BRIEF REPORT

Breast, Colorectal and Prostate Cancer Screening for Cancer Survivors and Non-Cancer Patients in Community Practices

Shawna V. Hudson, PhD[1,2], Karissa A. Hahn, MPH[2], Pamela Ohman-Strickland, PhD[2,3], Regina S. Cunningham, PhD[4], Suzanne M. Miller, PhD[5], and Benjamin F. Crabtree, PhD[1,2]

[1]The Cancer Institute of New Jersey, UMDNJ-Robert Wood Johnson Medical School, New Brunswick, NJ, USA; [2]Department of Family Medicine, UMDNJ-Robert Wood Johnson Medical School, New Brunswick, NJ, USA; [3]Biometrics Division, UMDNJ-School of Public Health, Piscataway, NJ, USA; [4]The Tisch Cancer Institute Mount Sinai Medical Center, New York, NY, USA; [5]Fox Chase Cancer Center, Philadelphia, PA, USA.

BACKGROUND: Cancer survivors have cancer surveillance and preventive screening needs that require monitoring. Little is known regarding their patterns of care in community primary care practices.

METHODS: Secondary analysis of 750 baseline patient surveys and medical record audits for patients ages 50+ years in 25 community-based primary care practices (N=109 survivors and 641 noncancer patients).

RESULTS: Patient self-reported screening rates for breast cancer (72%), colorectal cancer (81%) and prostate cancer (77%) were higher for cancer survivors compared to noncancer patients (69%, 67%, 53%, respectively). Screening rates documented in the primary care records were lower for all cancers. Cancer survivors were more likely than others to report having been screened for colorectal cancer (P=0.002) even after excluding colorectal cancer survivors from the analysis (P=0.034). Male cancer survivors were more likely to report being screened for prostate cancer than those without cancer (P<0.001), even after excluding prostate cancer survivors (P=0.020). There were no significant differences in either self-reported or medical record report of breast cancer screening rates among cancer survivors and noncancer patients.

CONCLUSIONS: Cancer survivors were more likely to self-report receipt of cancer screening than noncancer patients. Medical record reports of cancer screening were lower than self-reports for cancer survivors and noncancer patients. Identifying factors that affect cancer screening among cancer survivors is important and has implications for intervention design.

KEY WORDS: chart audit; cancer screening; cancer survivors; primary care.
J Gen Intern Med 24(Suppl 2):487–90
DOI: 10.1007/s11606-009-1036-3

INTRODUCTION

Cancer prevalence is estimated to be 15% for individuals ages 65 years and older and 3.5% for the total United States population.[1] By 2050, the estimated number of cancer survivors will surpass new cancer cases, putting great demands on service providers and systems of care.[1] Primary care clinicians (PCCs) (e.g., general internists, family physicians, nurse practitioners, physician assistants, and sometimes gynecologists) increasingly provide a "medical home" (i.e., usual source of care) for cancer survivors who have completed treatment.[2] Of the 36.6 million physician office visits made for cancer care, nearly one third (32%) are made to PCCs.[1,2] Yet, little is known about patterns of preventive cancer screening and surveillance testing for cancer survivors in the primary care setting.[3]

The Institute of Medicine describes current care available to cancer survivors as haphazard, unplanned, and inadequate.[1,2] However, several studies indicate that cancer survivors are more likely to receive preventive cancer screening than patients with no history of cancer.[4–7] In addition, having a PCC increases screening for recurrence in cancer survivors [6,8] and is important in providing comprehensive follow-up care.[9,10]

The purpose of this study is to describe preventive and surveillance screening in community-based primary care practices. It compares rates of preventive cancer screening of cancer survivors with other patients that have a usual source of primary care focusing on survivors of the three types of cancer that are most common among cancer survivors: female breast cancer, prostate cancer, and colorectal cancer.[1] While previous studies comparing cancer survivors to noncancer patients have focused on secondary analysis of large administrative datasets and self-reported data,[4–8,11] this study is unique in that it examines screening within community-based primary care practices where much survivor care takes place.[1]

METHODS

Setting and Sample

We used cross-sectional data collected at baseline, from January 2006 through May 2007, from a quality improvement intervention study, Supporting Colorectal Cancer Outcomes through Participatory Enhancements (SCOPE). The SCOPE study aimed to improve guideline adherence for preventive cancer screening among 25 practices in New Jersey. The University of Medicine and Dentistry of New Jersey—Robert Wood Johnson Medical School Institutional Review Board approved this study. Written informed consent was received from the medical directors and/or lead physicians of each practice and from all patients who participated in the study.

Data Collection

Outcome data were collected via patient survey and medical record review. Thirty consecutive patients 50 years of age or older were recruited in the waiting rooms of each practice to participate in the study. Eighty percent (N=791) of eligible patients approached in the waiting room completed the patient survey and agreed to have their medical record reviewed. After excluding patients whose charts were unavailable or who did not have at least one prior visit documented in their medical record, complete survey and medical record data were available for 750 patients. There were no significant differences between participants and those who refused to participate in terms of sex, but the groups differed in age, with older patients more likely to participate than younger patients. Sixty-eight percent of eligible patients age 50 to 59 years, 90% of those age 60 to 69, and 85% of those age 70 and older agreed to participate in the study (P<0.001).

Study participants completed a short survey that took approximately 15 minutes. The survey asked questions about their health and medical history, satisfaction with care provided in the practice, and recollection of receipt or recommendation for preventive cancer screening for colorectal cancer in addition to breast cancer and cervical cancer for women and prostate cancer for men. Each patient also consented to have their medical record reviewed. For all patients, nurse chart auditors from the research team noted the dates of relevant cancer screenings as well as patient age and other information documented in the medical record. Inter-rater reliability analyses were conducted using a sample of 20 charts (10 during training and 10 during data collection). Auditors were counseled on the results to assure data quality.

Measures

Cancer Survivors. We defined cancer survivors as patients reporting a personal history of one or more types of cancer excluding superficial nonmelanoma skin cancer.

Cancer Screening. We examined colorectal, breast, and prostate cancer screening using the United States Preventive Services Task Force (USPSTF) clinical considerations[12] and the American Cancer Society (ACS) screening recommendations[13] as guides for determining age and appropriate time interval. For each eligible patient in the practice, a binary variable was created for each type of screening to indicate whether screening had occurred according to recommendations (0=no, 1=yes).

1) *Colorectal Cancer Screening:* Patients were considered to be up to date on their colorectal cancer (CRC) screening if one of the following conditions were met: (1) colonoscopy within 10 years; (2) sigmoidoscopy within 5 years; or (3) at home fecal occult blood test (FOBT) within the past year.
2) *Breast Cancer Screening:* Patients were considered to be up to date on their breast cancer screening if they had a mammogram within the past year.
3) *Prostate Cancer Screening:* Patients under age 75[14] were considered to be up to date on their prostate cancer screening if they had a prostate-specific antigen (PSA) blood test within the past year.

Patient Demographics. We examined patient age, gender, marital status, race/ethnicity, education, health status, health insurance status, and number of clinic visits in the past 2 years for patients with no history of cancer, cancer survivors, and subgroups of cancer survivors with a specific history of breast cancer, prostate cancer, or colorectal cancer.

Statistical Analyses

Descriptive statistics, including proportions for all categorical descriptors and means with standard deviations for continuous descriptors, were calculated to describe the study population. Multivariate regressions accounting for clustering by practice investigated associations between cancer survivor status and up-to-date cancer screening, adjusting for age, race, health status, education, marital status, comorbidities, length of time in practice, and number of clinic visits. The SAS/STAT software (SAS system for Windows, Version 9.1.3)[15] was used for all statistical analyses, with generalized estimat-

Table 1. Demographics of patients without a history of cancer and cancer survivors (all and by diagnosis)

	All patients	No cancer	All cancer survivors†
N	750	641	109
Age (mean, SD)	64.13 (9.99)	63.35 (9.69)	68.70 (10.55)
Gender (% male)	295 (39%)	250 (39%)	45 (41%)
Marital status‡			
Married	477 (64%)	404 (64%)	73 (67%)
Not married	268 (36%)	232 (36%)	36 (33%)
Race/ethnicity‡			
White	523 (70%)	436 (68%)	87 (80%)
Black	128 (17%)	114 (18%)	14 (12%)
Hispanic	61 (8%)	57 (9%)	4 (4%)
Other	34 (5%)	30 (5%)	4 (4%)
Education*‡			
Less than high school	88 (12%)	81 (13%)	7 (6%)
High school	191 (26%)	168 (26%)	23 (21%)
Greater than high school	466 (62%)	387 (61%)	79 (73%)
Health status‡			
Excellent	61 (8%)	55 (8%)	6 (5%)
Very good	407 (55%) 251	349 (55%)	58 (54%)
Fair	(34%)	210 (33%)	41 (38%)
Poor	26 (3%)	23 (4%)	3 (3%)
Health Insurance‡			
Medicare	288 (43%)	234 (41%)	54 (52%)
Medicaid	35 (5%)	31 (6%)	4 (4%)
Managed care	305 (46%)	265 (47%)	40 (39%)
Fee-for-service	40 (6%)	35 (6%)	5 (5%)
Co-morbidities			
0–2	238 (32%)	203 (32%)	35 (32%)
3–5	335 (45%)	289 (45%)	46 (42%)
6+	177 (23%)	149 (23%)	28 (26%)
Mean (SD)	4.06 (2.31)	4.07 (2.30)	4.02 (2.39)
Length of time in practice			
>=5 years	419 (56%)	360 (56%)	59 (54%)
<5 years	331 (44%)	281 (44%)	50 (46%)
Number of visits in the past 2 years	7.67 (5.30)	7.72 (5.40)	7.37 (4.72)

*P<0.05

†Cancer types included bladder, breast, cervical, endometrial, kidney, leukemia, lung, lymphoma, melanoma, ovarian, prostate, throat, thyroid, tongue, uterine, and vaginal.

‡Numbers do not add up to the total because of missing data.

Table 2. Screening rates for cancer survivors vs. other patients

		Patient report			Chart review		
Type of cancer	Total eligible, N	Screening rate in cancer survivors (any cancer type)	Screening rate in noncancer patients	P value*	Screening rate in cancer survivors (any cancer type)	Screening rate in noncancer patients	P value*
Colorectal	750	80.73%	67.71%	0.002	55.96%	49.14%	0.246
Prostate	237	77.42%	53.40%	<0.001	48.39%	48.06%	0.745
Breast	455	71.88%	69.31%	0.285	42.19%	34.53%	0.109

**P value from proc genmod adjusted for clustering by practice as well as race, age, health status, education, marital status (married vs. not), number of comorbidities, length of time in practice and number of visits in the past 2 years.*

ing equations used to estimate regression coefficients and their standard errors.

RESULTS

Demographic characteristics for the sample are shown in Table 1. Self-reported screening rates from surveys for breast cancer, colorectal cancer, and prostate cancer were high at 72% to 81% for cancer survivors compared with 53% to 69% for noncancer patients (Table 2). Cancer survivors were more likely than patients without cancer to report being screened for colorectal cancer (P=0.002) even after excluding colorectal cancer survivors (N=13) from the analysis (P=0.034). Male survivors of any type of cancer were more likely to report being screened for prostate cancer than patients without cancer (P< 0.001) even after excluding prostate cancer survivors (N=23, P=0.020). Being married was a significant predictor of self-report for colorectal and prostate screening (P<0.001). For colorectal screening, older age was also a significant predictor of screening (P<0.001). There were no significant differences in breast cancer screening rates among cancer survivors and noncancer patients. Number of visits within the last 2 years did not help predict screening.

DISCUSSION

Consistent with previous research we found that cancer survivors had higher rates of screening than noncancer survivors.[4–7] While the self-reported rates of screening were fairly high, it is important to note that the potential for recurrence, as well as the development of secondary malignancies necessitate even more vigilant cancer screening efforts in survivor populations than among general patients.[1,16–19] Therefore, the lower documented rates in the medical records are concerning.

Interestingly, regardless of screening type and survivorship status, patients were more likely to self-report receipt of screening than their PCCs documented in their charts. Discrepancies may be due to care sought outside of primary care, patient recall error, and/or patient lack of knowledge about screening.[20] In future research, it will be important to explore the underlying mechanisms at work to identify and test targeted interventions for patients and their PCCs. Potential interventions may necessarily target very different processes (e.g., use of a survivor care plan and increased communication between PCCs and other care providers versus better patient education about relevant screening tests and appropriate testing intervals).

Study findings should be interpreted while considering several potential limitations. This study is based on secondary analyses of data collected in a quality improvement study where cancer survivorship was not the focus; therefore, available data on cancer treatment and follow-up was limited. Other limitations include the nonrandom sampling strategy and inability to validate patient self-reported screening events. Despite these limitations, findings from the current study emphasize the importance of improving patient-clinician communication regarding cancer screening in primary care. Increasing numbers of studies are documenting the importance of the participation of a PCC in increasing screening for recurrence in cancer survivors [6,8] and in providing comprehensive follow-up care.[9,10] Earle and colleagues found that survivors who saw both oncologists and PCCs were more likely to receive recommended follow-up care than patients who saw only one or the other.[6] However, potential synergies between these clinicians cannot be realized if screenings and follow-up care are not communicated. Identifying the factors (e.g., multiple opportunities for screening, increased documentation, and communication) that lead to increased screening is an important research area that must be addressed before interventions to increase the quality of survivor care can be successfully designed and systematically reproduced.

Funding/Acknowledgments: *Data collection for this study was funded by a National Cancer Institute grant R01 CA112387 awarded to Dr. Crabtree. Additional support for this study was provided by a National Cancer Institute career development grant K01 CA131500 awarded to Dr. Hudson. This research was conducted in conjunction with the New Jersey Family Medicine Research Network (NJFMRN), a shared resource of the Cancer Institute of New Jersey. It was also supported by the Cancer Institute of New Jersey's Survey Research and Qualitative Methods Shared Resource.*

Conflict of Interest: *None disclosed.*

Contributions of Authors: *All authors participated in conceptualization of the study and interpretation of study results. Dr. Hudson and Ms. Hahn designed the study analyses and with Dr. Ohman-Strickland analyzed the data. All authors approved the final version of the manuscript and decided to submit this work for publication.*

Support: *This research was supported through grants from the National Cancer Institute (K01 CA131500 and R01 CA112387).*

Corresponding Author: *Shawna V. Hudson, PhD; The Cancer Institute of New Jersey, UMDNJ-Robert Wood Johnson Medical School, 195 Little Albany Street, New Brunswick, NJ 08903-2681, USA (e-mail: hudsonsh@umdnj.edu).*

REFERENCES

1. **Hewitt ME, Greenfield S, Stovall E, National Cancer Policy Board (U. S.).** Committee on Cancer Survivorship: Improving Care and Quality of Life. From Cancer Patient to Cancer Survivor: Lost in Transition. Washington, DC: National Academies Press; 2006.
2. **Hewitt ME, Ganz PA, Institute of Medicine (U.S.).** American Society of Clinical Oncology (U.S.). From Cancer Patient to Cancer Survivor: Lost in Transition: an American Society of Clinical Oncology and Institute of Medicine Symposium. Washington, DC: National Academies Press; 2006.
3. **Keating NL, Landrum MB, Guadagnoli E, Winer EP, Ayanian JZ.** Surveillance testing among survivors of early-stage breast cancer. J Clin Oncol. 2007;25(9):1074–1081.
4. **Bellizzi KM, Rowland JH, Jeffery DD, McNeel T.** Health behaviors of cancer survivors: examining opportunities for cancer control intervention. J Clin Oncol. 2005;23(34):8884–893.
5. **Earle CC, Burstein HJ, Winer EP, Weeks JC.** Quality of non-breast cancer health maintenance among elderly breast cancer survivors. J Clin Oncol. 2003;21(8):1447–1451.
6. **Earle CC, Neville BA.** Under use of necessary care among cancer survivors. Cancer. 2004;101(8):1712–9.
7. **Trask PC, Rabin C, Rogers ML, et al.** Cancer screening practices among cancer survivors. Am J Prev Med. 2005;28(4):351–6.
8. **Doubeni CA, Field TS, Ulcickas Yood M, et al.** Patterns and predictors of mammography utilization among breast cancer survivors. Cancer. 2006;106(11):2482–8.
9. **Grunfeld E.** Cancer survivorship: a challenge for primary care physicians. Br J Gen Pract. 2005;55(519):741–2.
10. **Grunfeld E, Levine MN, Julian JA, et al.** Randomized trial of long-term follow-up for early-stage breast cancer: a comparison of family physician versus specialist care. J Clin Oncol. 2006;24(6):848–855.
11. **Mayer DK, Terrin NC, Kreps GL, et al.** Cancer survivors information seeking behaviors: a comparison of survivors who do and do not seek information about cancer. Patient Educ Couns. 2007;65(3):342–350.
12. **Agency for Healthcare Research and Quality.** Guide to Clinical Preventive Services. 2008; http://www.ahrq.gov/clinic/cps3dix.htm#cancer. Accessed May 26, 2009.
13. **Smith RA, Cokkinides V, Eyre HJ.** American cancer society guidelines for the early detection of cancer, 2005. CA Cancer J Clin. 2005;55(1):31–44.
14. **Hudson SV, Ohman-Strickland P, Ferrante JM, Lu-Yao G, Orzano AJ, Crabtree BF.** Prostate-specific antigen testing among the elderly in community-based family medicine practices. J Am Board Fam Med. 2009;22:257–265.
15. *SAS 9.1 for Windows* [computer program]. Version 9.1. Cary, NC2002–2003.
16. **Aziz NM, Rowland JH.** Trends and advances in cancer survivorship research: challenge and opportunity. Semin Radiat Oncol. 2003;13 (3):248–266.
17. **Demark-Wahnefried W, Pinto BM, Gritz ER.** Promoting health and physical function among cancer survivors: potential for prevention and questions that remain. J Clin Oncol. 2006;24(32):5125–131.
18. **Ganz PA.** Monitoring the physical health of cancer survivors: a survivorship-focused medical history. J Clin Oncol. 2006;24(32): 5105–111.
19. **Rowland JH, Hewitt M, Ganz PA.** Cancer survivorship: a new challenge in delivering quality cancer care. J Clin Oncol. 2006;24(32): 5101–4.
20. **Ferrante JM, Ohman-Strickland P, Hahn KA, et al.** Self-report versus medical records for assessing cancer-preventive services delivery. Cancer Epidemiol Biomarkers Prev. 2008;17(11):2987–994.