Barriers to Breast and Colorectal Cancer Survivorship Care: Perceptions of Primary Care Physicians and Medical Oncologists in the United States

Katherine S. Virgo, Catherine C. Lerro, Carrie N. Klabunde, Craig Earle, and Patricia A. Ganz

ABSTRACT

Purpose

High-quality, well-coordinated cancer survivorship care is needed yet barriers remain owing to fragmentation in the United States health care system. This article is a nationwide survey of barriers perceived by primary care physicians (PCPs) and medical oncologists (MOs) regarding breast and colorectal cancer survivorship care beyond 5 years after treatment.

Methods

The Survey of Physician Attitudes Regarding the Care of Cancer Survivors was mailed out in 2009 to a nationally-representative sample ($n = 3,596$) of US PCPs and MOs. Ten physician-perceived cancer survivorship care barriers/concerns were compared between the two provider types. Using weighted multinomial logistic regression, we modeled each barrier, adjusting for physician demographics, reimbursement, training, and practice characteristics.

Results

We received responses from 2,202 physicians (1,072 PCPs; 1,130 MOs; 65.1% cooperation rate). In adjusted patient-related barriers models, MOs were more likely than PCPs to report patient language barriers (odds ratio, [OR], 1.72; 95% CI, 1.22 to 2.42), insurance restrictions impeding test/treatment use (OR, 1.42; 95% CI, 1.03 to 1.96), and patients requesting more aggressive testing (OR, 4.08; 95% CI, 2.73 to 6.10). In adjusted physician-related barriers models, PCPs were more likely to report inadequate training (OR, 3.06; 95% CI, 2.03 to 4.61) and ordering additional tests/treatments because of malpractice concerns (OR, 1.87; 95% CI, 1.20 to 2.93). MOs were more likely to report uncertainty regarding general preventive care responsibility (often/always: OR, 1.97; 95% CI, 1.13 to 3.43; sometimes: OR, 2.16; 95% CI, 1.60 to 2.93).

Conclusion

MOs and PCPs perceive different cancer follow-up care barriers/concerns to be problematic. Resolving inadequate training, malpractice-driven test ordering, and preventive-care responsibility concerns may require continuing education, explicit guidelines, and survivorship care plans. Reviewing care plans with survivors may also reduce patients' requests for unnecessary testing.

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INTRODUCTION

There are nearly 14 million cancer survivors in the United States today.¹ Earlier detection and treatment, combined with recent advances in treatment, contribute to survivors living longer with cancer. The number of cancer survivors is expected to increase to almost 18 million with the aging of the population in whom cancer incidence is highest.² Combined with predicted shortages of primary care physicians (PCPs) and medical oncologists (MOs), these demographic changes present unique challenges for delivery of high-quality cancer survivorship care.³

The fragmented nature of the United States health care system presents additional challenges, highlighting the need for improved coordination and continuity of survivorship care. Patients receive care from many different providers (often located in geographically diverse areas) through several phases of illness over extended time periods.⁴ For patients more than 5 years after initial treatment, transitioning from an oncologist's care to follow-up care by a PCP requires care coordination that could potentially be improved by providing treatment summaries (TS) and survivorship care plans (SCP).⁵ Unfortunately, current physician reimbursement

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mechanisms do not support oncologists developing and delivering such plans. Studies have yet to demonstrate that plan use improves patient outcomes.⁶⁻⁷ Further, oncologists may hesitate to discharge patients to PCP care after monitoring patients closely over a long period and gaining patient trust.⁸ Yet with the growing number of new patients, oncologists simply cannot follow every patient throughout his or her remaining life span.

Insufficient communication between oncologists and PCPs can result in uncertainty among PCPs regarding appropriate post-treatment surveillance testing.⁹⁻¹¹ The limited evidence base to support decisions regarding appropriate surveillance beyond 5 years after treatment presents an additional barrier to optimal care. Discrepant perceptions of MO and PCP survivorship care roles can also lead to missed or duplicated care.¹² PCP and oncologist perceptions of their respective roles in survivorship care are more discrepant than with patient expectations of their roles.¹³ Patients may be satisfied with their care even if they perceive much greater participation by their PCP than the modest participation that may actually occur.¹⁴ Receipt of general noncancer preventive care is one benefit of concurrent follow-up by both MOs and PCPs compared with patients followed by oncologists alone.¹⁵ Other commonly cited noncancer-specific barriers to care, such as patient noncompliance, insurance restrictions impeding receipt of appropriate care, and language barriers, may also adversely affect patient receipt of appropriate survivorship care.¹¹

Using nationwide survey data, we examined 10 self-reported barriers and concerns MOs and PCPs may encounter while caring for cancer survivors who are 5 or more years beyond completion of active treatment and the characteristics of physicians experiencing these barriers and concerns. To our knowledge, this is a novel analysis, entirely distinct from the general survey overview/methodology paper published recently.¹⁶ We hypothesized that MOs and PCPs would have different perceived barriers. The Mandelblatt et al¹¹ adaptation of the behavioral model of access to care¹⁷⁻¹⁹ provides the conceptual framework for this analysis, as it incorporates communication between PCPs and oncologists in depicting realized access to cancer care.

METHODS

The Survey of Physician Attitudes Regarding the Care of Cancer Survivors (SPARCCS), cosponsored by the National Cancer Institute and the American Cancer Society, is a nationally representative mailed survey of United States PCPs and MOs conducted in 2009. The survey sought to improve understanding of the knowledge, attitudes, beliefs, and practices of these two groups of physicians regarding post-treatment care of breast and colon cancer survivors. Breast and colon cancer were chosen for study because of their high prevalence, long survivorship, and the availability of evidence-based guidelines for follow-up care.²⁰⁻²¹ SPARCCS instruments are available on request.²² Study approval was obtained from the National Cancer Institute's institutional review board and the US Office of Management and Budget.

The complete survey methodology has been described elsewhere.¹⁶ Briefly, 2,525 PCPs (family medicine, internal medicine, obstetrics/gynecology specialists) and 2,750 MOs (oncology and/or hematology specialists) were sampled using a systematic stratified approach from the American Medical Association Physician Masterfile.²³⁻²⁴ Eligible physicians ($n = 3,596$) were required to practice in a nonfederal setting, be younger than 76 years, and spend 20% or more of their time caring for patients. Furthermore, oncologists had to provide care for breast or colon cancer patients within the previous year, and PCPs had to work in an office-based practice. Questionnaires from 1,072 PCPs and 1,130 MOs were considered evaluable. The absolute weighted response rate calculated using the American Association of Public Opinion

Research RR₃ method was 57.6% and the cooperation rate was 65.1%. Respondents did not differ significantly from nonrespondents. Survey weights were calculated using replicate jackknife methods.¹⁶

Dependent Measures

Of the 10 specific barriers/concerns examined in the survey, six were derived from existing literature.^{9,25} Four were designed by the survey team. Five were categorized as patient-related barriers or concerns (language issues, nonadherence to physician-recommended care, requesting more aggressive surveillance testing, inability to pay/lacking insurance,²⁵ and insurance restrictions precluding test ordering²⁵). The remaining five were categorized as physician-related barriers and concerns (ordering tests or treatments as malpractice protection, uncertainty regarding which physician [MO or PCP] is providing general preventive health care,⁹ concerns about duplicating care,⁹ missed care concerns,⁹ and inadequate knowledge or training to manage patient problems⁹). Respondents were asked how frequently they experienced each barrier (never, rarely, sometimes, often, always, or not applicable). To ensure an adequate number of respondents in each category to perform all analyses, "never" and "rarely" were collapsed into a single category, as were "often" and "always," resulting in three levels. Two crude patient- and physician-related barrier summary variables were created by totaling all responses (never, 1; always, 5) across the patient- and physician-related barrier questions and converting the total to a dichotomous variable (< 15 , low score; ≥ 15 , high score).

Independent Measures

The primary independent measure was physician type—either MO or PCP. Physician characteristics, practice and patient characteristics, salary and reimbursement information, and self-reported knowledge and training were controlled for in the analyses. Physician characteristics included race/ethnicity, year of medical school graduation, United States or foreign training, and teaching status.

Practice and patient characteristics included primary practice site (eg, office or hospital) and location type (eg, full- or part-owner or employee of physician-owned practice), number of physicians in the primary practice location, metropolitan statistical area, census region, electronic medical records use, weekly patient volume, percent of patients categorized as "safety-net" (ie, Medicaid-insured or uninsured), and percent of patients 65 years and older. Salary and reimbursement included whether the physician was salaried and whether salaries were productivity based. Primary reimbursement was categorized as fee-for-service, capitation, or a mixture of both.

Several questions gauged physician confidence in cancer-related care knowledge regarding appropriate surveillance, long-term physical adverse effects of cancer and its treatment, and psychological outcomes. Because many individual knowledge questions were highly correlated, a summary variable was created (self-ascribed knowledge of follow-up care) and defined as tertiles of the distribution of summed knowledge question responses (high score, 17 to 18; medium, 14 to 16; low, 4 to 13). Training regarding late and long-term effects of cancer treatment was assessed, as were the training methods used in the previous 5 years (eg, continuing medical education or professional meetings).

Statistical Analyses

Analyses were performed using SAS (version 9.2; SAS Statistical Institute, Cary, NC). The surveyfreq procedure was used to apply replicate weights and conduct Rao-Scott χ^2 tests. Weighted multinomial logistic regression models (surveylogistic with generalized logit link) were used to examine the relationship between each perceived barrier and the physician and practice characteristics. This technique permitted the use of polychotomous response categories (never/rarely, sometimes, often/always) for the dependent variables with never/rarely as the referent. All models included physician specialty (MO or PCP). Owing to the number of potential candidates for model inclusion, only variables with a Rao-Scott χ^2 P value $\leq .15$ were entered into each model, reducing the likelihood of overfitting and model noise. The Newton-Raphson method was specified for model fitting.

RESULTS

The 2,202 respondents (1,130 MOs and 1,072 PCPs) corresponded to a weighted total of 148,303 physicians (7,950 MOs and 140,353 PCPs). Physician type was significantly associated with all physician, practice, and patient characteristics; productivity-based salary; and all knowledge and training measures except training received from colleagues in the past 5 years (Table 1). Physician type (MO or PCP) was also significantly associated ($P < .05$) with all barriers to patient care in weighted-unadjusted analyses, except inability to pay/lacking insurance (Table 2). The average number of barriers and concerns physicians reported (often/always or sometimes) was 4.8 overall (standard deviation [SD], 2.2), 4.9 for MOs (SD, 2.2), and 4.7 for PCPs (SD, 2.3).

Patient-Related Barriers

For all respondents combined, the most common patient-related barrier was patient inability to pay/lacking insurance coverage (64.6%). Compared with PCPs in weighted-unadjusted analyses, MOs were significantly more likely to report that patients often/always request more aggressive surveillance testing than the physician would recommend (28.9% v 10.0%; $P < .05$), often/always/sometimes have language barriers that interfere with communication (25.7% v 20.3%), and sometimes have insurance restrictions that preclude obtaining necessary tests or treatments (43.2% v 37.3%). MOs were also significantly more likely to report that patients sometimes are noncompliant with recommended care (55.2% v 47.5%; $P < .01$; Table 2).

In weighted, adjusted, multinomial models, MOs were more likely than PCPs to report patients requesting more aggressive testing as a barrier (often/always: odds ratio [OR], 4.08; 95% CI, 2.73 to 6.10; sometimes: OR, 1.99; 95% CI, 1.53 to 2.58; Table 3). Compared with solo practitioners, physicians in small- to medium-sized practices (two to five and six to 15 physicians, respectively) were more likely to report patients sometimes requesting unnecessary testing. Physicians treating a higher percentage of safety-net patients (6% or more) were less likely to report patients sometimes requesting unnecessary testing as a barrier than were physicians treating few safety-net patients.

MOs were more likely to report patient language as a barrier to survivorship care compared with PCPs (often/always/sometimes: OR, 1.72; 95% CI, 1.22 to 2.42). Language was also a significant barrier to care among physicians (MOs and PCPs combined) in the northeast and west, those practicing at community health centers, in large practices (≥ 16 physicians) or in metropolitan statistical areas, and those reimbursed by capitation.

MOs were significantly more likely than PCPs to report insurance restrictions precluding the ordering of tests/treatments as a barrier (sometimes: OR, 1.42; 95% CI, 1.03 to 1.96). Insurance restrictions were also problematic for Hispanic physicians and those with productivity-based salaries. Conversely, respondents in medium-to-large practices (≥ 6 physicians), in the west, physicians trained in the United States, and those who were not paid by salary or whose salaries were not based on productivity were less likely to report insurance restrictions as a barrier to test ordering.

PCPs and MOs did not differ in reporting the remaining two patient-related barriers (patient inability to pay/lacking insurance or refusing recommended care) in adjusted analyses (results not shown). Although MOs had high patient-related barrier scores overall com-

pared with PCPs in unadjusted analyses ($P < .001$), this association was no longer significant in adjusted analyses ($P = .1132$).

Physician-Related Barriers

For all respondents combined, the most common physician-related barrier was concern about missed care (55.7%). Compared with MOs in weighted-unadjusted analyses, PCPs were significantly more likely ($P < .001$) to often/always/sometimes report lacking adequate training (46.4% v 10.5%) and order tests/treatments as malpractice protection (51.1% v 40.2%). PCPs were also significantly more likely to often/always voice concerns about missed care (15.1% v 11.7%; $P < .01$). MOs were more likely ($P < .01$) to often/always/sometimes report concerns about duplicated care (56.0% v 47.7%) and general preventive health care responsibility (42.3% v 33.1%).

In weighted-adjusted multinomial models, inadequate knowledge or training to manage patient problems was significantly more likely to be reported as a barrier by PCPs compared with MOs (often/always/sometimes: OR, 3.06; 95% CI, 2.03 to 4.61; Table 4). Physician characteristics associated with a lower likelihood of reporting inadequate knowledge or training included black race, being in the mid-range of the listed medical school graduation years (1980 to 1996), having high or moderate self-ascribed knowledge regarding follow-up care, and being trained in late- and long-term effects.

MOs were more likely than PCPs to report uncertainty regarding general preventive health care responsibility (often/always: OR, 1.97; 95% CI, 1.13 to 3.43; sometimes: OR, 2.16; 95% CI, 1.60 to 2.93; Table 4). Uncertainty was also more likely to be a concern for physicians (MOs and PCPs combined) in the west and those in practices that were transitioning to a full electronic medical record system. Physicians with high self-ascribed knowledge of cancer-related follow-up care and those physicians whose practice was 26% to 50% elderly patients were less likely to express uncertainty.

PCPs were more likely than MOs to report often or always ordering extra tests/treatments as malpractice protection (often/always: OR, 1.87; 95% CI, 1.20 to 2.93). Ordering extra tests or treatments was also more common among physicians who were reimbursed via capitation, were of Asian/Pacific Islander descent, saw more than 100 patients per week, and had only some late-effects training. Physician characteristics associated with a lower likelihood of ordering tests/treatments as malpractice protection included high self-ascribed knowledge of cancer-related follow-up care, detailed late-effects training, receipt of late-effects training from colleagues, being in the mid-range of listed medical school graduation years (1980 to 1996), and having a salary not based on productivity.

PCPs and MOs did not differ in reporting the final two physician-related barriers (concerns regarding duplicated or missed care) in adjusted analyses (results not shown). Although PCPs had high physician-related barrier scores overall compared with MOs in unadjusted analyses ($P = .0166$), this association was no longer significant after adjustment ($P = .9986$).

DISCUSSION

Our article examined 10 self-reported barriers and concerns MOs and PCPs face regarding the care of breast and colon cancer survivors who are 5 years or more beyond completion of active treatment. To our knowledge, this is the first nationwide study of its kind. Our primary

Table 1. Descriptive Characteristics by Physician Type, Weighted Comparisons

Characteristic	Total (N = 148,303)*†		Oncologist (n = 7,950)*†		PCP (n = 140,353)*†		P‡
	No.	%	No.	%	No.	%	
Physician characteristics							
Race							
White	102,821	69.3	5,008	63.0	97,813	69.7	< .001
Asian/PI	24,368	16.4	2,279	28.7	22,089	15.7	
Hispanic	9,604	6.5	309	3.9	9,295	6.6	
Black	7,456	5.0	172	2.2	7,284	5.2	
Other/missing	4,054	2.7	182	2.3	3,871	2.8	.0409
Year of medical school graduation							
≤ 1979	36,076	24.3	2,069	26.0	34,007	24.2	
1980-1988	40,570	27.4	1,971	24.8	38,599	27.5	
1989-1996	38,161	25.7	1,840	23.1	36,321	25.9	< .001
≥ 1997	33,496	22.6	2,069	26.0	31,426	22.4	
Trained in the United States							
No	36,657	24.7	2,834	35.6	33,823	24.1	
Yes	111,646	75.3	5,116	64.4	106,530	75.9	< .001
Currently teaching medical students or residents							
No	87,687	59.1	3,841	48.3	83,846	59.7	
Yes	59,684	40.2	4,097	51.5	55,587	39.6	
Missing	932	0.6	12	0.2	920	0.7	
Practice and patient characteristics							
Primary site of practice							
Office practice	127,666	86.1	5,301	66.7	122,365	87.2	< .001
Hospital	8,145	5.5	2,386	30.0	5,759	4.1	
Community health center	7,933	5.3	101	1.3	7,832	5.6	
More than one option selected	3,489	2.4	110	1.4	3,379	2.4	
Missing	1,069	0.7	51	0.6	1,018	0.7	< .001
Practice location							
Full- or part-time owner of physician-owned practice	81,776	55.1	3,598	45.3	78,177	55.7	
Employee of physician-owned practice	15,447	10.4	890	11.2	14,557	10.4	
Employee of large medical group	21,378	14.4	732	9.2	20,646	14.7	
Employee of group- or staff-model HMO	3,584	2.4	107	1.4	3,476	2.5	
Employee of university hospital or clinic	10,308	7.0	1,716	21.6	8,592	6.1	
Employee of non-university hospital or clinic	14,590	9.8	700	8.8	13,890	9.9	
Other/missing	1,220	0.8	207	2.6	1,014	0.7	< .001
No. of physicians in primary practice location							
1	34,929	23.6	805	10.1	34,124	24.3	
2-5	62,456	42.1	3,117	39.2	59,339	42.3	
6-15	33,791	22.8	2,349	29.6	31,442	22.4	.0096
≥ 16	14,249	9.6	1,528	19.2	12,721	9.1	
Missing	2,877	1.9	150	1.9	2,727	1.9	
MSA							
MSA population ≥ 1 million	91,828	61.9	5,213	65.6	86,615	61.7	
All other MSAs	56,475	38.1	2,737	34.4	53,738	38.3	
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Table 1. Descriptive Characteristics by Physician Type, Weighted Comparisons (continued)

Characteristic	Total (N = 148,303)*†		Oncologist (n = 7,950)*†		PCP (n = 140,353)*†		P†
	No.	%	No.	%	No.	%	
Census region							
Northeast	30,911	20.8	1,998	25.1	28,913	20.6	.0096
Midwest	33,781	22.8	1,707	21.5	32,074	22.9	
South	51,557	34.8	2,697	33.9	48,860	34.8	
West	32,054	21.6	1,548	19.5	30,506	21.7	
EMR							< .001
Paper records and charts	58,381	39.4	1,728	21.7	56,653	40.4	
Partial EMR	20,522	13.8	1,529	19.2	18,993	13.5	
In transition from paper to full EMRs	22,714	15.3	1,934	24.3	20,780	14.8	
Full EMR	44,637	30.1	2,659	33.4	41,979	29.9	< .001
Missing	2,047	1.4	100	1.3	1,948	1.4	
No. of patients seen at primary location in a typical week							
≤ 50	21,352	14.4	2,294	28.9	19,058	13.6	< .001
51-100	78,772	53.1	4,244	53.4	74,528	53.1	
≥ 101	45,889	30.9	1,307	16.4	44,582	31.8	
Missing	2,289	1.5	105	1.3	2,185	1.6	
Percent of patients classified as safety net							< .001
0-5	24,624	16.6	694	8.7	23,930	17.1	
6-10	29,246	19.7	1,775	22.3	27,471	19.6	
11-20	45,179	30.5	2,528	31.8	42,651	30.4	
≥ 21	44,592	30.1	2,382	30.0	42,210	30.1	< .001
Missing	4,661	3.1	570	7.2	4,091	2.9	
Percent of patients ≥ 65 years old							
0-25	71,459	48.2	690	8.7	70,769	50.4	< .001
26-50	52,814	35.6	4,013	50.5	48,801	34.8	
≥ 51	21,572	14.5	3,114	39.2	18,459	13.2	
Missing	2,457	1.7	133	1.7	2,324	1.7	
Salary and reimbursement							< .001
Salary based on productivity of physician/group							
No	41,374	27.9	2,870	36.1	38,504	27.4	
Yes	48,645	32.8	2,706	34.0	45,939	32.7	
Not paid by salary	53,661	36.2	1,873	23.6	51,788	36.9	.5265
Missing	4,622	3.1	501	6.3	4,122	2.9	
Reimbursement							
Primarily fee for service	58,199	39.2	3,320	41.8	54,879	39.1	
Mixture of fee for service and capitation	10,151	6.8	457	5.8	9,693	6.9	< .001
Primarily capitation	8,780	5.9	454	5.7	8,327	5.9	
Do not know, inapplicable, missing	71,173	48.0	3,719	46.8	67,454	48.1	

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Table 1. Descriptive Characteristics by Physician Type, Weighted Comparisons (continued)

Characteristic	Total (N = 148,303)*†		Oncologist (n = 7,950)*†		PCP (n = 140,353)*†		P‡
	No.	%	No.	%	No.	%	
Knowledge and training							
Self-ascribed knowledge of cancer-related follow-up care for breast and colon cancer survivors							
Low knowledge: score, 4-13§	66,815	45.1	919	11.6	65,896	47.0	< .001
Medium knowledge: score, 14-16	53,795	36.3	3,314	41.7	50,481	36.0	
High knowledge: score, 17-18	27,478	18.5	3,705	46.6	23,774	16.9	
Missing	214	0.1	12	0.1	202	0.1	
Received training regarding long-term effects of cancer treatment that survivors might experience							
No	50,749	34.2	563	7.1	50,185	35.8	< .001
Yes, some	87,374	58.9	4,505	56.7	82,868	59.0	
Yes, in detail	8,457	5.7	2,856	35.9	5,602	4.0	
Missing	1,723	1.2	25	0.3	1,697	1.2	
In the past 5 years, how did you receive this training?							
Continuing medical education							
No	48,461	33.4	2,255	28.5	46,206	33.7	.0108
Yes	96,508	66.6	5,662	71.5	90,847	66.3	
Professional meetings or conferences							
No	88,838	61.3	1,921	24.3	86,917	63.4	< .001
Yes	56,131	38.7	5,996	75.7	50,135	36.6	
Medical school							
No	134,931	93.1	7,557	95.5	127,374	92.9	.0346
Yes	10,038	6.9	360	4.5	9,678	7.1	
Medical journals							
No	65,408	45.1	2,090	26.4	63,317	46.2	< .001
Yes	79,561	54.9	5,827	73.6	73,735	53.8	
Colleagues							
No	89,291	61.6	4,748	60.0	84,542	61.7	.3970
Yes	55,678	38.4	3,169	40.0	52,510	38.3	

Abbreviations: EMR, electronic medical records; HMO, health maintenance organization; MSA, metropolitan statistical area; PCP, primary care physician; PI, Pacific Islander.

*Percentages may not add up to total number because of rounding.

†Unweighted numbers are as follows: total, 2,202; oncologist, 1,130; PCP, 1,072.

‡Rao-Scott χ^2 test.

§Scores of 4 or 5 were attributable to missing responses.

Table 2. Survivorship Care Barriers and Concerns by Physician Type, Weighted Comparisons

Characteristic	Total (N = 148,303)*		Oncologist (n = 7,950)*		PCP (n = 140,353)*		Pt
	No.	%	No.	%	No.	%	
Patient-related barriers/concerns							
Patients refuse or do not adhere to recommended care							
Often/always	16,374	11.9	634	8.1	15,741	12.1	.0002
Sometimes	65,962	47.9	4,320	55.2	61,642	47.5	
Never/rarely	55,272	40.2	2,878	36.8	52,394	40.4	
I am not able to order appropriate tests or treatments because of health insurance plan restrictions							.0329
Often/always	17,116	12.6	971	12.5	16,145	12.6	
Sometimes	51,205	37.6	3,345	43.2	47,860	37.3	
Never/rarely	67,764	49.8	3,422	44.2	64,342	50.1	
Patients have language barriers that interfere with communication‡							.0235
Often/always	3,446	2.5	267	3.4	3,179	2.5	
Sometimes	24,637	18.0	1,735	22.3	22,902	17.8	
Never/rarely	108,642	79.5	5,783	74.4	102,859	79.8	
Patients request more aggressive cancer surveillance testing than what I would recommend							< .001
Often/always	14,898	11.1	2,268	28.9	12,630	10.0	
Sometimes	58,526	43.5	3,647	46.5	54,879	43.3	
Never/rarely	61,247	45.5	1,935	24.6	59,312	46.8	
Patients are unable to pay (or lack insurance coverage for follow-up care)							.9186
Often/always	17,389	12.7	982	12.7	16,407	12.7	
Sometimes	70,779	51.9	4,086	52.8	66,693	51.8	
Never/rarely	48,298	35.4	2,675	34.6	45,622	35.4	
Total patient-related barrier score§							< .001
Low; < 15	113,940	81.6	5,753	72.8	108,187	82.1	
High; ≥ 15	25,674	18.4	2,152	27.2	23,523	17.9	
Physician-related barriers/concerns							
I order tests or treatments to protect myself against malpractice litigation							< .001
Often/always	21,231	15.8	757	9.7	20,474	16.2	
Sometimes	46,479	34.6	2,374	30.5	44,105	34.9	
Never/rarely	66,517	49.6	4,663	59.8	61,854	48.9	
I am uncertain about which physician (oncology specialist or PCP) is providing patients' general preventive health care							.0007
Often/always	8,675	6.3	724	9.3	7,951	6.1	
Sometimes	37,496	27.3	2,568	33.0	34,927	27.0	
Never/rarely	91,060	66.4	4,487	57.7	86,573	66.9	
I am concerned about duplicated care by the PCP and oncology specialist							.0035
Often/always	15,503	11.3	1,033	13.2	14,470	11.2	
Sometimes	50,424	36.8	3,343	42.8	47,082	36.5	
Never/rarely	70,947	51.8	3,436	44.0	67,511	52.3	
(continued on following page)							

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Table 2. Survivorship Care Barriers and Concerns by Physician Type, Weighted Comparisons (continued)

Characteristic	Total (N = 148,303)*		Oncologist (n = 7,950)*		PCP (n = 140,353)*		P†
	No.	%	No.	%	No.	%	
I am concerned about missed care by the PCP and oncology specialist							.0047
Often/always	20,049	14.9	912	11.7	19,138	15.1	
Sometimes	56,163	41.8	3,749	48.3	52,413	41.4	
Never/rarely	58,005	43.2	3,102	40.0	54,902	43.4	
I don't have adequate knowledge or training to manage my patients' problems‡							< .001
Often/always	4,921	3.7	96	1.3	4,825	3.8	
Sometimes	54,760	40.7	702	9.2	54,058	42.6	
Never/rarely	74,787	55.6	6,823	89.5	67,964	53.6	
Total physician-related barrier scores§							.0338
Low; < 15	115,699	82.9	6,836	86.5	108,863	82.7	
High; ≥ 15	23,915	17.1	1,069	13.5	22,846	17.3	

Abbreviation: PCP, primary care physician.

*No. of patients for each barrier may not add up to the overall total weighted No. of patients (N = 148,303) in all instances because of missing values for some barriers. Only non-missing patient data were included in the multivariable analysis. Unweighted numbers are as follows: total, 2,202; oncologist, 1,130; PCP, 1,072.

†Rao-Scott χ^2 test.

‡Because of small sample sizes, "sometimes" was combined with "often/always" for purposes of all analyses.

§Crude total barrier scores were calculated by adding all responses (never, 1; always, 5) across the patient- and physician-related barrier questions (ranges, 1-20 and 1-24, respectively) and converting the total to a dichotomous variable (< 15, low score; ≥ 15, high score).

Table 3. Patient-Related Barriers and Concerns to Cancer Survivorship Care: Weighted Adjusted Multinomial Logistic Regression Models

Variable	Insurance Plan Restrictions*			Language Barrier†			Request More Aggressive Care‡		
	Response (v R/N)	OR	95% CI	Response (v R/N)	OR	95% CI	Response (v R/N)	OR	95% CI
Physician type									
PCP		1.00	Ref		1.00	Ref		1.00	Ref
Oncologists	O/A	0.93	0.59 to 1.46	O/A/S	1.72	1.22 to 2.42	O/A	4.08	2.73 to 6.10
	S	1.42	1.03 to 1.96				S	1.99	1.53 to 2.58
No. of physicians in primary practice location									
1		1.00	Ref		1.00	Ref		1.00	Ref
2-5	O/A	0.84	0.47 to 1.49	O/A/S	1.27	0.81 to 2.00	O/A	1.21	0.64 to 2.29
2-5	S	0.90	0.60 to 1.34				S	1.60	1.12 to 2.28
6-15	O/A	0.52	0.27 to 0.99	O/A/S	1.32	0.80 to 2.18	O/A	1.86	0.95 to 3.66
6-15	S	0.58	0.36 to 0.94				S	1.64	1.09 to 2.47
≥ 16	O/A	0.29	0.11 to 0.77	O/A/S	2.05	1.13 to 3.72	O/A	1.47	0.70 to 3.05
≥ 16	S	0.53	0.31 to 0.92				S	1.48	0.90 to 2.43
Primary site of practice									
Office practice		1.00	Ref		1.00	Ref			
Hospital				O/A/S	0.79	0.42 to 1.49			
Community health center				O/A/S	3.50	1.77 to 6.91			
More than one selected				O/A/S	1.90	0.67 to 5.40			
Census region									
Midwest		1.00	Ref	O/A/S	1.00	Ref			
Northeast	O/A	1.24	0.64 to 2.38		2.13	1.22 to 3.74			
Northeast	S	0.94	0.62 to 1.42						
South	O/A	1.44	0.80 to 2.58	O/A/S	1.63	0.98 to 2.70			
West	O/A	1.28	0.63 to 2.60	O/A/S	2.35	1.40 to 3.92			
West	S	0.54	0.36 to 0.81						
MSA									
Non-MSA					1.00	Ref			
MSA				O/A/S	1.67	1.13 to 2.49			
Percent of safety net patients									
≤ 5									
6-10, O/A							O/A	1.00	Ref
6-10% safety net							S	0.94	0.45 to 1.96
11-20% safety net							O/A	0.59	0.35 to 0.99
11-20% safety net							S	0.65	0.33 to 1.27
≥ 21% safety net							O/A	0.49	0.31 to 0.76
≥ 21% safety net							S	0.59	0.31 to 1.12
Salary based on productivity							S	0.61	0.38 to 0.99
Yes		1.00	Ref						
No	O/A	0.73	0.40 to 1.31						
No†	S	0.58	0.40 to 0.84						
Not paid by salary	O/A	0.61	0.37 to 1.02						
Not paid by salary	S	0.58	0.40 to 0.84						

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Table 3. Patient-Related Barriers and Concerns to Cancer Survivorship Care: Weighted Adjusted Multinomial Logistic Regression Models (continued)

Variable	Insurance Plan Restrictions*			Language Barrier†			Request More Aggressive Care‡		
	Response (v R/N)	OR	95% CI	Response (v R/N)	OR	95% CI	Response (v R/N)	OR	95% CI
Reimbursement									
FFS									
Mixed capitation/FFS									
Capitation									
Race									
White		1.00	Ref					1.00	Ref
Asian/PI	O/A	0.86	0.48 to 1.54				O/A	1.28	0.74 to 2.23
Asian/PI	S	1.10	0.73 to 1.64				S	1.08	0.77 to 1.52
Hispanic¶	O/A	2.42	1.13 to 5.17	O/A/S			O/A	0.98	0.47 to 2.06
Hispanic	S	1.08	0.56 to 2.09	O/A/S	1.00		S	1.22	0.66 to 2.24
Black	O/A	1.06	0.45 to 2.49				O/A	0.96	0.27 to 3.38
Black	S	0.62	0.31 to 1.23				S	0.52	0.25 to 1.09
Other/missing	O/A	0.56	0.17 to 1.89				O/A	0.67	0.20 to 2.21
Other/missing	S	0.85	0.36 to 2.04				S	0.27	0.11 to 0.67
Trained in the United States									
No		1.00	Ref						
Yes	O/A	0.52	0.31 to 0.87						
Yes	S	0.69	0.47 to 1.00						

NOTE. Boldfaced values represent significant results.

Abbreviations: FFS, fee for service; MSA, metropolitan statistical area; O/A, often/always; O/A/S, often/always/sometimes; OR, odds ratio; PCP, primary care physician; PI, Pacific Islander; Ref, reference; R/N, rarely/never; S, sometimes.

*¶I am not able to order appropriate tests or treatments because of insurance plan restrictions." Model also adjusted for training regarding late effects, continuing medical education training, training at meetings, training by journals, and training by colleagues.

†¶Patients have language barriers that interfere with communication." Model also adjusted for self-ascribed knowledge, medical school training, patients per week, percent of safety net patients, and race/ethnicity.

‡¶Patients request more aggressive cancer surveillance testing than what I would recommend." Model also adjusted for training at meetings, percent of elderly patients, and use of electronic medical records, \$ORs associated with physician type are interpreted as follows: oncologists were significantly more likely to report insurance plan restrictions precluding ordering appropriate tests or treatments compared with PCPs (sometimes: OR, 1.42; 95% CI, 1.03 to 1.96).

¶¶ORs associated with barriers are interpreted as follows: insurance plan restrictions were problematic for physicians with productivity-based salaries (sometimes: OR, 1.72; 95% CI, 1.19 to 2.50) and Hispanic physicians (often/always: OR, 2.42; 95% CI, 1.13 to 5.17).

Table 4. Physician-Related Barriers/Concerns to Cancer Survivorship Care: Weighted Adjusted Multinomial Logistic Regression Models

Descriptive Variable	Protect Against Malpractice*			Who Is Providing General Preventive Care†			Inadequate Knowledge/Training‡		
	Response (v R/N)	OR	95% CI	Response (v R/N)	OR	95% CI	Response (v R/N)	OR	95% CI
Physician type									
PCP		1.00	Ref		1.00	Ref		1.00	Ref
Oncologist§	O/A S	0.53 1.01	0.34 to 0.84 0.74 to 1.39	O/A S	1.97 2.16	1.13 to 3.43 1.60 to 2.93	O/A/S	0.33 0.22 to 0.49	
Knowledge of cancer-related follow-up care for breast and colon cancer survivors									
Low		1.00	Ref		1.00	Ref		1.00	Ref
Medium	O/A	0.69	0.45 to 1.04	O/A	0.62	0.34 to 1.12	O/A/S	0.62	0.46 to 0.83
Medium	S	0.92	0.66 to 1.28	S	0.79	0.56 to 1.12			
High	O/A	0.47	0.24 to 0.91	O/A	0.70	0.30 to 1.63	O/A/S	0.27	0.18 to 0.42
High	S	0.79	0.54 to 1.18	S	0.50	0.32 to 0.79			
Received training regarding late effects									
No		1.00	Ref		1.00	Ref		1.00	Ref
Yes, some	O/A	1.57	1.01 to 2.46				O/A/S	0.46	0.32 to 0.66
Yes, some	S	0.99	0.70 to 1.40						
Yes, detailed	O/A	1.53	0.69 to 3.40				O/A/S	0.13	0.05 to 0.31
Yes, detailed	S	0.35	0.19 to 0.65						
Trained by colleagues									
No		1.00	Ref		1.00	Ref			
Yes	O/A	0.64	0.44 to 0.93						
Yes	S	1.07	0.80 to 1.44						
No. of patients seen at primary location									
≤ 50		1.00	Ref						
51-100	O/A	0.83	0.50 to 1.38						
51-100	S	1.25	0.77 to 2.01						
≥ 101	O/A	1.48	0.82 to 2.67						
≥ 101	S	1.69	1.01 to 2.81						
Primary site of practice									
Office practice		1.00	Ref						
Hospital	O/A	0.64	0.27 to 1.53						
Hospital	S	1.11	0.56 to 2.20						
Community health center	O/A	0.51	0.18 to 1.50						
Community health center	S	0.70	0.34 to 1.44						
More than one selected	O/A	1.33	0.38 to 4.65						
More than one selected	S	3.94	1.52 to 10.20						
EMR									
Paper records and charts					1.00	Ref			
Partial EMR				O/A	1.06	0.36 to 3.15			
Partial EMR				S	0.72	0.43 to 1.21			
In transition from paper to full EMR				O/A	2.29	1.02 to 5.13			
In transition from paper to full EMR				S	0.71	0.45 to 1.13			
Full EMR				O/A	1.49	0.64 to 3.46			
Full EMR				S	0.97	0.67 to 1.42			

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Table 4. Physician-Related Barriers/Concerns to Cancer Survivorship Care: Weighted Adjusted Multinomial Logistic Regression Models (continued)

Descriptive Variable	Protect Against Malpractice*			Who Is Providing General Preventive Care†			Inadequate Knowledge/Training‡		
	Response (v R/N)	OR	95% CI	Response (v R/N)	OR	95% CI	Response (v R/N)	OR	95% CI
Census region									
Midwest					1.00	Ref			
Northeast				O/A	1.36	0.60 to 3.07			
Northeast				S	0.89	0.59 to 1.35			
South				O/A	1.75	0.84 to 3.64			
South				S	1.14	0.78 to 1.67			
West				O/A	2.49	1.18 to 5.26			
West				S	1.01	0.68 to 1.49			
Percent of patients ≥ 65 years old									
0-25					1.00	Ref			
26-50				O/A	0.77	0.39 to 1.53			
26-50				S	0.62	0.44 to 0.87			
51-100				O/A	1.02	0.48 to 2.19			
51-100				S	0.75	0.50 to 1.12			
Salary based on productivity									
Yes		1.00	Ref						
No	O/A	0.43	0.26 to 0.71						
No	S	0.54	0.36 to 0.82						
Not paid by salary	O/A	0.64	0.29 to 1.43						
Not paid by salary	S	0.63	0.34 to 1.15						
Reimbursement									
Primarily FFS		1.00	Ref						
Mixed capitation/FFS	O/A	0.64	0.26 to 1.54						
Mixed capitation/FFS	S	1.03	0.56 to 1.90						
Primarily capitation	O/A	2.43	1.17 to 5.07						
Primarily capitation	S	1.13	0.61 to 2.10						
Race									
White		1.00	Ref					1.00	Ref
Asian/PI	O/A	2.06	1.25 to 3.39				O/A/S	0.90	0.58 to 1.42
Asian/PI	S	1.06	0.70 to 1.59						
Hispanic	O/A	2.08	0.96 to 4.50				O/A/S	1.15	0.62 to 2.15
Hispanic	S	1.74	0.94 to 3.22						
Black	O/A	0.97	0.37 to 2.58				O/A/S	0.39	0.18 to 0.82
Black	S	0.98	0.44 to 2.20						
Other/missing	O/A	2.00	0.61 to 6.52				O/A/S	0.43	0.11 to 1.68
Other/missing	S	1.83	0.53 to 6.27						

(continued on following page)

Table 4. Physician-Related Barriers/Concerns to Cancer Survivorship Care: Weighted Adjusted Multinomial Logistic Regression Models (continued)

Descriptive Variable	Protect Against Malpractice*			Who Is Providing General Preventive Care†			Inadequate Knowledge/Training‡		
	Response (v R/N)	OR	95% CI	Response (v R/N)	OR	95% CI	Response (v R/N)	OR	95% CI
Year of medical school graduation									
≤ 1979		1.00	Ref						
1980-1988	O/A	0.71	0.42 to 1.18				O/A/S	0.63	0.44 to 0.91
1980-1988	S	0.53	0.34 to 0.83						
1989-1996	O/A	0.80	0.47 to 1.36				O/A/S	0.52	0.33 to 0.80
1989-1996	S	0.65	0.43 to 0.97						
≥ 1997	O/A	1.25	0.71 to 2.21				O/A/S	0.69	0.43 to 1.09
≥ 1997	S	0.87	0.55 to 1.38						

NOTE. Boldfaced values represent significant results.

Abbreviations: EMR, electronic medical records; FFS, fee for service; MO, medical oncologist; O/A, often/always; O/A/S, often/always/sometimes v rarely/never; OR, odds ratio; PCP, primary care physician; PI, Pacific Islander; Ref, reference; R/N, rarely/never; S, sometimes.

*“I order tests or treatments to protect myself against malpractice litigation.” Model also adjusted for United States training.

†“I am uncertain about which physician (oncology specialist or PCP) is providing patients’ general preventive health care.” The model adjusted for no other variables.

‡“I do not have adequate knowledge or training to manage my patients’ problems.” Model also adjusted for continuing medical education training, training at meetings, training with journals, training with colleagues, percent of elderly patients, patients per week, site of practice, No. of physicians in practice, and United States training.

§ORs associated with physician type are interpreted as follows: MOs were more likely than PCPs to report uncertainty regarding who was responsible for providing general preventive health care (O/A: OR, 1.97; 95% CI, 1.13 to 3.43; sometimes: OR, 2.16; 95% CI, 1.60 to 2.93).

¶Odds associated with barriers are interpreted as follows: uncertainty regarding general preventive health care responsibility was more likely to be a concern for physicians in the West (O/A: OR, 2.49; 95% CI, 1.18 to 5.26) and those working in an environment that was in transition to a full EMR (O/A: OR, 2.29; 95% CI, 1.02 to 5.13).

finding was that MOs and PCPs perceived different barriers and concerns as problematic, though the actual number of perceived barriers did not differ between MOs and PCPs (4.9 and 4.7, respectively). MOs were more likely to report concerns about language barriers when communicating with patients, insurance restrictions impeding ordering tests/treatments, patients requesting unnecessary testing, and general preventive-care responsibility. PCPs were more concerned with feeling inadequately trained and ordering extra tests/treatments as malpractice protection. Guidelines regarding cancer survivor follow-up care tend to be more explicit for the initial 5 years after treatment, but less so beyond 5 years.²⁶⁻²⁷ PCPs seem aware that there are additional services they should be providing for cancer survivors but may be unclear what those services should include.

Our findings regarding PCPs feeling inadequately trained in survivorship care and ordering excess tests/treatments suggest the need for improved physician education and training in survivorship care, particularly considering the growing population of long-term cancer survivors. Oncology and primary care professional societies should partner with cancer research organizations to develop improved guidelines and webinars for clinicians that address clinical knowledge gaps identified by provider studies such as SPARCCS and the unmet medical and psychosocial patient needs as reported by cancer survivor surveys.²⁸⁻²⁹ Guidelines should be expanded to include the period beyond 5 years after primary treatment and clearly differentiate among guideline-recommended care, care that may be considered but is not explicitly guideline-recommended, and care that is clearly not indicated.

MOs' concerns regarding requests from patients for unnecessary testing suggest a need for patient education. Patient navigators are trained to address education and two other concerns of MOs: language barriers when communicating with patients and insurance restrictions impeding necessary test/treatment ordering. Navigators can identify translators and link patients with support groups providing both educational and psychological structure. Navigators are also trained to assist patients in finding affordable care, often aided by social workers.³⁰⁻³¹ The new standards for American College of Surgeons Commission on Cancer-accredited hospitals requiring that patient navigation be available either on site or by referral should help reduce oncologists' concerns.³²

In addition, our findings regarding MOs' uncertainty about general preventive care responsibility suggest the need for increased coordination among clinicians in cancer survivorship care delivery. Survivorship care can be difficult to navigate. A team effort is needed to facilitate the patient-to-survivor transition.¹¹ Improved care planning is needed beyond 5 years after primary treatment, despite the lack of survivorship care standards. For patients transitioning back to PCPs for continued care, TS and SCP are promising tools for improving continuity and coordination of care and for improving survivors' knowledge of optimal tests.³³ Increased coordination among clinicians may also improve PCPs' confidence in their ability to manage patient problems. We found that PCPs who more frequently reported

receiving a TS or SCP from the patient's oncology specialist were less likely to indicate having inadequate knowledge or training to manage patient problems (TS: often/always, 42.6%; sometimes, 41.9%; *v* rarely/never, 57.3%; SCP: often/always, 37.6%; sometimes, 44.5%; *v* rarely/never, 51.3%).

Potential study limitations include the focus on breast and colon cancer survivorship care barriers. Though the barriers included were fairly generic, it is possible that barriers encountered in providing follow-up care for children who are cancer survivors, for example, may differ from the barriers reported in this article. Similarly, as our analysis was comparative in nature, some barriers perceived solely by PCPs or solely by medical oncologists may have been overlooked in survey design. In addition, the self-reported nature of the data is a potential limitation. Over- or under-reporting is possible because of social desirability bias. For example, the number of physicians who reported ordering extra tests/treatments as malpractice protection may be an undercount of the actual number of respondents ordering more tests/treatments than necessary.

The importance of long-term follow-up care for cancer survivors should not be underestimated. Years ago, post-treatment survival for cancer patients was relatively short and surveillance was focused primarily on detecting recurrences and new primary cancers. With advances in diagnosis and treatment, patients are living longer and concerns about late effects of cancer and its treatment have come to the forefront, as have heightened concerns regarding psychosocial issues. The current study is important in highlighting potential challenges in transitioning survivors' care from MOs to PCPs and is unique in identifying MO- and PCP-specific concerns. High priority should be given to developing more efficient methods of communication among providers and between providers and patients,¹¹ designing new models of survivorship care such as oncology medical homes,³⁴⁻³⁵ and establishing educational programs tailored to the specific concerns of PCPs regarding appropriate surveillance testing and late- and long-term effects of cancer and its treatment. Nationally representative physician surveys, such as SPARCCS, have been and will continue to remain crucial for systematic evaluation of the impact of such changes on cancer survivorship care.

AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

The author(s) indicated no potential conflicts of interest.

AUTHOR CONTRIBUTIONS

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