Determinants and Outcomes of Satisfaction With Healthcare Provider Communication Among Cancer Survivors

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Abstract

Background: Despite the surge of interest in improving provider communication, empirical research is sparse on the determinants and outcomes of cancer survivors' satisfaction with healthcare provider communication. **Methods:** Longitudinal Medical Expenditure Panel Survey data spanning 2008 through 2014 was used to identify 4,588 respondents who were ever diagnosed with cancer. A composite score was generated by combining 5 measures of satisfaction. We used multivariate logistic regressions and 2-part models to examine the associations between satisfaction ratings and outcomes, including general, mental, and physical health; office visits; and total healthcare, drug, and out-of-pocket expenditures. **Results:** The study sample comprised 2,257 nonelderly (age 18–64 years) and 2,331 elderly (age ≥65 years) respondents. Among both age groups, higher satisfaction was associated with fewer comorbidities, fewer year 1 office visits, and absence of year 1 emergency department visits. Membership of higher satisfaction tertile in year 1 was associated with better year 2 mental health (tertile 1 [T1]: predictive margin [PM], 27.1%; tertile 2 [T2]: PM, 35.5%; *P*=.013; tertile 3 [T3]: PM, 37.0%; *P*=.005) and general health (T1 [ref]: PM, 30.3%; T3: PM, 38.9%; *P*=.007) among the elderly. Greater satisfaction was associated with fewer year 2 office visits (T1 [ref]: PM, 7.42 visits; T3: PM, 6.26 visits; *P*=.038) among the nonelderly; and lower year 2 healthcare expenditures (T1 [ref]: PM, $34,071; T3: PM, $26,995; *P*=.049) among the elderly. **Conclusions:** We identified potential differences in cancer survivors' needs and expectations of provider communication based on comorbidities and baseline service use. These results emphasize the need for individualized communication strategies for patients with cancer and survivors shaped by their distinct requirements. Our findings of better health, lower service use, and lower expenditures among more satisfied cancer survivors suggest that interventions to improve provider communication could lead to a more efficient use of healthcare resources.

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Measurement of value in healthcare is key to the movement from volume- to value-based delivery models. In its 2001 report, "Crossing the Quality Chasm: A New Health System for the 21st Century," the Institute of Medicine recognized patient satisfaction as an important measure of value in healthcare.[1] This report prompted extensive efforts to incorporate patients' experience of care into pay-for-performance initiatives. A decade later, the Patient Protection and Affordable Care Act (ACA) mandated the adjustment of Medicare payment rates in response to value-based performance scores—a substantive portion of which is measured using patients' assessment of communication with healthcare providers.[2] The Patient-Centered Outcomes Research Institute (PCORI) established by the ACA also recognizes "communication and dissemination research" as one of its 5 priorities under which studies of patients' values and preferences in communication are encouraged.[3,4]

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Healthcare provider communication is especially germane to cancer care. The anxiety that accompanies cancer diagnosis and receipt of complex information about treatments, costs, and prognosis[5–7] may render patients more sensitive to what they perceive as particularly good care or communication. Effective communication between healthcare providers, patients, and families is vital at each point along the cancer care continuum, and especially so at the end of treatment. During this transition, fears about cancer recurrence and uncertainty of long-term survival come to the fore.[8] Numerous questions also arise about next steps in care, including whom to consult, what tests to undergo, and how to manage late and lasting effects of cancer or its treatment.[9] Addressing survivors' emotional needs, effective communication, and information sharing are essential to patient-centered survivorship care planning.[9]

In a 2007 monograph published by the NCI, Epstein and Street[10] introduced a framework for patient-centered communication in cancer, organized around 6 functions: fostering healing relationships, exchanging information, responding to emotions, managing uncertainty, making decisions, and enabling patient self-management. The framework conceptualized the role of a trusting patient–clinician relationship in optimal delivery of cancer survivorship care that would lead to better continuity of care, adherence to treatment plans, reduced suffering, and reduced morbidity and mortality rates.[10] Subsequent research led to the development of several survey measures for assessing patient-centered aspects of provider communication in cancer care.[11–13] However, there is limited empirical research on survivor-level determinants of satisfaction with provider communication and ensuing outcomes, including general, physical, and mental health; service utilization; and costs.

The present study is an extension of an earlier inquiry into the determinants and outcomes of patient satisfaction with provider communication in the general population.[14] We analyzed nationally representative longitudinal data to identify factors associated with cancer survivors' satisfaction with healthcare provider communication and examined the associations between different levels of satisfaction and short-term outcomes, including health status, healthcare utilization, and expenditures.

Methods

Data Source and Study Population

The data for the study were obtained from the Medical Expenditure Panel Survey (MEPS) household component spanning 2008 through 2014 (panels 13–19). The MEPS is a large, nationally representative survey of health status, healthcare utilization, experiences with care, and expenditures for the US noninstitutionalized civilian population.[15] Each panel consists of 5 rounds of surveys conducted over approximately 2 years.

The study cohort was identified using the NCI's Office of Cancer Survivorship definition of cancer survivorship, which states "an individual is considered a cancer survivor from the time of diagnosis through the balance of his or her life."[16] As such, the study cohort included newly diagnosed cancer survivors, long-term cancer survivors, individuals receiving cancer treatment, and those who had completed treatment. Our study cohort is composed of adults aged ≥18 years who were ever diagnosed with cancer (nonmelanoma skin cancer excluded), had ≥1 physician or clinic visit 1 year prior to the first survey encounter, and had no missing data on all satisfaction measures in the first year of the panel.

Satisfaction Measures

The healthcare provider communication component of the Consumer Assessment of Healthcare Providers and Systems (CAHPS) included with the MEPS asks how often over the past 12 months the respondents' physicians or other health providers accomplished the following: (1) listened carefully, (2) explained things in a way that was easy to understand, (3) showed respect for what the respondent had to say, and (4) spent enough time with the respondent. Response options covered a 4-point scale ranging from "never" to "always." Additionally, the MEPS includes a measure of the respondents' global rating of healthcare received in the past year, ranging from 0 ("worst possible") to 10 ("best possible"). This global satisfaction rating has been shown to be highly correlated with satisfaction with provider communication.[17] We generated a composite satisfaction score by using the standard approach of combining the z scores (difference between the raw score and the sample mean of a measure divided by the standard deviation of the measure) of the 4 CAHPS measures and the global rating from year 1.[18]

Survivor Outcomes

We evaluated 3 categories of outcomes from year 2: health status, healthcare utilization, and healthcare expenditures. Mental and physical health status was measured using the Mental and Physical Component Summary scores derived from the 12-item Short Form Health Survey version 2 (SF-12v2).[19] Additionally, the respondents' health on the day of the interview (rated as excellent, very good, good, fair, or poor) was included as a measure of their general health status. Healthcare utilization was measured in terms of total number of emergency department (ED) visits, inpatient admissions, and office-based visits over the past year. Healthcare expenditures were measured as total healthcare expenditure, expenditures on prescription drugs, and out-of-pocket expenditures over the past year.

Determinants

Respondents' age, sex, race/ethnicity (non-Hispanic white or others), marital status (currently married or others), education (less than high school, high school, or college), poverty level (family income <100%–124%, 125%–399%, or ≥400% of federal poverty line), and smoking status were identified from panel-year 1 responses (Table 1). Access to healthcare was ascertained using health insurance status (any private, Medicare and/or Medicaid, or uninsured in age group 18–64 years; Medicare only, Medicare and private, or Medicare and other public in age group ≥65 years) and whether the respondents had a usual source of healthcare. The total number of comorbidities (0, 1, or ≥2 in age group 18–64 years; 0, 1, 2, 3, or ≥4 in age group ≥65 years) from a list of 8 self-reported ailments (arthritis, asthma, cerebrovascular disease, coronary artery disease, diabetes mellitus, emphysema, hypertension, and myocardial infarction) was used to approximate baseline health status. Additional indicators of health status and proclivity to using healthcare included year 1 Physical and Mental Component Summary scores, self-rated general health, office visits, ED visits, hospitalizations, total healthcare expenditures, drug expenditures, and out-of-pocket spending. Receipt of cancer-related treatment within 2 years of the survey was identified through prescriptions for antineoplastic agents in the MEPS Prescribed Medicines file or through receipt of chemotherapy, radiation therapy, or surgery related to cancer in the Outpatient Visits, Office-Based Medical Provider Visits, and Hospital Inpatient Stays files.[20]

Statistical Analyses

Descriptive statistics were stratified by age group (18–64 years and ≥65 years). Analyses were conducted to (1) identify the year 1 demographic and health-related attributes associated with year 1 satisfaction with provider communication, and (2) examine adjusted health outcomes and resource use in year 2 associated with year 1 satisfaction with provider communication.

Using multivariable logistic regression, we examined the associations between respondent characteristics (year 1 sociodemographic features, insurance status, usual source of care, comorbidity count, smoking status, active treatment status, tertile of office visits, any ED visits, and any inpatient care) and membership of the highest satisfaction tertile. This categorization of the dependent variable was based on distributions of the components of the composite score and motivated by the existing literature in this field.[21–26]

Leveraging the panel design of MEPS, we examined the association between satisfaction measures in year 1 and outcomes in year 2. Year 2 indicators for excellent/very good general health, highest tertile of mental health, and highest tertile of physical health were modeled using logistic regressions. We used 2-part models to account for the abundance of zero outcomes and skewed distributions of non-zero outcomes in healthcare utilization and expenditures. In the first part, we modeled the probability of an outcome being non-zero using logistic regression. In the second part, conditional on a positive outcome, the value of the outcome was fitted using appropriate regression models—Poisson regressions for healthcare use and gamma regressions with log link functions for expenditures. All regressions were controlled for the covariates listed earlier and stratified by age.

Adjusted percentages of membership of a group, number of visits, and expenditures are presented as predictive margins (PMs), which standardize the outcome of each group to the covariate distribution of the population.[27] All statistical tests were 2-sided and conducted at 5% level of significance using Stata/IC 14 (StataCorp LLC). We incorporated sampling and post-stratification weights in all analyses to yield nationally representative estimates.

Table 1. Characteristics of Respondents

	Age Group			
	Age 18–64 y		Age ≥65 y	
	n	Weighted %	n	Weighted %
Age, y				
18–44	557	22.1	–	–
45–49	276	12.0	–	–
50–54	367	16.3	–	–
55–59	463	21.6	–	–
60–64	594	28.0	–	–
65–69	–	–	623	24.4
70–74	–	–	499	22.4
≥75	–	–	1,209	53.3
Sex				
Female	1,600	66.9	1,211	51.6
Male	657	33.1	1,120	48.4
Race/Ethnicity				
Non-Hispanic white	1,749	88.2	1,888	91.3
Others/Missing	508	11.8	443	8.7
Marital status				
Currently married	1,280	63.4	1,249	53.6
Others/Missing	977	36.6	1,082	46.4
Education				
Less than high school	83	2.2	207	5.6
High school	765	29.4	862	35.7
College	1,075	53.6	902	42.8
Missing	334	14.8	360	15.9
Income level[a]				
Low	543	17.3	474	13.7
Middle	896	35.9	1,106	46.6
High	818	46.8	751	39.7
Insurance coverage				
Age 18–64 y, any private	1,490	75.0	–	–
Age 18–64 y, public only	545	16.5	–	–
Age 18–64 y, uninsured	222	8.5	–	–
Age ≥65 y, Medicare only	–	–	844	35.5
Age ≥65 y, Medicare and private	–	–	1,149	54.2
Age ≥65 y, Medicare and other public	–	–	338	10.3
Usual source of care				
No/Missing	256	10.6	121	4.8
Yes	2,001	89.4	2,210	95.2
Smoking status				
Smoker	520	22.3	202	7.8
Nonsmoker/Missing	1,737	77.7	2,129	92.2
Number of comorbidities[b]				
0	686	32.2	209	10.0
1	644	29.7	530	22.9
Age 18–64 y: ≥2	927	38.1	–	–
Age ≥65 y: 2	–	–	693	29.8
Age ≥65 y: 3	–	–	452	19.0
Age ≥65 y: ≥4	–	–	447	18.3
Active treatment within 2 years of survey				
No	1,388	58.6	1,215	48.5
Yes	869	41.4	1,116	51.5
Tertiles of physician office visits in year 1				
First (T1)	952	39.9	871	34.2
Second (T2)	611	28.3	752	32.9
Third (T3)	694	31.8	708	32.9
Any ED visits in year 1				
No	1,733	78.4	1,806	77.8
Yes	524	21.6	525	22.2
Any hospital admissions in year 1				
No	1,879	83.3	1,855	78.9
Yes	378	16.8	476	21.1
Panel number				
13	363	16.1	319	16.1
14	321	14.2	360	13.0
15	277	12.3	294	12.5
16	370	16.4	408	16.3
17	330	14.6	347	15.4
18	297	13.2	287	12.5
19	299	13.2	316	14.2

Abbreviation: ED, emergency department.
[a]Defined as family income of <100%–124% (low), 125%–399% (middle), and ≥400% (high) of federal poverty line.
[b]Derived from the following 8 self-reported ailments: arthritis, asthma, cerebrovascular disease, coronary artery disease, diabetes mellitus, emphysema, hypertension, and myocardial infarction.

Results

We identified 4,588 cancer survivors, of which 2,257 were nonelderly (age 18–64 years) and 2,331 were elderly (age ≥65 years). Respondents' demographic, healthcare access, and baseline health characteristics are listed in Table 1. The median age of the study sample was 54 years among the nonelderly cohort and 75 years among the elderly. Frequency distributions of cancer sites and specific comorbidities are displayed in supplemental eTables 1 and 2 (available with this article at JNCCN.org). As a comparison, eTable 2 also includes the frequency distribution of comorbidities among MEPS respondents without a cancer history from the corresponding panel-range. Figure 1 shows the distribution of scores for specific questions and global satisfaction ratings.

Table 2 shows the results from multivariable logistic regression, with membership of the highest satisfaction tertile as the dependent variable. Among the nonelderly, the odds of membership of the highest satisfaction tertile were higher among older respondents (age 18–44 years: reference category [ref]; age 55–59 years: odds ratio [OR], 1.67; P=.002; age 60–64 years: OR, 1.56; P=.016). In the same age group, satisfaction ratings were negatively associated with number of comorbidities (0 comorbidities: ref; ≥2 comorbidities: OR, 0.69; P=.015) and increasing tertiles of office visits in year 1 (tertile 1 [T1]: ref; tertile 2 [T2]: OR, 0.76; P=.034; tertile 3 [T3]: OR,

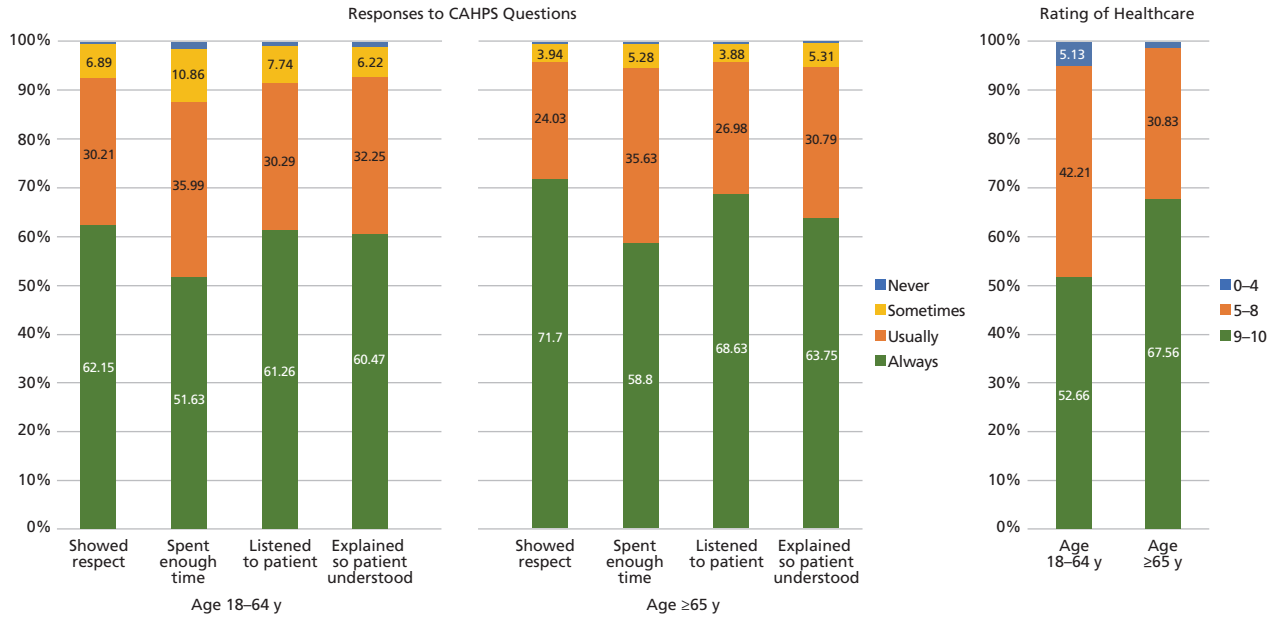

Figure 1. Distribution of responses to CAHPS questions and overall rating of healthcare among respondents with a history of cancer diagnosis. Abbreviation: CAHPS, Consumer Assessment of Healthcare Providers and Systems.

0.54; *P*<.001). Among the elderly, satisfaction ratings were lower among respondents with ≥4 comorbidities (0 comorbidities: ref; ≥4 comorbidities: OR, 0.65; *P*=.044) and those with any ED visit in year 1 (no ED visits: ref; any ED visit: OR, 0.63; *P*=.002).

Among the elderly, higher patient satisfaction in year 1 was associated with membership of the highest year 2 mental health tertile (satisfaction T1 [ref]: PM, 27.1%; T2: PM, 35.5%; *P*=.013; T3: PM, 37.0%; *P*=.005), and the highest year 2 general health tertile (T1 [ref]: PM, 30.3%; T3: PM, 38.9%; *P*=.007) (Table 3). Among the nonelderly, the relationship between satisfaction ratings and mental health was not consistent across satisfaction tertiles (T1 [ref]: PM, 29.7%; T2: PM, 36.0%; *P*=.036; T3: PM, 34.0%; *P*=.187). Highest year 1 satisfaction tertile was associated with fewer office visits among the nonelderly (T1 [ref]: PM, 7.42; T3: PM, 6.26; *P*=.038) and lower year 2 total healthcare expenditure among the elderly (T1 [ref]: PM, $34,071; T3: PM, $26,995; *P*=.049). Similarly, greater year 1 satisfaction was associated with lesser healthcare expenditure among the nonelderly and fewer year 2 office visits among the elderly, but these results were statistically insignificant.

Discussion

In this study, we used a large nationally representative survey with longitudinal data to explore satisfaction with healthcare provider communication among cancer survivors. Our primary findings were: (1) in both elderly and nonelderly cancer survivors, greater satisfaction with provider communication was associated with better baseline health status, as measured by fewer year 1 comorbidities, fewer office visits, or absence of ED visits; and (2) higher satisfaction in year 1 was associated with better health ratings, fewer office visits (nonelderly only), and lower total healthcare expenditure (elderly only) in year 2.

The presence of multiple comorbidities may adversely influence satisfaction ratings through alternative pathways. Illness complexity is likely to affect a patient's perception of the care experience.[28,29] Alternatively, variations by comorbidities also may reflect genuine differences in the quality of care received. Providers may find it challenging to convey a large volume of information to clinically complex patients, especially within the resource and time constraints of an outpatient visit. Multiple comorbidities also may lead to greater fragmentation of care,[30,31] which may adversely affect satisfaction ratings.

Table 2. Adjusted Associations Between Survivor Characteristics and Highest Satisfaction Tertile

	Age Group					
	Age 18–64 y			Age ≥65 y		
	OR	95% CI	*P* Value	OR	95% CI	*P* Value
Age, y						
18–44	Ref	–		–	–	
45–49	1.18	0.82–1.70	.370	–	–	
50–54	1.42	0.95–2.13	.084	–	–	
55–59	1.67	1.21–2.30	.002	–	–	
60–64	1.56	1.09–2.25	.016	–	–	
65–69	–	–		Ref	–	
70–74	–	–		1.06	0.77–1.44	.733
≥75	–	–		0.93	0.71–1.21	.575
Sex						
Male	Ref	–		Ref	–	
Female	1.20	0.95–1.51	.127	0.98	0.80–1.21	.884
Race/Ethnicity						
Non-Hispanic white	Ref	–		Ref	–	
Others/Missing	1.09	0.86–1.37	.484	0.90	0.69–1.17	.439
Marital status						
Currently married	Ref	–		Ref	–	
Others/Missing	0.87	0.68–1.10	.234	1.21	0.97–1.50	.090
Education						
Less than high school	Ref	–		Ref	–	
High school	0.82	0.42–1.60	.559	0.92	0.60–1.42	.717
College	0.75	0.39–1.46	.401	0.93	0.60–1.44	.742
Missing	0.96	0.08–11.3	.974	0.86	0.09–8.47	.895
Income level[a]						
Low	Ref	–		Ref	–	
Middle	1.19	0.87–1.61	.279	1.19	0.89–1.60	.237
High	1.21	0.83–1.77	.318	1.07	0.77–1.49	.696
Insurance coverage						
Age 18–64 y, any private	Ref	–		–	–	
Age 18–64 y, public only	0.81	0.61–1.09	.167	–	–	
Age 18–64 y, uninsured	0.66	0.42–1.02	.064	–	–	
Age ≥65 y, Medicare only	–	–		Ref	–	
Age ≥ 65 y, Medicare and private	–	–		1.00	0.80–1.27	.970
Age ≥65 y, Medicare and other public	–	–		0.91	0.64–1.30	.590
Usual source of care						
No/Missing	Ref	–		Ref	–	
Yes	1.53	1.00–2.35	.050	1.55	0.94–2.56	.060
Smoking status						
Smoker	Ref	–		Ref	–	
Nonsmoker/Missing	1.21	0.90–1.61	.200	1.43	1.00–1.99	.050
Number of comorbidities[b]						
0	Ref	–		Ref	–	
1	0.83	0.62–1.10	.194	0.99	0.66–1.48	.968
Age 18–64 y: ≥2	0.69	0.51–0.93	.015	–	–	
Age ≥65 y: 2				0.78	0.53–1.16	.214
Age ≥65 y: 3	–	–		0.87	0.56–1.35	.526
Age ≥65 y: ≥4	–	–		0.65	0.42–0.98	.044
Active treatment within 2 years of survey						
No	Ref	–		Ref	–	
Yes	1.05	0.84–1.31	.670	1.00	0.81–1.23	.997
Tertiles of physician office visits in year 1						
First (T1)	Ref	–		Ref	–	
Second (T2)	0.76	0.59–0.98	.034	0.97	0.75–1.26	.837
Third (T3)	0.54	0.40–0.74	<.001	0.84	0.66–1.06	.139
Any ED visits in year 1						
No	Ref	–		Ref	–	
Yes	0.87	0.65–1.17	.353	0.63	0.48–0.84	.002
Any hospital admissions in year 1						
No	Ref	–		Ref	–	
Yes	1.18	0.85–1.64	.322	1.29	0.96–1.72	.088

Note: Panel numbers controlled for but not reported.
Abbreviations: ED, emergency department; OR, odds ratio.
[a]Defined as family income of <100%–124% (low), 125%–399% (middle), and ≥400% (high) of federal poverty line.
[b]Derived from the following 8 self-reported ailments: arthritis, asthma, cerebrovascular disease, coronary artery disease, diabetes mellitus, emphysema, hypertension, and myocardial infarction.

Although the association between better baseline health and greater satisfaction with provider communication has been reported earlier,[14] a similar association among cancer survivors in the present study deserves closer consideration. Not only are comorbid illnesses more common among cancer survivors than the general population[32] but also a diagnosis of cancer may augment all the mentioned pathways. Thus, our results highlight the importance of accounting for patient mix in payment formulas to the extent that providers who care for complex cancer survivors are adequately compensated. At the same time, provider teams need to be equipped with systems and training to coordinate survivorship care.[9] It has been reported that, with increasing subspecializations in cancer treatment, providers often lack the skills to manage the wide array of other ailments that may be present in this population.[33] Therefore, it is incumbent on physician training programs to facilitate the development of skills required to care for complex survivors, including managing comorbidities, identifying and addressing special needs of those with multiple ailments, and coordinating care.

Our results are consistent with those of previous studies indicating associations among patient experience, clinical effectiveness, and patient safety. For instance, a meta-analysis showed that better quality of patient–provider communication was positively associated with adherence to treatment in an overwhelming majority of studies.[34] Better patient expe-

Table 3. Adjusted Relationships Between Year 1 Satisfaction Tertiles and Year 2 Self-Rated Health, Service Use, and Expenditures

	Patient Satisfaction Tertile		
	1 (Least Satisfied)	2	3 (Most Satisfied)
Variable	Age 18–64 y		
Excellent/Very good general health			
Unadjusted proportion (%)	29.6	38.2	49.2
PM (95% CI)	38.0 (33.9–42.2)	38.1 (34.8–41.4)	41.1 (37.2–45.0)
P value	Ref	.982	.306
Highest quartile of mental health			
Unadjusted proportion (%)	23.5	35.5	41.1
PM (95% CI)	29.7 (25.3–34.1)	36.0 (31.3–40.7)	34.0 (29.5–38.4)
P value	Ref	.036	.187
Highest quartile of physical health			
Unadjusted proportion (%)	26.1	33.5	40.2
PM (%)	32.5 (27.9–37.1)	32.4 (28.5–36.3)	35.4 (31.6–39.1)
P value	Ref	.952	.355
Total ED visits			
Unadjusted mean	0.39	0.26	0.26
PM (95% CI)	0.29 (0.24–0.35)	0.32 (0.23–0.39)	0.34 (0.25–0.42)
P value	Ref	.853	.4
Total hospital admissions			
Unadjusted mean	0.22	0.19	0.15
PM (95% CI)	0.18 (0.14–0.22)	0.21 (0.13–0.28)	0.19 (0.13–0.26)
P value	Ref	.449	.87
Total physician office visits			
Unadjusted mean	7.96	6.96	5.85
PM (95% CI)	7.42 (6.78–8.06)	6.60 (5.98–7.22)	6.26 (5.47–7.05)
P value	Ref	.211	.038
Total healthcare expenditure			
Unadjusted mean	$21,661	$26,465	$18,059
PM (95% CI)	$22,143 ($17,024–$27,262)	$26,706 ($18,279–$35,133)	$22,547 ($15,785–$29,309)
P value	Ref	.189	.716
Total drug expenditure			
Unadjusted mean	$2,877	$2,921	$2,560
PM (95% CI)	$2,927 ($2,479–$3,375)	$2,822 ($2,315–$3,329)	$2,940 ($2,282–$3,598)
P value	Ref	.704	.87
Total out-of-pocket expenditure			
Unadjusted mean	$1,403	$1,428	$1,072
PM (95% CI)	$1,409 ($1,159–$1,659)	$1,292 ($1,060–$1,526)	$1,150 ($947–$1,355)
P value	Ref	.78	.089

(continued on next page)

All models controlled for age, sex, race, marital status, education, poverty, insurance, usual source of provider, panel number, comorbidity count, smoking status, year 1 SF Physical and Mental Component Summary scores, year 1 self-rated general health, year 1 ED visits (any vs none), year 1 hospital admissions (any vs none), year 1 physician office visits, year 1 total healthcare expenditures, year 1 drug expenditures, and year 1 out-of-pocket spending.
Abbreviations: ED, emergency department; PM, predictive margin; SF, short form.

Table 3. Adjusted Relationships Between Year 1 Satisfaction Tertiles and Year 2 Self-Rated Health, Service Use, and Expenditures (cont.)

	Patient Satisfaction Tertile		
	1 (Least Satisfied)	2	3 (Most Satisfied)
Variable		Age ≥65 y	
Excellent/Very good general health			
Unadjusted proportion (%)	23.6	31.8	45.8
PM (95% CI)	30.3 (26.0–34.6)	32.2 (28.9–35.5)	38.9 (35.1–42.7)
P value	Ref	.466	.007
Highest quartile of mental health			
Unadjusted proportion (%)	22.9	34.8	41.7
PM (95% CI)	27.1 (22.1–32.1)	35.5 (31.5–39.5)	37.0 (32.7–41.4)
P value	Ref	.013	.005
Highest quartile of physical health			
Unadjusted proportion (%)	25.1	32.1	42.5
PM (%)	32.9 (28.9–36.8)	31.4 (27.4–35.3)	35.8 (32.3–39.3)
P value	Ref	.586	.314
Total ED visits			
Unadjusted mean	0.40	0.29	0.31
PM (95% CI)	0.37 (0.32–0.44)	0.28 (0.21–0.34)	0.30 (0.24–0.36)
P value	Ref	.070	.238
Total hospital admissions			
Unadjusted mean	0.33	0.29	0.28
PM (95% CI)	0.30 (0.25–0.35)	0.30 (0.23–0.37)	0.31 (0.24–0.37)
P value	Ref	.990	.744
Total physician office visits			
Unadjusted mean	10.03	9.43	9.09
PM (95% CI)	9.55 (8.90–10.19)	9.68 (8.71–10.64)	9.32 (8.24–10.40)
P value	Ref	.65	.619
Total healthcare expenditure			
Unadjusted mean	$33,558	$27,341	$29,591
PM (95% CI)	$34,071 ($29,011–$39,131)	$28,230 ($22,907–$33,553)	$26,995 ($22,568–$31,422)
P value	Ref	.301	.049
Total drug expenditure			
Unadjusted mean	$2,612	$2,620	$2,577
PM (95% CI)	$2,572 ($2,307–$2,837)	$2,775 ($2,459–$3,092)	$2,851 ($2,467–$3,236)
P value	Ref	.445	.261
Total out-of-pocket expenditure			
Unadjusted mean	$1,579	$1,265	$1,290
PM (95% CI)	$1,515 ($1,281–$1,749)	$1,242 ($1,059–$1,425)	$1,229 ($1,080–1,378)
P value	Ref	.132	.080

All models controlled for age, sex, race, marital status, education, poverty, insurance, usual source of provider, panel number, comorbidity count, smoking status, year 1 SF Physical and Mental Component Summary scores, year 1 self-rated general health, year 1 ED visits (any vs none), year 1 hospital admissions (any vs none), year 1 physician office visits, year 1 total healthcare expenditures, year 1 drug expenditures, and year 1 out-of-pocket spending.
Abbreviations: ED, emergency department; PM, predictive margin; SF, short form.

rience also has been found to be positively associated with medication compliance[35–37] and performance on patient safety indicators.[38] Recently, enhancing communication between patients with cancer and their healthcare team through electronic patient-reported outcomes systems was shown to improve overall survival.[39,40]

Effective patient–provider communication is beneficial for patients, clinicians, and hospitals alike. However, given the scarcity of time for such communication, concerns have been raised that higher satisfaction ratings may align with greater volume of care and not necessarily with high-value care.[41,42] A previous analysis of the general population using the MEPS data found that higher satisfaction ratings were associated with greater service use, including inpatient visits and drug expenditures.[14] Older studies also have linked patient satisfaction with the extent of fulfilment of patient requests.[43,44] To the contrary, we found that greater satisfaction was associated with fewer physician office visits among younger respondents and lower total healthcare expenditure among the elderly. These departures from earlier findings may stem from the greater complexity of cancer survivorship care compared with the care delivered to the general population. Cancer survivors often require periodic visits to health professionals from multiple disciplines. Although vital, the frequency of these visits also can compound the distress caused by the diagnosis of cancer, its treatment,

and follow-up.[45,46] In this context, effective provider communication can streamline survivorship care and improve health outcomes by alleviating anxiety, boosting mutual trust, and enhancing self-care efficacy and adherence.[10] Overall, our results suggest that addressing survivors' concerns also align well with efficient use of healthcare services. That said, more research is needed to better understand the complex relationship between survivors' satisfaction with provider communication and service use.

Our findings should be interpreted in the light of several limitations. First, our study sample comprises cancer survivors in all phases of the cancer care continuum, including recently diagnosed and long-term survivors. The satisfaction scores that form the foundation of our analyses also are not reflective specifically of the quality of cancer care received. Restricting the analysis to those with a recent diagnosis of cancer would have allowed us to better focus on satisfaction with provider communication for cancer-directed care. However, cancer survivors identified in household surveys such as the MEPS generally are long-term survivors. Furthermore, beginning in 2013, variables indicating time since cancer diagnosis were removed from the MEPS for confidentiality concerns. Thus, the numbers of recently diagnosed survivors are insufficient for separate analyses.

Second, in our examination of the relationship between patient satisfaction and outcomes, we could not control for some potentially important confounders that were not available in the data, including disease stage at diagnosis, all specific cancer treatments since diagnosis, time since last cancer-directed treatment (for those not treated within 2 years of survey), provider characteristics, and financial burden of cancer care. Information on cancer sites also could not be incorporated into the analyses due to insufficient numbers. Future studies should address these limitations using larger, more-detailed, cancer-focused data to evaluate care experiences that are unique to cancer survivors. Potential databases include the Consumer Assessment of Healthcare Providers and Systems (CAHPS) Cancer Care Survey and the SEER-CAHPS linked data.[47–50] The former was designed to measure respondents' experiences while they receive cancer-directed treatments, whereas the SEER-CAHPS linkage provides data on Medicare beneficiaries' experiences at various phases of cancer care.

The above limitations notwithstanding, to our knowledge, this is the first nationally representative study of the drivers and outcomes of cancer survivors' satisfaction with provider communication. We identified important determinants of satisfaction with provider communication among cancer survivors, including comorbidities and baseline service use. Our analyses adjusted for a comprehensive list of factors that may affect satisfaction with provider communication and estimated the short-term outcomes of satisfaction by taking advantage of the panel design of the MEPS.

Conclusions

The ongoing improvement in cancer survival has resulted in a population of survivors with many unique medical and psychosocial needs. Our results highlight the need for individualized communication strategies in cancer survivorship care. Notably, our results suggest that improving cancer survivors' satisfaction with provider communication would lead to better health outcomes in an efficient manner. Great interest is being shown in how to measure systematically and improve provider communication in cancer survivorship care. To those ends, our findings will motivate future inquiries into effective provider communication along the cancer care continuum, preferably using novel, cancer-based data sources, including the CAHPS Cancer Care Survey and the SEER-CAHPS linked data.

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