2.1)
EASE	1.2 (0.8, 1.8)	0.7 (0.5, 0.9)§	1.1 (0.9, 1.4)	1.1 (0.9, 1.5)	0.9 (0.6, 1.3)
COSTS	1.1 (0.7, 1.8)	0.8 (0.6, 1.0)	1.0 (0.8, 1.3)	1.1 (0.8, 1.5)	0.9 (0.6, 1.2)
LOCATION	1.3 (0.8, 2.0)	0.8 (0.6, 1.0)	1.2 (0.9, 1.6)	1.2 (0.9, 1.7)	0.9 (0.6, 1.2)
TELEPHONE	1.5 (0.9, 2.5)	0.8 (0.6, 1.1)	1.0 (0.7, 1.3)	1.2 (0.9, 1.6)	0.7 (0.5, 1.0)†

a OVERALL = "overall quality of the medical services received in the last year"

INFORMATION = "information given about what was wrong with you"

FOLLOW-UP = "follow-up care received after an initial treatment or operation"

CONCERN = "concern of doctors for overall health rather than just for an isolated symptom of disease"

SPECIALISTS = "availability of care by specialists when needs it"

AVAILABILITY = "availability of medical services at night and on weekends"

EASE = "ease and convenience of getting to a doctor from where person lives"

COSTS = "out-of-pocket costs paid for medical services"

LOCATION = "getting all medical care needs taken care of at the same location"

TELEPHONE = "ease of obtaining answers to questions over the telephone about treatment or prescriptions"

b Adjusted for age, sex, race, ethnicity, education, income, marital status,

household composition, rural resident, and insurance type

* p < 0.0001

p < 0.001

§ p < 0.01

† p = 0.05

Table 5B

**Adjusted Odds Ratios of Being Very Satisfied with Care for
Respondents Who Got Worse Compared to Those Who Did Not**

Aspect of care ^a	Sensory or Physical Function				
	Vision	Hearing	Lower extremity mobility	Upper extremity mobility	Hand dexterity
	adjusted odds ratio ^b				
OVERALL	0.8 (0.7, 1.0)	0.9 (0.7, 1.0)†	1.0 (0.9, 1.1)	0.8 (0.7, 1.0)	0.9 (0.8, 1.1)
INFORMATION	0.7 (0.5, 0.9)§	1.0 (0.8, 1.2)	0.9 (0.7, 1.0)	0.8 (0.7, 1.0)	0.8 (0.6, 1.1)
FOLLOW-UP	0.6 (0.5, 0.8)#	0.9 (0.7, 1.1)	1.0 (0.8, 1.2)	0.9 (0.7, 1.1)	0.7 (0.6, 0.9)†
CONCERN	0.8 (0.6, 1.0)	1.0 (0.9, 1.2)	1.1 (0.9, 1.2)	0.9 (0.7, 1.2)	1.0 (0.8, 1.3)
SPECIALISTS	0.9 (0.7, 1.2)	0.9 (0.8, 1.1)	1.1 (0.9, 1.3)	1.0 (0.8, 1.2)	0.9 (0.7, 1.1)
AVAILABILITY	0.6 (0.4, 1.0)†	1.0 (0.7, 1.2)	0.9 (0.7, 1.1)	0.8 (0.6, 1.0)†	0.8 (0.6, 1.1)
EASE	0.7 (0.5, 0.9)§	1.0 (0.8, 1.2)	0.9 (0.8, 1.1)	0.9 (0.7, 1.1)	0.9 (0.7, 1.1)
COSTS	0.8 (0.6, 1.0)	0.8 (0.7, 1.0)	1.0 (0.8, 1.2)	0.9 (0.7, 1.1)	1.1 (0.8, 1.4)
LOCATION	0.7 (0.5, 0.9)†	0.9 (0.7, 1.1)	1.0 (0.8, 1.2)	0.9 (0.7, 1.2)	1.0 (0.8, 1.3)
TELEPHONE	0.8 (0.6, 1.1)	1.0 (0.8, 1.2)	1.0 (0.8, 1.2)	1.0 (0.8, 1.2)	0.9 (0.7, 1.2)

a See Table 4B for definitions

b Adjusted for age, sex, race, ethnicity, education, income, marital status, household composition, rural resident, and insurance type

* $p < 0.0001$ # $p < 0.001$ § $p < 0.01$ † $p = 0.05$