

General Internists' Preferences and Knowledge About the Care of Adult Survivors of Childhood Cancer

A Cross-sectional Survey

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Background: Adult childhood cancer survivors (CCSs) are at high risk for illness and premature death. Little is known about the physicians who provide their routine medical care.

Objective: To determine general internists' self-reported attitudes and knowledge about the care of CCSs.

Design: Cross-sectional survey.

Setting: Mailed survey delivered between September 2011 and August 2012.

Participants: Random sample of 2000 U.S. general internists.

Measurements: Care preferences, comfort levels with caring for CCSs (7-point Likert scale: 1 = very uncomfortable, 7 = very comfortable), familiarity with available surveillance guidelines (7-point Likert scale: 1 = very unfamiliar, 7 = very familiar), and concordance with Children's Oncology Group Long-Term Follow-Up Guidelines in response to a clinical vignette.

Results: The response rate was 61.6% (1110 of 1801). More than half the internists (51.1%) reported caring for at least 1 CCS; 72.0% of these internists never received a treatment summary. On

average, internists were "somewhat uncomfortable" caring for survivors of Hodgkin lymphoma, acute lymphoblastic leukemia, and osteosarcoma. Internists reported being "somewhat unfamiliar" with available surveillance guidelines. In response to a clinical vignette about a young adult survivor of Hodgkin lymphoma, 90.6% of respondents did not appropriately recommend yearly breast cancer surveillance, 85.1% did not appropriately recommend cardiac surveillance, and 23.6% did not appropriately recommend yearly thyroid surveillance. Access to surveillance guidelines and treatment summaries were identified as the most useful resources for caring for CCSs.

Limitation: Findings, based on self-report, may not reflect actual clinical practice.

Conclusion: Although most general internists report involvement in the care of CCSs, many seem unfamiliar with available surveillance guidelines and would prefer to follow patients in collaboration with a cancer center.

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More than 350 000 childhood cancer survivors (CCSs) live in the United States, and this population continues to expand (1, 2). In 2002, the Institute of Medicine recognized the substantial health risks facing CCSs, including end-organ dysfunction, second malignant neoplasms, and cognitive impairment (3–9). The Institute of Medicine recommended lifelong, risk-based health care to mitigate these late effects. Such care includes a systematic plan for periodic surveillance and prevention that is adapted to the specific risks from the individual patient's previous cancer, therapy, genetic predisposition, health behaviors, and comorbid conditions (3, 10). In response, various international groups created and disseminated guidelines for the risk-based care of CCSs (11–15). In 2003, the North American Children's Oncology Group (COG) published the Long-Term Follow-Up (LTFU) Guidelines for Survivors of Childhood, Adolescent, and Young Adult Cancer, which provide surveillance guidelines based on survivors' exposure to cancer therapies (11, 15). Yet, more than a decade after the Institute of Medicine report, most CCSs are not engaged in appropriate risk-based health care (16–20).

Several factors contribute to this lack of engagement. Survivors treated at a young age often have limited knowledge of the therapies they had and their consequences (21).

Many adult CCSs have difficulty obtaining adequate health insurance (21–26). Finally, transitions from pediatric to adult-care providers and from tertiary care cancer centers to community clinicians contribute to suboptimal care (27, 28). Previous studies of pediatric oncologists suggest that insufficient understanding of late effects and publicly available surveillance guidelines contribute to ineffectual transitions (23, 29–31). More than 80% of adult CCSs receive health care from a primary care physician (PCP) in their community, yet our understanding of the care delivered by PCPs to this growing and clinically challenging population is limited (16). As more than half of the adult-focused PCPs in the United States are general internists (32), we conducted a nationally representative survey of practicing general internists to assess their attitudes and knowledge about the care of CCSs.

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Context

Most adult childhood cancer survivors (CCSs) receive health care from primary care physicians.

Contribution

This survey of general internists found that about half provided care for adult CCSs but most had never received a treatment summary from a referring cancer center. Internists were "somewhat uncomfortable" caring for survivors of Hodgkin lymphoma, acute lymphoblastic leukemia, and osteosarcoma. In a vignette case, most general internists did not recommend appropriate surveillance for a Hodgkin lymphoma survivor.

Implication

Although general internists see adult CCSs, many are unfamiliar with recommended surveillance practices and lack coordinated communication processes with oncologists and cancer centers.

—The Editors

METHODS**Study Population**

Using methods from previous studies (33, 34), we selected a national probability sample of practicing physicians who listed general internal medicine as their primary specialty from the American Medical Association Physician Masterfile, a database intended to include all physicians in the United States. We selected 2000 physicians from approximately 148 000, giving a sampling percentage of 1.35% (or 1 physician sampled of every 74 physicians in the population). We obtained approval from the University of Chicago's institutional review board before study initiation.

Survey Mailings

Surveys were mailed to physicians between September 2011 and August 2012, with a prenotification letter and postcard reminder. Up to 4 mailings were sent to increase response rates. A \$10 incentive was included in the first mailing. The third mailing included a \$5 incentive, and the fourth and final mailing included \$20 on receipt of a completed survey. During the fourth mailing, physicians were called if a phone number was available. We used the Google search engine (Google, Mountainview, California) to identify discrepant addresses from data provided by the American Medical Association Physician Masterfile for nonrespondents. If an alternate address was identified, subsequent mailings were sent to the new address. Internists were excluded from the analytic sample if surveys were returned 2 or more times with incorrect addresses or if participants were identified as deceased, retired, or no longer practicing internal medicine.

Survey Instrument

The survey was derived from previous surveys about physician attitudes and knowledge about cancer care (29,

35, 36). A CCS was defined as a patient diagnosed with cancer at or before age 21 years, at least 5 years from cancer therapy completion, and who was cancer free. This definition was chosen to capture physician experiences with patients who had survived the period in which relapse is the predominant health threat and is consistent with terminology used by several groups that research the long-term effects of pediatric cancer (for example, the North American Childhood Cancer Survivor Study and the British Childhood Cancer Survivor Study) (8, 37).

The 18-item survey assessed respondents' demographics, medical education, and practice structure. We asked internists about the number of CCSs they had cared for in the past 5 years and how frequently they had received a cancer treatment summary (documenting the survivor's diagnosis, cancer therapy, and follow-up plan) from a referring cancer center. We assessed comfort level with caring for survivors of acute lymphoblastic leukemia, Hodgkin lymphoma, and osteosarcoma with a 7-point Likert scale, with scores ranging from 1 (very uncomfortable) to 7 (very comfortable). A similar Likert scale assessed familiarity with the available monitoring guidelines for childhood, adolescent, and young adult cancer survivors (scores ranging from 1 [very unfamiliar] to 7 [very familiar]). We asked internists whether they prefer to care for survivors independently, in consultation with a cancer center-based physician or LTFU clinic, or by referral to a cancer center-based physician or another PCP. The survey included a hypothetical vignette describing a 29-year-old female survivor of Hodgkin lymphoma whose therapy included mantle radiation and anthracycline chemotherapy (cumulative dose, 150 mg/m²) at age 16 years. Using a set of preselected responses, we asked internists about their approach to breast cancer and cardiac and thyroid surveillance for this patient. We compared responses with the COG LTFU guidelines (15). Finally, we asked internists to rate the usefulness of 11 tools that might assist them in independently caring for such a survivor using a scale ranging from 1 (not at all useful) to 4 (very useful).

Statistical Analysis

Descriptive statistics included frequency counts and percentages, means with SDs, and medians with ranges. Chi-square tests or 2-sample *t* tests were conducted for comparisons between groups. We calculated Spearman rank correlation coefficients when determining associations between 2 continuous or ordinal variables. We fit multivariate linear and logistic regression models to examine internists' comfort with caring for CCSs and knowledge of surveillance guidelines, respectively. Covariates, chosen a priori, were sex, years of practice, number of patients seen per week, having seen at least 1 CCS in the past 5 years, and practice environment. Age was highly correlated with years of practice ($r = 0.92$) and was not included in the multivariate models. All analyses were conducted by using

Stata software, version 12 (StataCorp, College Station, Texas).

Role of the Funding Source

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RESULTS

We received 1110 completed questionnaires out of 1801 potential respondents (response rate, 61.6%) (Appendix Figure, available at www.annals.org). Characteristics of the participating internists are detailed in Table 1. We found no statistically significant differences in sex, age, or geographic location of practice between respondents and nonrespondents.

Fifty-one percent of respondents reported having cared for at least 1 adult CCS in the 5 years preceding the survey (Table 1). Among this subset, 72.0% reported “never” having received a treatment summary.

Only 61 internists (5.5%) preferred to care for CCSs independently. Most (84.0%) preferred to work in collaboration with a cancer center–based physician or LTFU clinic, and 10.5% indicated that they would refer CCSs to a cancer center–based physician, LTFU program, or another PCP.

On average, internists reported being “somewhat uncomfortable” caring for CCSs. Only 36.9%, 27.0%, and 25.0% of respondents indicated that they were “somewhat comfortable” or “comfortable” (Likert score ≥ 5) caring for Hodgkin lymphoma, acute lymphoblastic leukemia, and osteosarcoma survivors, respectively. In multivariate analyses, comfort levels were higher among internists with a larger patient volume, those who had seen at least 1 CCS in the preceding 5 years, and men (Appendix Table 1, available at www.annals.org).

General Internists' Familiarity and Knowledge of Published LTFU Guidelines

Internists reported being generally unfamiliar with available surveillance guidelines for CCSs. Only 12.0% stated that they felt at least “somewhat familiar” with available guidelines (Likert score ≥ 5).

Knowledge of available surveillance guidelines for breast cancer and cardiac and thyroid function was assessed by using the clinical vignette (Table 2). Only 9.4% of internists (95% CI, 7.7% to 11.2%) were in concordance with current COG guidelines for breast cancer surveillance in women exposed to chest radiation (recommending annual mammography and breast magnetic resonance imaging) (38). An additional 17.8% (CI, 15.6% to 20.2%) recognized the need for surveillance for early breast cancer with annual mammograms. Only 14.9% (CI, 12.8% to

Table 1. Demographic and Practice Characteristics of Respondents and Nonrespondents

Characteristic	Respondents (n = 1110)*	Nonrespondents (n = 890)*
Age, y		
Median	44	45
Mean (SD)	44 (10)	45 (10)
Range	25–66	26–66
Sex		
Male	666 (60.7)	552 (62.1)
Female	431 (39.3)	337 (37.9)
Years in practice		
Median	10	–
Mean (SD)	11.9 (9.7)	–
Range	0–38	–
Patients seen/wk, n		
Median	70	–
Mean (SD)	69.5 (40.7)	–
Range	0–300	–
Practice environment		
Solo or 2-person	191 (17.9)	–
Group (≥ 3 physicians)	294 (27.6)	–
Multispecialty group practice	176 (16.5)	–
Academic faculty practice	168 (15.8)	–
Other	238 (22.3)	–
Number of CCSs in past 5 y		
None	542 (48.9)	–
1–2	303 (27.4)	–
3–5	173 (15.6)	–
6–9	48 (4.3)	–
10 or more	42 (3.8)	–
Region of practice in the United States		
New England	90 (8.1)	74 (8.3)
Middle Atlantic	200 (18.0)	173 (19.4)
South Atlantic	203 (18.3)	170 (19.1)
East North Central	166 (15.0)	143 (16.1)
East South Central	54 (4.9)	42 (4.7)
West North Central	66 (5.9)	38 (4.3)
West South Central	79 (7.1)	79 (8.9)
Mountain	58 (5.2)	47 (5.3)
Pacific	194 (17.5)	124 (13.9)

CCS = childhood cancer survivor.

* Values are reported as numbers (percentages), unless otherwise indicated. Missing values are excluded from percentage calculations.

17.1%) correctly recommended biennial echocardiographic surveillance for cardiac dysfunction. More than three quarters (76.4% [CI, 73.7% to 78.8%]) of the internists correctly recommended annual surveillance with serum thyroid-stimulating hormone and free thyroxine testing for thyroid dysfunction. Only 5.4% (CI, 4.2% to 6.9%) answered all 3 surveillance questions in concordance with COG guidelines.

Factors independently associated with correctly answering the surveillance questions were assessed (Appendix Table 2, available at www.annals.org). For breast cancer surveillance, we examined whether physicians understood that early surveillance (compared with the general population) is recommended and predictors of recommending

Table 2. Clinical Vignette Questions and Physician Responses

Question and Answer Choices	Responses, n (%)†
Breast cancer surveillance	
In thinking about C.L.'s medical care, how would you approach breast cancer screening?	
I would follow current accepted guidelines for average-risk individuals and ask her to begin yearly mammograms when she turns 50.	220 (20.0)
I would recommend yearly mammograms starting this year.*	196 (17.8)
I would recommend every-other-year mammograms starting this year.	123 (11.2)
I would recommend yearly breast magnetic resonance imaging and mammograms starting this year.*	103 (9.4)
Don't know or unsure	458 (41.6)
Missing	10
Cardiac surveillance	
You see that C.L. had an echocardiogram 5 years after chemotherapy. The echocardiogram was normal. How would you approach cardiac care for this patient?	
I would not proceed with further testing.	567 (51.5)
I would refer her at this time to a cardiologist for evaluation and stress testing.	81 (7.4)
I would recommend every-other-year echocardiogram.*	164 (14.9)
I would recommend yearly echocardiogram.	85 (7.7)
Don't know or unsure	205 (18.6)
Missing	8
Thyroid surveillance	
You review C.L.'s past laboratory results and see that she has undergone yearly thyroid function tests. They have all been normal. What would be your approach to thyroid screening?	
I would repeat thyroid-stimulating hormone and free thyroxine test and plan to check both yearly.*	843 (76.4)
I would check thyroid-stimulating hormone this year and then discontinue if test is normal.	56 (5.1)
I would discontinue thyroid function tests since they have been normal.	70 (6.3)
Don't know or unsure	135 (12.2)
Missing	6

* Correct answers.

† Percentages were not calculated for answers deemed "missing."

annual magnetic resonance imaging and mammography or only annual mammography. In both cases, having seen at least 1 CCS in the preceding 5 years was associated with the internist promoting annual breast cancer surveillance (odds ratio for mammography and breast magnetic resonance imaging, 1.75 [CI, 1.11 to 2.75]; odds ratio for mammography only, 1.33 [CI, 1.00 to 1.78]).

Usefulness of Various Resources for Facilitating Care of CCSs

Internists identified access to LTFU guidelines (mean utility rating, 3.8 [85.5% with a "very useful" rating of 4]) and patient-specific standardized letters from specialists with follow-up recommendations for the PCP sent directly to the physician (mean utility rating, 3.7 [79.9% with rat-

ing of 4]) as the most useful tools for caring for adult CCSs (Table 3).

DISCUSSION

Longitudinal cohort studies of CCSs have shown that chemotherapy and radiation exposure portends significant risk for second malignant neoplasms and damage to vital organs, often resulting in debilitating chronic illness and premature death (4, 7, 8, 39–41). In fact, 70% of adult CCSs report a chronic health condition, with survivors having an almost 6-fold higher risk for a severe or life-threatening health problem compared with their siblings (4, 42). Of note, most CCSs are not followed at a cancer center and their PCP may not be aware of their health risks or surveillance recommendations (16–19). Our survey of a representative sample of general internists provides reasons for concern about the survivorship care received by these patients and highlights the need for health policy measures and research aimed at transitions of care from the cancer treatment team to PCPs.

To our knowledge, this is the first large study that assesses general internists' experiences, attitudes, and knowledge of risk-based health care of CCSs, including surveillance for late effects and second malignant neoplasms. Although studies have examined the attitudes of PCPs about survivors of adult cancer (for example, breast and colorectal cancer), these have focused on monitoring for recurrence of the primary disease in early years after treatment and not on late effects in long-term survivors (43, 44). Our survey had several notable findings. First, internists expressed that although they are generally uncomfortable with caring for this population, most (89.5%) are willing to care for survivors and slightly more than half already do. Yet, there is a critical gap in internists' self-reported familiarity and knowledge of available LTFU guidelines. This would be expected to affect survivors' receipt of appropriate health care among at-risk survivors followed in the community versus a cancer center, consistent with previous research showing inferior adherence to recommended echocardiography (22.3% vs. 53.2%) and mammography (34.6% vs. 62.4%) (16). Most respondents reported being unfamiliar with available guidelines, and only 5.4% were in full concordance with COG surveillance guidelines. Despite differences in training, these data are consistent with our previous finding that 2% of U.S. and Canadian family physicians and only 33% of pediatric oncologists correctly identified all 3 surveillance recommendations (29, 45). Further, in a survey study of U.S. physicians about the care of breast and colorectal cancer survivors, only 40% of PCPs reported being confident in their knowledge of the correct follow-up tests for these patients (44). Only 9.4% of internists in our survey appropriately recommended yearly breast cancer surveillance with magnetic resonance imaging and mammography as recommended by the COG and the American Cancer So-

ciety (15, 38, 46). Given the high risk among women exposed to chest radiation for a childhood cancer (12% to 20% will develop breast cancer by age 45 years), it is imperative that these women be screened (38). In a 2009 report examining the breast cancer surveillance practices of 551 women exposed to chest radiation for childhood cancer, only 36.5% had a mammogram in the preceding 2 years (19). Physician recommendation was the strongest predictor of mammography adherence, highlighting that surveillance practices are dependent on physician awareness and endorsement of the surveillance guidelines.

Internists reported that the most important tools needed to care for CCSs were access to surveillance guidelines and a summary of survivors' cancer treatment. However, only 28.0% of those who reported having seen a CCS had received such a treatment summary. This finding is consistent with data showing that fewer than 20% of adult CCSs report having received risk-based, survivor-focused care and only 15% report having received a treatment summary (16, 17). Because internists report relative discomfort with caring for this population, a summary of survivors' past disease, treatment, and complications is critical. In fact, the Institute of Medicine's aptly named 2006 report, "From Cancer Patient to Cancer Survivor: Lost in Transition," delineated the risk-based LTFU care required for all cancer survivors (10). The cornerstone of these recommendations is the survivorship care plan (SCP), which provides survivors and PCPs with a road map for posttreatment care created by their oncology treatment team. The key elements of the SCP include a cancer treatment summary, information on potential late effects, guidelines for surveillance, and contact information for the treating cancer center (10, 47). Research has shown that having an SCP increases the likelihood that a survivor will obtain appropriate risk-based surveillance and does not increase cancer worry (47, 48). In 1 study, high-risk Hodgkin lymphoma survivors were provided with an SCP, and among those who previously did not adhere to recommended surveillance, 41% reported having mammography, and 20% reported having echocardiography in the subsequent 6 months (49). The American Society of Clinical Oncology has identified SCPs as essential quality indicators of survivorship care, and the Commission on Cancer has mandated that all cancer survivors have an SCP by 2015 (10, 50, 51). Our study findings indicate that most internists following CCSs do not receive these plans. Thus, this identified clinical standard is clearly not being met.

Several limitations should be considered when interpreting our findings. First, because the findings are based on general internists' self-report, they may not necessarily reflect what occurs in actual clinical practice. Moreover, our study population does not represent the experiences of other PCPs who care for this population, including family physicians, pediatricians, and obstetrician-gynecologists who provide primary care to many women during their childbearing years. However, we have recently published

Table 3. Perceived Usefulness of Various Methods for Assisting General Internists' Ability to Care for CCSs Independently

Type	Mean Utility Rating/Percentage With Rating of 4*
Access to long-term follow-up guidelines for CCSs	3.8/85.5
Medical education seminars and courses about cancer follow-up care	3.2/44.0
Web site with information and opportunity for questions and answers	3.4/59.0
Patient-specific standardized letter from specialist with follow-up recommendations for the primary care physician sent directly to you	3.7/79.9
Patient-specific standardized letter from specialist with follow-up recommendations given to the patient	3.4/54.2
Ability to telephone or e-mail specialist for advice	3.4/55.1
Expedited routes of re-referral to cancer specialists	3.4/54.7
Pamphlets on follow-up cancer care	2.9/30.6
Expedited access to investigations (e.g. computed tomography scan, magnetic resonance imaging, and positron emission tomography scan) for suspected recurrence	3.1/44.2
Expedited access to support services (e.g. social work, psychology)	3.0/36.6
More medical or support staff in primary care office	2.7/26.8

CCS = childhood cancer survivor.

* On a scale of 1 (not at all useful) to 4 (very useful).

similar results from a survey of U.S. and Canadian family physicians (45). In addition, our results may be susceptible to response bias if physicians with a greater interest or experience in cancer survivorship were more likely to have responded to the survey. However, there were no statistically significant differences between respondents and non-respondents in terms of sex, age, and geographic location. Finally, many of the COG surveillance guidelines are based on expert consensus opinion rather than empirical data. As such, the recommendations need to be considered in combination with clinical judgment in the context of the individual patient. However, the current recommendations for breast cancer and cardiovascular surveillance are endorsed by other national and international cancer groups (46, 52).

In summary, our study suggests that internists who provide most primary care in the United States are generally uncomfortable with caring for CCSs, and most have suboptimal knowledge of the available guidelines for late effects surveillance. Concentrated efforts to improve these gaps should include enhanced education of PCPs through webinars, education sessions at national meetings, and guidelines linked to internal medicine Web sites. Focused efforts should also be made to improve comanagement by oncologists and PCPs throughout the cancer care trajectory (cancer diagnosis through survivorship). Given current technologies, SCP creation and dissemination efforts should potentially be streamlined through electronic medical records, Web-based tools, and parallel smartphone and tablet applications. Ultimately, findings from this study

will provide a platform for intervention research targeting education of PCPs and dissemination of SCPs in the hope of ultimately improving physician knowledge and comfort in caring for this high-risk population.

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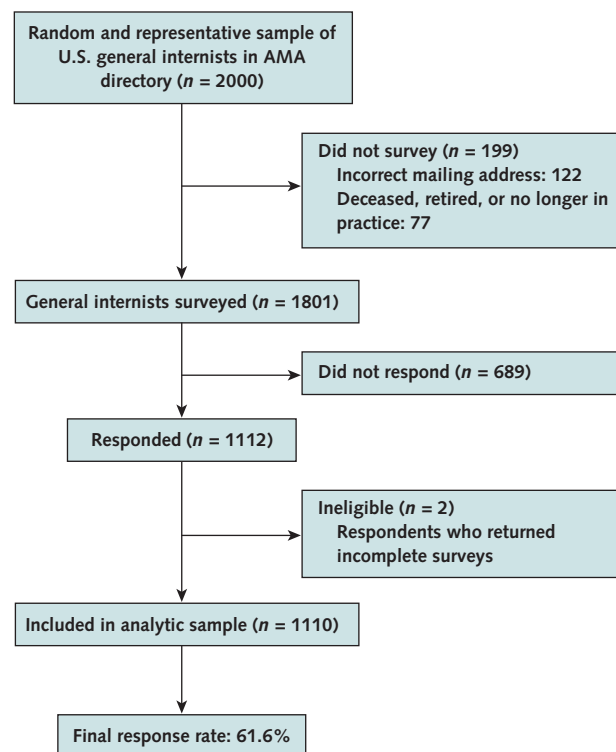
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Appendix Figure. Study flow diagram.



AMA = American Medical Association.

Appendix Table 1. Multivariate Linear Regression on Comfort Levels* With CCSs

Physician Characteristic	Regression Coefficient (95% CI)	P Value
Acute lymphoblastic leukemia		
Female	−0.52 (−0.74 to −0.29)	<0.001
Patients seen/wk†	0.19 (0.08 to 0.31)	0.001
Years in practice†	−0.01 (−0.12 to 0.10)	0.87
Saw at least 1 CCS in past 5 y	0.22 (0.01 to 0.43)	0.044
Practice environment (vs. solo)		
Group	−0.31 (−0.60 to −0.02)	0.034
Other	−0.26 (0.63 to 0.11)	0.167
Hodgkin lymphoma		
Female	−0.46 (−0.68 to −0.23)	<0.001
Patients seen/wk†	0.20 (0.08 to 0.31)	0.001
Years in practice†	0.14 (0.03 to 0.26)	0.013
Saw at least 1 CCS in past 5 y	0.43 (0.21 to 0.64)	<0.001
Practice environment (vs. solo)		
Group	−0.13 (−0.42 to 0.16)	0.39
Other	−0.08 (−0.45 to 0.29)	0.66
Osteosarcoma		
Female	−0.41 (−0.64 to −0.19)	<0.001
Patients seen/wk†	0.24 (0.12 to 0.36)	<0.001
Years in practice†	0.05 (−0.06 to 0.17)	0.39
Saw at least 1 CCS in past 5 y	0.24 (0.02 to 0.45)	0.032
Practice environment (vs. solo)		
Group	−0.15 (−0.44 to 0.15)	0.33
Other	−0.04 (−0.42 to 0.33)	0.82

CCS = childhood cancer survivor.

* On a Likert scale from 1 (very uncomfortable) to 7 (very comfortable).

† Per 1-SD (about 40 patients and about 10 y) increase.

Appendix Table 2. Multivariate Logistic Regression on Correctly Answering Surveillance Questions

Physician Characteristic	Odds Ratio (95% CI)	P Value
Breast cancer surveillance: COG recommendation*		
Years in practice†	0.96 (0.75–1.22)	0.736
Practice environment (vs. solo)		
Group	0.98 (0.53–1.81)	0.950
Other	1.46 (0.69–3.10)	0.326
Female	1.13 (0.71–1.79)	0.603
Patients seen/wk†	1.11 (0.88–1.41)	0.386
Saw at least 1 CCS in past 5 y	1.75 (1.11–2.75)	0.016
Breast cancer surveillance: early surveillance‡		
Years in practice†	0.94 (0.80–1.09)	0.404
Practice environment (vs. solo)		
Group	0.88 (0.60–1.30)	0.531
Other	1.17 (0.72–1.90)	0.537
Female	1.06 (0.79–1.43)	0.699
Patients seen/wk†	1.13 (0.96–1.32)	0.131
Saw at least 1 CCS in past 5 y	1.33 (1.00–1.78)	0.049
Cardiac surveillance		
Years in practice†	1.11 (0.92–1.33)	0.293
Practice environment (vs. solo)		
Group	0.90 (0.57–1.40)	0.632
Other	0.47 (0.24–0.92)	0.028
Female	0.88 (0.60–1.29)	0.516
Patients seen/wk†	1.11 (0.92–1.34)	0.296
Saw at least 1 CCS in past 5 y	1.22 (0.86–1.75)	0.269

CCS = childhood cancer survivor; COG = Children's Oncology Group.

* COG recommends annual mammography and breast magnetic resonance imaging beginning 8 y after radiation or at age 25 y, whichever occurs last.

† Per 1-SD increase (about 10 y and about 40 patients).

‡ Early surveillance refers to annual mammography or annual mammography and breast magnetic resonance imaging starting before the age of 40 y as recommended for the general population.