Enrollment of Patients With Lung and Colorectal Cancers Onto Clinical Trials

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Abstract

Purpose: Only 2% to 5% of adult patients with cancer enroll onto clinical trials. We assessed simultaneously characteristics of patients and their physicians that may be independently associated with participation.

Methods: CanCORS, a National Cancer Institute (NCI)–funded population-based observational cohort study of newly diagnosed patients with lung and colorectal cancers, sampled patients across five geographic areas, five health care delivery systems, and 15 Veterans Administration hospitals. We linked patient survey and medical record data with physician survey data to examine correlates of trial enrollment.

Results: Among 9,901 patients, 5.3% enrolled onto trials. Of the 9,901 patients, we linked 6,506 patients to one medical oncologist, surgeon, or radiation oncologist (physicians, N = 1,325) who responded to the physician survey and was consid-

ered their primary cancer clinician decision maker. Patient age, race, disease stage, geographic region, and health insurance were independently associated with trial enrollment. Physician factors independently associated with patient trial enrollment were being a medical oncologist, practicing at an NCI-designated cancer center, taking the lead in discussing trials with patients, and receiving increased income from trial enrollment. After simultaneously adjusting for patient and physician characteristics, only being a physician practicing at an NCI-designated cancer center (odds ratio [OR], 1.65; 95% CI, 1.19 to 2.27) and patient female sex (OR, 1.36; 95% CI, 1.10 to 1.68), age > 70 versus < 50 years (OR, 0.28; 95% CI, 0.16 to 0.48), and advanced disease (OR, 1.85; 95% CI, 1.45 to 2.37) remained independently associated with trial enrollment.

Conclusion: Both practice environment and patient clinical and demographic characteristics are associated with cancer clinical trial enrollment; simultaneous intervention may be required when trying to increase enrollment rates.

Introduction

Clinical trials, both federally and industry sponsored, have allowed remarkable progress in the treatment of some cancers. However, a long-standing consensus exists that the enrollment of adult patients with cancer onto clinical trials is low. Enrollment fractions, defined as the number of enrollees divided by the population-based estimated cancers diagnosed, in therapeutic nonsurgical National Cancer Institute (NCI) Clinical Trial Cooperative Group studies are below 2%¹ and are even lower, less than 1%, for surgical trials.² When trial eligibility is taken into account, the rates rise but still may be as low as 10%.³

A recent report by the Institute of Medicine recommended that participation of both patients and physicians in cancer clinical trials be expanded.⁴ This report generated extensive media coverage,⁵ leading to Congressional attention⁶ and a consensus that our system for cancer clinical trials is in crisis.⁷

Extensive scientific literature has reported on patient and provider characteristics associated with participation in cancer

clinical trials.⁸ Most studies, however, have focused on either patient or provider factors and cannot provide insight into the relative importance of each or their interaction.

To understand how patient and provider characteristics prompt clinical trial participation, we analyzed data collected in the NCI-funded CanCORS (Cancer Care Outcomes Research and Surveillance Consortium), population- and health system–based prospective cohort study of 10,000 patients newly diagnosed with lung or colorectal cancer. We linked survey and medical record data for these patients with survey data from more than 4,000 of their physicians. Our objective was to estimate the prevalence of trial enrollment and determine the independent associations between patient or provider characteristics and enrollment.

Methods

CanCORS was designed to provide understanding of treatment choices and outcomes among newly diagnosed patients with lung and colorectal cancers across five geographic areas, five health care systems, and 15 Veterans Administration (VA) hos-

pitals. Enrollment of patients onto the study occurred between September 2003 and March 2006. The study population has been described previously.⁹ Eligible patients were at least 21 years of age and had been diagnosed within 3 months before study entry with non-small-cell or small-cell lung cancer or adenocarcinoma of the colon or rectum. Patients or their surrogates were surveyed approximately 4 and 14 months after diagnosis; their medical records were abstracted through 14 months after diagnosis. Physicians providing cancer care to study participants were also surveyed. The survey instruments can be accessed online.¹⁰

The analytic cohort for this report included CanCORS patients who completed a baseline or follow-up survey or consented to medical record review. Of the 10,404 CanCORS patients, 9,901 met at least one of these criteria. Patients were considered to have enrolled onto a clinical trial if they responded yes to the question “Did you participate in a clinical trial or a research study for your cancer?” on the baseline or follow-up survey, or if their medical records reflected such enrollment. For the 528 patients identified as clinical trial participants, the sources of information on trial enrollment were medical record and patient survey for 427 patients (81%), medical record alone for 12 patients (2%), and patient survey alone for 89 patients (17%).

Of the 6,871 physicians with verified addresses who were contacted, 4,188 (61%) responded to a survey. Separate versions of the survey were administered to surgeons, medical oncologists, radiation oncologists, and noncancer specialists identified by CanCORS patients as playing a key role in their care. In this article, we use the term specialist physician to describe a physician who might directly refer a patient to a cancer clinical trial, namely a surgeon, medical oncologist, or radiation oncologist. All survey versions included two questions related to clinical trials. The first question asked physicians to categorize their role in discussing clinical trials with patients, and the second asked if their income was likely to increase, decrease, or not change as a result of enrolling patients. Physician demographic characteristics and medical practice environments were also captured. Questionnaires sent to specialty physicians queried them about the number of patients they had referred to or enrolled onto any cancer clinical trial in the past 12 months and whether they practiced at an NCI-designated cancer center or a clinical community oncology program (CCOP). Of the 4,188 physicians who responded to the physician questionnaires, 1,730 (41%) were specialty physicians: 904 surgeons, 556 medical oncologists, and 270 radiation oncologists.

For each patient, we identified all specialty physicians who treated the patient, using information from the patient survey and medical record. We linked each patient to a single specialty physician who had participated in the provider survey. For patients who reported treatment with multiple specialty physicians who had completed the provider survey, prioritization was by specialty: one, medical oncologist; two, radiation oncologist; and three, surgeon. This order of prioritization was based on the level of involvement in discussing clinical trials with patients as

reported by the specialists. Among medical oncologists, 79% reported discussing trials with patients with little input from other clinicians, 68% of radiation oncologists reported discussing clinical trials with patients jointly with another clinician, and 55% of surgeons reported referring patients to another clinician to talk about clinical trials.

In this manner, 6,506 patients were linked to a specialty physician, and there were 1,325 unique specialty physicians linked to these patients, with many physicians linked to more than one patient. Of these physicians, 37% were medical oncologists, 11% were radiation oncologists, and 52% were surgeons. An enrollment rate, defined as the proportion of the patients linked to that provider who enrolled onto a clinical trial, was calculated for each specialist.

With regard to statistical analysis, Fisher's exact and χ^2 tests were used to determine patient characteristics associated with clinical trial enrollment. Patient characteristics that were statistically significant at the .05 level were included in a multivariable logistic regression model to determine the independent association of each factor with clinical trial enrollment. Odds ratios were estimated using Wald's CIs. General estimating equations using a binomial distribution were used to evaluate whether patient and physician factors were associated with patient enrollment onto a clinical trial, accounting for multiple patients per physician by treating each physician as a cluster. Because medical oncologists were the most common physician decision makers, we repeated the main analyses restricting the physician sample to medical oncologists to understand if our results were robust when restricted to the most common decision-making process.

Results

Characteristics of all patients in this analysis and of patients linked to a provider are listed in Table 1. Almost 59% of patients were men, reflecting the participation of the VA as a CanCORS site. Less than 10% of patients were younger than 50 years of age, and minorities represented one third of the study population. More than half of the patients had stage III or IV disease, half were from the West Coast, and approximately one third from the South. VA patients and those in the managed-care group comprised 14% and 10% of the study population, respectively. Most patients had private insurance (42%) or were covered by Medicare (37%).

Overall, 5.3% of patients were enrolled onto clinical trials. Among patients linked to cancer specialists, 6.3% were enrolled onto clinical trials. Clinical trial participation declined with patient age from 11% among those age ≤ 50 years to 1% among those age ≥ 80 years (Table 1). Minority patients were approximately 25% less likely to enroll onto trials than their counterparts. Enrollment was twice as high for patients with stages III to IV disease, 20% higher for patients with lung cancer, 25% higher for patients in the Midwest and South when compared with the Northeast and 50% higher when compared with the West, and 30% higher for patients with VA/military insurance compared with Medicare and Medicaid.

Table 1. Patient Self-Reported Characteristics and Cancer Clinical Trial Enrollment Rates, Overall and for Those Linked to Specialty Physician Responding to Provider Survey: CanCORS Study

Characteristic	All Patients (N = 9,901)				Linked Patients (n = 6,506)			
	No.	%	Trial Enrollment (n = 528; %)	P	No.	%	Trial Enrollment (n = 408; %)	P
Sex				.041				.002
Male	5,804	59	5.7		3,755	58	7.1	
Female	4,097	41	4.8		2,751	42	5.2	
Age category, years				< .001				< .001
21-49	808	8	10.8		580	9	12.2	
50-59	1,900	19	7.2		1,317	20	7.9	
60-69	2,654	27	6.0		1,828	28	6.8	
70-79	2,955	29	4.2		1,855	29	4.9	
≥ 80	1,582	16	1.4		924	3	2.0	
Race/ethnicity				.016				.141
White	6,733	68	5.8		4,566	70	6.6	
Black	1,738	14	4.3		790	12	6.1	
Other	1,430	17	4.4		1,150	18	5.0	
Married				.001				.271
Yes	5,354	54	6.0		3,721	57	6.6	
No	4,547	46	4.6		2,785	43	5.9	
Stage of disease				< .001				< .001
III to IV	5,555	56	6.9		3,704	57	8.0	
Other	4,346	44	3.5		2,802	43	4.0	
Cancer type				.025				.008
Lung	5,244	53	5.8		3,317	57	7.1	
Colorectal	4,657	47	4.8		3,189	49	5.5	
Region of country				< .001				< .001
Northeast	77	1	5.2		40	1	7.5	
Midwest	1,417	14	6.7		755	12	8.0	
South	3,538	36	6.3		2,273	35	7.8	
West	4,869	49	4.2		3,438	53	4.9	
VA patient				.012				.002
Yes	1,404	14	6.8		787	12	8.8	
No	8,497	86	5.1		5,719	88	5.9	
Kaiser patient				.291				.175
Yes	963	10	4.6		660	10	5.0	
No	8,938	90	5.4		5,719	90	6.4	
Health insurance				< .001				< .001
Private	4,159	42	6.5		2,947	45	7.0	
Medicare	3,658	37	4.4		2,378	37	5.3	
Medicaid	296	3	5.4		183	3	7.7	
VA/other military	584	6	6.9		330	5	9.1	
No insurance	194	2	6.7		105	2	11.4	
Other/unknown	1,010	10	2.9		563	9	3.7	

Abbreviations: CanCORS, Cancer Care Outcomes Research and Surveillance Consortium; VA, Veterans Administration.

In the multivariable model that adjusted only for patient factors (Table 2), the odds of clinical trial enrollment were higher for patients age < 50 years compared with those age ≥ 50 years, higher in white patients compared with black patients, higher for patients with stages III to IV disease compared with less-advanced cancers, higher for patients living in the

South and Midwest compared with patients in the Northeast, and higher for patients with private health insurance compared with VA/military insurance.

Of the linked specialty physicians in this analysis, 83% were men, and 47% were age < 50 years (Table 3). Most physicians were white (72%). More than half were surgeons. Approxi-

Table 2. Adjusted ORs for CanCORS Patient Enrollment Onto Clinical Trials*

Variable	OR	95% CI
Sex		
Male	Reference	
Female	0.91	0.74 to 1.11
Age category, years		
21-49	Reference	
50-59	0.58	0.43 to 0.77
60-69	0.47	0.35 to 0.63
70-79	0.33	0.24 to 0.46
≥ 80	0.12	0.07 to 0.19
Race/ethnicity		
White	Reference	
Black	0.63	0.47 to 0.84
Other	0.80	0.61 to 1.06
Married		
Yes	1.13	0.93 to 1.36
No	Reference	
Stage of disease		
III to IV	1.89	1.55 to 2.30
Other	Reference	
Cancer type		
Lung	Reference	
Colorectal	0.85	0.69 to 1.04
Region of country		
Northeast	1.00	0.36 to 2.81
Midwest	1.46	1.11 to 1.93
South	1.57	1.22 to 2.01
West	Reference	
VA patient		
Yes	1.19	0.85 to 1.68
No	Reference	
Health insurance		
Private	Reference	
Medicare	0.83	0.64 to 1.06
Medicaid	0.70	0.41 to 1.20
VA/other military	0.63	0.40 to 0.97
No insurance	0.75	0.42 to 1.35
Other/unknown	0.44	0.29 to 0.65

Abbreviations: CanCORS, Cancer Care Outcomes Research and Surveillance Consortium; OR, odds ratio; VA, Veterans Administration.

* From multivariable logistic regression model using all variables in table as covariates.

mately one quarter practiced at an NCI-designated cancer center, and one third practiced at a CCOP. Approximately 6% reported that they expected income increases with patient enrollment onto trials.

Table 3 also lists the clinical trial enrollment rates among patients linked to a specialty physician by physician characteristics. Patients were more likely to be enrolled onto trials if their physician was a medical oncologist, practiced at an NCI-designated cancer center, discussed clinical trials with little input

from other clinicians, and/or experienced an income increase with enrollment.

Appendix Table A1 (online only) lists odds ratios for patient factors that were associated with clinical trial enrollment after also adjusting for physician characteristics. Patient factors associated with clinical trial enrollment were female sex, age < 50 years, advanced disease (stages III to IV), and living in the South. Black race and having private or military health insurance were no longer associated with trial enrollment after accounting for physician characteristics.

After adjusting for patient characteristics associated with trial enrollment, the only statistically significant physician factor related to clinical trial enrollment was practicing at an NCI-designated cancer center (Appendix Table A1, online only). Physician specialty (medical oncologist), taking a lead role in discussing clinical trials with patients, and experiencing a financial benefit were not independently associated with enrollment. Results of analyses restricted to medical oncologists and their linked patients were similar to those of the main analyses (data not shown).

Discussion

Our trial enrollment rate of 5.3% is consistent with previous estimates of low enrollment among patients with cancer, although it is almost twice the estimated 3% rate in the Institute of Medicine report⁴ and the 2.5% rate in the NCI Clinical Trial Cooperative Groups.¹¹ Some of the reasons for the higher trial participation rate may be that CanCORS represents a select sample of patients already enrolled onto NCI- and non-NCI-sponsored studies and that some of the information is based on patient self-reporting, which is associated with overestimation. Most previous estimates of enrollment onto cancer trials have been based on extrapolations from disparate source population statistics¹ or small trials.³ The CanCORS study is distinctive in presenting a population-based and data-driven estimate of trial enrollment rates for newly diagnosed patients with lung and colorectal cancers.

In analyses that included only patient factors, we found that patients who were younger, white, privately insured, from the South and Midwest, and with advanced disease were more likely to participate in trials. However, when we adjusted for physician factors, sex became a significant predictor, with higher odds of enrollment for women, whereas race and region were no longer predictive.

Bivariable analyses considering only physician factors found that medical oncologists, physicians practicing in NCI-designated cancer centers, those who reported discussing clinical trials with little input from other clinicians, and those who reported that their income was likely to increase if they enrolled more patients had statistically significantly higher enrollment rates. However, after multivariable adjustment evaluating the independence of these associations and accounting for patient characteristics and the clustering of patients within physicians, the only independently significant physician characteristic associated with trial enrollment was practicing at an NCI-designated cancer center. The lack of independent effect of some

Table 3. Clinical Trial Enrollment Rate of CanCORS Patients by Physician Characteristics*

Physician Characteristic	Specialty Physicians		Patients		Enrollment Rate (%)	P
	No.	%	No.	%		
Sex†						.109
Male	1,086	83	5,218	82	6.1	
Female	210	17	1,153	18	7.4	
Age category, years†						.590
< 50	603	47	2,837	45	6.6	
50-59	450	35	2,522	40	6.2	
60-69	209	16	850	13	5.5	
≥ 70	26	2	123	2	9.0	
Race/ethnicity†						.089
White	916	72	4,470	71	6.1	
Black	37	3	151	2	5.3	
Asian	248	19	1,249	20	6.1	
Hispanic	50	4	288	5	10.1	
Other	22	2	114	2	7.9	
Specialty						< .001
Surgery	688	52	2,221	34	4.4	
Medical oncology	489	37	3,863	60	7.6	
Radiation oncology	148	11	422	6	4.3	
Practices at NCI-designated cancer center						< .001
Yes	309	23	1,320	20	8.8	
No	1,016	77	5,186	80	5.6	
Practices at CCOP						.094
Yes	435	33	2,411	37	6.9	
No	890	67	4,095	63	5.9	
Discusses clinical trials without input from another clinician						< .001
Yes	442	33	3,465	53	7.8	
No	883	67	3,041	47	4.5	
Experiences income increase with clinical trial enrollment						.029
Yes	78	6	470	7	8.7	
No	1,247	94	6,036	93	6.1	

Abbreviations: CanCORS, Cancer Care Outcomes Research and Surveillance Consortium; CCOP, clinical community oncology program; NCI, National Cancer Institute.

* Each CanCORS patient (n = 6,506) is linked to one specialty physician (n = 1,325).

† Demographic characteristics (sex, age, and race/ethnicity) were missing for some physician surveys.

physician factors may be related to their correlation with patient characteristics. Patients with advanced disease were more likely to be linked to a medical oncologist (69%) than a surgeon (23%). In contrast, those with less-advanced disease were equally likely to be linked to a medical oncologist (46%) or a surgeon (49%). Of note, the decrease in statistical power as the number of variables in a multivariable model increases should be considered when interpreting these models.

Patient sex, age, and stage of disease have previously been reported as factors associated with clinical trial enrollment,¹⁻³ as have minority race and low socioeconomic status.^{1,2,11-14} In our study, black patients were more likely to be seen by a provider at an NCI-designated cancer center (26%) than white patients (20%), which may be related to the inconsistency of our findings regarding the association between race and trial enrollment. Providers practicing in an academic medical center have

been reported to be more likely to offer trial participation.^{15,16} In a previous report on CanCORS providers by Klabunde et al,¹⁷ medical specialty, academic affiliation, monthly patient load, and practicing at an NCI-designated cancer center or CCOP were associated with clinical trial participation. That report was based on the provider survey, which asked physicians about their patient population overall, not just those enrolled onto CanCORS.¹⁷ Our study confirms the association between practicing in an NCI-designated cancer center and clinical trial enrollment of CanCORS patients. Physicians at NCI-designated cancer centers would be expected to have more clinical trials available to offer. These cancer centers often have access to NCI Cooperative Group trials, phase I and II studies of novel agents, and studies requiring facilities and equipment not available in the community. NCI-designated cancer centers are required to have an infrastructure for supporting clinical trials,

leading to high recruitment and retention rates and enrollment of a population with characteristics similar to those of the community served.

Unlike Klabunde et al,¹⁷ we did not find an association between physician medical specialty and enrollment. This may result from the fact that we controlled for stage of disease, which was correlated with the medical specialty of the linked physician. Patients with advanced (stages III to IV) cancer were more likely to be linked with a medical oncologist (69%) than those with earlier-stage disease (48%). Once stage of disease was included in the multivariable model, medical specialty did not offer an independent association with trial enrollment.

Patient enrollment in a clinical trial requires a gateway offer to participate, most frequently coming from a physician.^{17,18} Nationally, attempts to influence provider behavior through financial incentives are under scrutiny.¹⁹⁻²² The independent effect of financial compensation was not demonstrated in this study. However, the proportion of physicians with such expectations was low, and the statistical power to observe such an association may have been limited. Specific information regarding which clinical trials, patient populations, or sponsors would lead to enhanced compensation was not captured in the provider survey. For example, an industry-sponsored trial at an NCI-designated cancer center does not provide a direct financial benefit to the investigator, although it provides indirect benefits, because clinical investigators are evaluated by their ability to execute trials successfully. Such indirect financial incentives were not captured in the survey, which was designed to report direct financial benefits. Furthermore, it is possible that CanCORS participants may not have been eligible for trials that would have led to a financial benefit for the provider. Providers may also be selective about which patients are offered a clinical trial based on their perception of a patient's likelihood of adhering to the protocol.²³

There are several limitations to this study. First, the response rate to the physician survey was 61%, which although high compared with many provider surveys, leaves open the possibility that responding physicians may not be representative of all CanCORS providers when it comes to trial involvement. Although a single physician was linked to each patient, a physician could be linked to multiple patients, giving greater weight to that physician's responses in the evaluation of physician factors. Second, patients could identify up to five physicians who played key roles in their care, but only one physician per patient was selected for the linkage. It is possible that the composition of the team of providers has an influence on whether a patient is referred to or enrolls onto a clinical trial. It is also possible that a physician other than the one selected for the linkage may have been instrumental in talking to the patient about clinical trials or facilitating the enrollment. Third, we have no information on what clinical trials, if any, were available for each patient at his or her clinical center. A major reason that cancer patients do not enroll onto clinical trials is that a protocol is not available for their diagnosis and stage of disease.³ Among those for whom a clinical trial is available, however, only 20% are offered the opportunity to enroll, and most accept the offer.²⁴ Finally, we

used a composite measure of clinical trial participation based on patient survey responses and medical record review. There was imperfect agreement between these sources when both were available, and we did not have an independent data source to assess the sensitivity and specificity of our enrollment measure.

The study has major strengths. Most importantly, our large study population was population and health system based, including a heterogeneous patient population receiving care in diverse settings and regions. In addition, we had access to both patient self-reported data and medical records and were able to link these data with information reported by physicians.

In conclusion, although our data do not provide enough insight into the actual mechanisms of clinical trial enrollment to recommend interventions most likely to work, they do give strong signals on where to look. The findings regarding patient age and disease stage most likely reflect the eligibility criteria of open trials; however, the findings regarding sex and provider practice site are provocative. It is necessary to explore further the reasons for enrollment by sex to determine what factors could be leveraged to increase interest in trial participation among men. Similarly, it is necessary to evaluate the culture as well as the infrastructure at NCI-designated cancer centers versus non-NCI cancer centers to identify potentially mutable factors that could be targeted in non-NCI cancer center settings. NCI-designated cancer centers have a well-developed infrastructure for navigating the protocol through the regulatory processes and for protocol implementation, and they may be more likely to offer novel investigational therapies. Enhancing both availability of protocols, novel agents, and clinical trial infrastructure outside of these environments would facilitate enrollment of patients in facilities outside of these centers. Providers in NCI-designated cancer centers are expected to enroll patients onto clinical trials, and there may be nonfinancial incentives for these activities, as we have noted. In contrast, for most physicians involved in clinical care, enrolling patients onto clinical trials requires substantial additional work and support to accomplish. A recent study showed that approximately 4,000 personnel hours were required to enroll 20 patients onto a clinical trial.²⁵ Although most of the personnel time is provided by a nurse and data manager, a practice must participate in a critical mass of trials to generate sufficient financial support for the requisite personnel. With increasing pressure to generate clinical revenue by maximizing patient load, incentives, financial or otherwise, are needed to assist non-NCI cancer center providers to participate in clinical trials.

Nationwide, a sizable proportion of cancer clinical trials close because of inadequate accrual, yielding no scientific results after substantial investment.^{4,26,27} Even trials accruing a sufficient number of patients may have limited generalizability because of the selection bias inherent in low enrollment. It is critical that effective strategies for patient recruitment to trials be implemented to expedite the availability of treatments that would reduce morbidity and mortality. With this study, CanCORS contributes to the progress in cancer trials enrollment by providing population-based data for a baseline for trial enroll-

ment rates, as well as a new look at the physician and patient characteristics that may influence enrollment. The study also indicates a strong need for additional research to recommend interventions that can enhance recruitment of patients to trials at non-NCI cancer centers.

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Appendix

Table A1. Adjusted ORs for Clinical Trial Enrollment: CanCORS Study*

Factor	Multivariable GEE Model		
	OR	95% CI	P
Patients			
Sex (female v male)	1.36	1.10 to 1.68	.004
Age, years			
50-59 v < 50	0.82	0.60 to 1.11	NS
60-69 v < 50	0.64	0.46 to 0.88	.006
≥ 70 v < 50	0.28	0.16 to 0.48	< .001
Race			
Black v white	1.11	0.72 to 1.71	NS
Other v white	1.45	1.02 to 2.07	.041
Region			
Northeast v West	1.21	0.78 to 1.87	NS
Midwest v West	1.24	0.42 to 3.68	NS
South v West	1.55	1.10 to 2.18	.012
Marital status (married v not married)	0.95	0.77 to 1.17	NS
Stage (III to IV v other)	1.85	1.45 to 2.37	< .001
Cancer type (CRC v lung)	1.31	1.00 to 1.72	.048
VA patient (yes v no)	1.19	0.72 to 1.95	NS
Health insurance			
Medicare v private	0.95	0.59 to 1.53	NS
Other v private	0.96	0.61 to 1.52	NS
Physicians			
Specialty			
Surgeon v medical oncologist	0.70	0.42 to 1.20	NS
Radiation oncologist v medical oncologist	1.18	0.78 to 1.77	NS
Discusses clinical trials by himself/herself	1.31	0.89 to 1.91	NS
Expects income increase	1.23	0.73 to 2.07	NS
Practices at NCI cancer center	1.65	1.19 to 2.27	.002

Abbreviations: CanCORS, Cancer Care Outcomes Research and Surveillance Consortium; CRC, colorectal cancer; GEE, general estimating equation; NCI, National Cancer Institute; NS, not significant; OR, odds ratio; VA, Veterans Administration.

* From multivariable GEE model to evaluate independent associations of characteristics patients and their physicians and accounting for clustering of patients within physicians.