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Cost-Related Medication Nonadherence and Cost-Saving Strategies Used by Elderly Medicare Cancer Survivors

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Abstract

Objective—To compare cost-related medication nonadherence among elderly Medicare enrollees with and without cancer, and to describe the strategies cancer survivors used to offset the costs of medications.

Methods—Using the 2005 Medicare Current Beneficiary Survey and Medicare claims, we compared self-reported cost-related medication nonadherence (CRN), spending less on basic needs to afford medicines, and cost-reduction strategies among elderly beneficiaries with and without cancer. Descriptive statistics and logistic regression models were used to characterize and compare these populations.

Results—In a nationally representative sample of 9818 non-institutionalized elderly Medicare enrollees, 1392 (14%) were classified as cancer survivors based on Medicare claims. Cancer survivors were older, more highly educated, more likely to be male and non-Hispanic, and more likely to have multiple co-morbidities, poorer health status, and employer-paid medication coverage. While 10% of cancer survivors and 11% without cancer reported CRN; about 6% and 9% ($p=0.004$) of those with and without cancer, respectively, reported spending less on basic needs to offset the costs of medications. Cancer survivors who reported CRN ($n=143$) had lower income (62.2% versus 48.6%, $p=0.11$), and were more likely to be African-American (13.0% versus 6.4%, $p=0.033$), and have non-employer-based medication insurance ($p=0.002$) compared to those who did not report CRN. In adjusted analyses, CRN among the two groups was similar, but with some subgroup differences noted by gender and cancer type. Use of cost-reduction strategies was mostly similar among cancer survivors and those without cancer.

Conclusion—Cost-related medication nonadherence medication is common among elderly Medicare beneficiaries, but appears to be similar among those with and without cancer.

Keywords

cancer survivorship; cost; adherence; Medicare; elderly

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INTRODUCTION

Drug expenditures continue to rise and there is growing evidence that this has resulted in financial burden on patients, often leading them to skip pills and avoid filling prescriptions in order to save costs.[1] Cost-related nonadherence is associated with worse health outcomes, including myocardial infarction, stroke and hospitalizations.[2-4]. Cancer costs, in particular, have grown substantially and there is a growing literature suggesting that patients with cancer experience significant out-of-pocket costs during diagnosis, treatment, and follow-up care.[5-8] According to the Kaiser Family Foundation survey of patients with cancer, one-quarter of respondents reported that they used up all or most of their savings, and one in ten reported being unable to pay for basic necessities like food, heat, and housing. About 8% reported delaying or avoiding care for cancer due to costs.[9] A study of those filing for bankruptcy found that the highest out-of-pocket medical expenses were associated with cancer compared to other diagnoses.[10]

Most cancers occur in patients aged 65 and older, and the number of cancer survivors in this age group is projected to increase significantly over the next few decades.[11] The burden of comorbidities and need for medications are greater in the older population. However, a recent study using data from the U.S. National Health Interview Survey found that while cancer survivors under age 65 reported forgoing medical care, prescription medications, dental care, and mental health care due to financial concerns at higher rates than similar cohorts without cancer, these findings were not observed among survivors aged 65 and older.[12] The goal of our study was to specifically compare cost-related medication nonadherence in a nationally representative population in the Medicare Current Beneficiary Survey (MCBS) with and without cancer, and further, to describe the strategies cancer survivors used to offset the costs of medications. Understanding cancer patients' experiences with medication nonadherence may help address potential barriers in effective treatment of their non-cancer comorbidities.

METHODS

Data source and sample population

The MCBS is a longitudinal, nationally representative rotating panel survey of Medicare beneficiaries with three in-person interviews per year. Participants are selected from Medicare enrollment files using a stratified area probability design. The main fall interview is conducted using a 4-year panel survey design with a routine panel replacement strategy that ensures a nationally representative group in each year. The study sample for this cross-sectional analysis included elderly Medicare beneficiaries (aged 65 or older) participating in the 2005 MCBS. We excluded disabled Medicare enrollees under the age of 65 years. We relied on linked Medicare fee-for-service claims for cancer diagnoses; Medicare HMO enrollees were therefore excluded in order to avoid miscategorizing enrollees as having no cancer (if their cancer was not claimed to Medicare, but to their outside medical health plan). Both cancer survivors and controls had to be enrolled in Medicare A and B in 2005 through the month of their fall interview. Because all study subjects were in traditional fee-for-service Medicare, all relevant claims were submitted to Medicare and available for this research using files included with the MCBS. We categorized the enrollees into two groups, cancer or no cancer, based on having one or more ICD-9 claims codes for any cancer (140-171, 174-208, and 233.0) excluding non-melanoma skin cancer. Records in all Medicare claims files (inpatient, outpatient, physician, home health, hospice, durable medical equipment, or skilled nursing facility) were used to identify cancer diagnoses in an approximate 10-month period between January 1 of the calendar year and the fall interview date (median date in October 2005). We used this period for ascertainment since the fall round includes questions developed for the MCBS by the investigators regarding cost-

related medication nonadherence. The term “cancer survivor” in this analysis refers to any respondent with a diagnosis of cancer identified in any of the Medicare claims files. All study participants were required to be alive at the time of the fall interview.

The main MCBS interview that took place in the fall and is the basis for this study had a response rate of 82% for 1st-year respondents, dropping to 65% for 4th-years, averaging 72.24% over the entire sample. The duration of survey participation was similar among the cancer survivors and controls (Table 1). Item response rates for the specific survey questions which contributed to our study outcomes were 99.3% or higher.

Outcome measures

The outcomes for this study included the following self-reported measures: cost-related medication nonadherence (CRN), spending less on basic needs to afford medicine, and cost-reduction strategies used to offset medication-related financial burdens. The measures were not specific to a particular class of medications, and thus pertained to cancer and non-cancer prescriptions. We considered participants to have cost-related medication nonadherence if they reported ever having any of the following three behaviors in the current survey year: skipping doses to make a medicine last longer, taking less medicine than prescribed to make a medicine last longer, and not filling a prescription because it was too expensive. These survey questions are general and do not address specific medications. This composite cost-related medication nonadherence measure [13] has been available from the MCBS since 2004 and tested and extensively used by members of the study team. [1;14-16] Survey participants further reported whether they ever spent less on other basic needs (such as food and heat) to afford medicines during the current year. Participants also reported using any of the following five strategies in order to offset the costs of medications: using generic formulations of medications, requesting or receiving free samples, obtaining prescriptions via mail-order or Internet, obtaining medications from outside the U.S., and comparing pharmacy prices before filling prescriptions.

Demographic and socioeconomic variables included gender, age (grouped as 65-74, 75-84, and older than 85 years), income (<\$25,000, \$25,000), race (African American, white, or other), Hispanic ethnicity (yes or no), and educational attainment (no high school diploma, high school diploma, beyond high school). Other health-related variables included self-reported general health status (categorized as “good, very good, or excellent”, and “fair or poor”), number of self-reported medical conditions other than cancer (cardiac disease, hypertension, diabetes, arthritis, psychiatric disorder, neurological condition other than dementia, and lung disease; categorized as 0-1, 2-3, 4+) and limitations of activities of daily living (ADLs, categorized as 0, 1-2, 3+). We also adjusted for enrollees’ type of drug insurance coverage and the number of years of participation in the MCBS. [1] Lastly, we adjusted for year of survey participation because in previous analyses we found that, overall, respondents answered slightly differently to the questions of interest in their initial interview round compared to follow up interviews. [1]

Statistical Analyses

All analyses, which included sampling weights were conducted using Stata version 10 (StataCorp LP, College Station, Texas). First, we estimated percentages for the national Medicare population, and compared the characteristics of patients with and without cancer using chi-square statistics. We then measured the prevalence of cost-related medication nonadherence, spending less on basic needs, and the five cost-reduction strategies among enrollees with and without cancer. We also described the characteristics of cancer survivors who reported cost-related medication burden. Next, we conducted logistic regression analyses to estimate the odds of these outcomes for enrollees with and without cancer,

controlling for key clinical and demographic characteristics. To determine whether enrollees with specific cancers differed with respect to self-reported burden of medication costs, we repeated the logistic regression analyses with independent binary terms for each of four major cancer groups, with no cancer as the reference category. The cancer groups included breast (ICD-9 codes 174.x, 233.0), colorectal (153.x, 154.0, 154.1), and prostate (185.x) cancers, as well as a group of “high-mortality” cancers comprising lung (162.x), ovarian (183.x), and pancreatic (157.x) cancers.[6] A fifth binary term combined malignant cancers other than breast, colorectal, prostate, lung, ovarian, and pancreas (140.x-152.x; 154.2x-156.x; 158.x-161.x, 163.x-165.x; 170.x-172.x; 175.x -182.x; 184.x; 186.x-208.x). We stratified the analyses by gender.

Finally, we conducted sensitivity analyses using two alternative strategies for identifying cancer survivors in the MCBS dataset. First, we defined cancer survivors as those who had at least two outpatient cancer claims of the same type within 90 days or one inpatient cancer claim, modeled after an approach by Yabroff et al.[17] In the second, we defined cancer survivors based on self-report.[18] These analyses yielded fewer cancer survivors, but the overall study findings were similar (not shown) to those using the broader definition above. Therefore, we present only the results obtained using the strategy described earlier.

RESULTS

Study population

In a nationally representative sample of 9818 non-institutionalized elderly Medicare enrollees with no managed care surveyed in 2005, 1392 (14%) had at least one Medicare claim for cancer, excluding non-melanoma skin cancer, during the survey year, prior to the fall interview. Cancer survivors were older, more highly educated, more likely to be male and non-Hispanic, and more likely to have multiple co-morbidities, poorer health status, and employer-paid medication coverage. (**Table 1**) Among cancer survivors, 457 had prostate cancer, 279 had breast cancer, and 138 had colorectal cancer. A total of 142 enrollees had either ovarian, lung, or pancreatic cancer, and 353 had other cancers. Prostate cancer survivors were older, had higher income and education levels, and were more likely to report excellent/very good/good health (data not shown). Enrollees with high mortality cancers were more likely to have income less than \$25,000, report fair/poor health, and have more limitations in activities of daily living (data not shown).

Cost-related medication nonadherence

In unadjusted analyses (**Table 2**), there were no differences in the rate of cost-related nonadherence between cancer survivors and those without cancer (10.3% and 11.2%, respectively, $p = 0.426$). However, cancer survivors were less likely to report spending less on basic needs in order to pay for their medications (6.3% cancer versus 9.0% no cancer, $p=0.004$). The latter effect was statistically significant in adjusted analyses (OR 0.71, 95%CI 0.54-0.94, **Table 3**).

Among cancer survivors, those who reported cost-related medication nonadherence were more likely to have incomes less than \$25,000 (62.2% versus 48.6%), be African-American (13.0% versus 6.4%), and have no reported insurance covering medications (47.5% versus 33.9%) compared to those without nonadherence. (**Table 4**) Cancer survivors who reported spending less on basic needs were more often female (58.2% versus 43.7%), with incomes less than \$25,000 (73.8% versus 48.5%), African American (18.9% versus 6.2%), and have no high school education (38.5% versus 22.5%). They were also more likely to report fair/poor health (25.7% versus 19.9%, **Table 4**).

In adjusted analyses restricted to women enrollees, we found that compared to those with no cancer, female colorectal survivors were more likely to report cost-related medication nonadherence (2.53, 95% CI 1.27-5.06) and spending less on basic needs in order to pay for medications (OR 2.63, 95% CI 1.30-5.31). (Table 5) On the contrary, breast cancer survivors were less likely to report nonadherence (OR 0.54, 95% CI 0.32-0.92) than women without cancer. Interestingly, there was a non-statistically significant reduction in cost-related medication nonadherence and spending less on basic needs among the male colorectal cancer survivors. (Table 5)

Cost-reduction strategies

More than half of all enrollees reported using generic medications and requesting or receiving free samples, while nearly a quarter compared pharmacy prices prior to purchasing medications. Overall, there were no significant differences between cancer survivors and those without cancer in most cost-reduction strategies (Table 2). However, cancer survivors were more likely to report using mail-order or the Internet to obtain their medications (36.3% versus 31.1%), a finding which remained statistically significant in adjusted analyses (OR 1.13, 95% CI 1.00-1.29). (Table 3) While female colorectal cancer survivors were more likely to ask for samples (OR 1.79, 95% CI 1.12-2.87) compared to those without cancers, cost-reduction strategies used by survivors of breast, prostate and high mortality cancers were similar to those used by elderly patients without cancer (Table 5).

DISCUSSION

We found that about 10% of Medicare enrollees with and without cancer reported cost-related medication nonadherence, while 6% and 9% of cancer survivors and those without cancer, respectively, reported spending less on basic needs to offset the costs of medications. Overall, there were no significant differences in cost-related nonadherence among cancer survivors and those without cancer, though in smaller subgroups, we found differences by gender and cancer type. Among cancer survivors, sociodemographic characteristics appeared to contribute to higher rates of cost-related medication nonadherence.

Our study adds to the literature examining the effects of self-reported cost-related medication burden among cancer survivors. Prior studies have shown that cancer treatment is costly to patients, and for many, the associated costs extend for years following cancer treatment.[5-7] For example, numerous studies have found high rates of nonadherence with adjuvant hormonal therapy for at least five years after breast cancer. [19-21] Cost has been shown to be an important factor in nonadherence,[22;23] and a recent study showed that breast cancer survivors on aromatase inhibitors reported having more financial difficulties than those on tamoxifen.[24] Oral medications for cancer are becoming more common and there is growing need to assess the factors associated with nonadherence and the impact of interventions to improve adherence.[22] In addition to oral chemotherapy, cancer survivors also take medications for other chronic illnesses, such as hypertension, diabetes, hyperlipidemia, and osteoporosis.

We hypothesized that elderly patients with cancer would have greater financial burden related to medications due to high costs of follow-up cancer care, use of long-term adjuvant therapy (particularly among those with breast cancer), and high prevalence of co-morbid conditions. However, we found that while cost-related nonadherence was high among Medicare enrollees with and without cancer, overall cancer survivors were not at a higher risk for nonadherence. These findings are consistent with the recent study from the National Health Interview Survey.[12]

Why might elderly cancer survivors overall not have higher cost-related medication nonadherence than those without cancer? First, it is possible that the cancer survivors in our study already completed their treatment for cancer and, were therefore not subject to the high costs of treatment at the time of the survey. Since we did not have information about the time since diagnosis, we reanalyzed our data using a definition that is more likely to identify “active” cancer (two outpatient claims of the same type or one inpatient claim),[17] but found similar results. We also found no differences when we identified cancer survivors by self-report. Second, it is possible that since most cancer survivors at the time of our study were not likely taking oral chemotherapy agents, their overall medication use was similar to those without cancer. It is interesting that breast cancer survivors who often continue on long-term adjuvant hormone therapy were actually less likely to report cost-related medication nonadherence than enrollees without cancer, and even women with other cancers. Third, it is possible that cancer survivors during and following treatment may take a more proactive approach to disease management and medication adherence, and may perceive economic factors to be less of a constraint. A fourth possible explanation may be related to having insurance coverage for medications. In our cohort, medication coverage was more commonly reported by cancer survivors than those without cancer, and less commonly among those who reported cost-related nonadherence. While we adjusted for medication coverage insurance in our models, it is possible that this covariate does not fully account for the effects of different forms of insurance coverage on cost-related nonadherence. Further, our study population also had health care insurance through Medicare, and therefore, did not have to confront high costs of care, in addition to the costs of medications. Finally, it is possible that cancer survivors did not experience the extent of cost-related nonadherence as those without cancer due to having access to resources that are not readily available to those without cancer. These include free drug programs that allow them to receive certain chemotherapy agents and adjuvant therapies, as well as social services and family support that may help them navigate the health care system and obtain needed care following cancer.[25] This may be particularly notable for women with breast cancer, and may be related to their substantially less cost-related nonadherence. While our sample sizes for the subgroup analyses were small, the fact that female colorectal cancer patients were more than twice as likely to report CRN and spending less on basic needs, compared to females with no cancer, is troublesome and this finding requires additional study. It may be possible that these women have fewer resources available and/or potentially have additional untoward effects on their health as a result of their cancer, such as ostomies which require long-term care.[26]

Our study has several limitations. We identified cancer survivors based on claims data and our sample likely included those at different phases of cancer treatment. However, we refined our search in sensitivity analyses with similar results. We believe that claims-based ascertainment is more likely to identify true cancer cases and more reliable than self-report. Further, cancer survivors were identified based on ICD-9 diagnosis codes. We did not require that clinical contact occur during the year, but ordinarily patients need to be seen in order to have a claim noted. It is possible that this may bias toward the inclusion of cancer patients who may have had greater access to care than non-cancer patients; however, it is also possible that cancer patients were sicker and therefore accessed the system while the controls did not. Therefore, we do not suspect a systematic bias. Additionally, our main outcome measures are based on self-report and, due to social desirability bias, respondents may have underreported their true extent of cost-related underuse of medications. However, we expect that there are no systematic differences in this bias based on cancer status. There is the potential for selection bias, as there is for any survey of cancer patients. Sicker patients (both with and without cancer, but perhaps more notable for those with cancer) may be less likely to ever participate in a survey. However, we found no significant differences in the duration of survey participation between the cancer survivors and those without cancer.

Lastly, our study took place prior to the implementation of Medicare Part D. While this may be a limitation in studying cost-related burdens, the fact that our study showed no differences in nonadherence among those with and without cancer, and that Medicare Part D resulted in modest decrease in cost-related medication nonadherence in the general population,[1] suggests that our findings would likely be similar in the years following Part D implementation.

In summary, our study found that cost-related medication nonadherence was commonly reported by Medicare enrollees, but there were no differences between cancer survivors and those without cancer. While the high prevalence of cost-related medication nonadherence in this population is concerning, our study suggests that elderly Medicare cancer survivors may not face a greater perceived burden of medication costs than elderly beneficiaries without cancer. While our subgroup analyses were small, we found some gender and cancer-specific differences that need to be further explored. As the number of cancer survivors continues to increase and get older, the findings of our study enhance our understanding of the potential barriers on effective treatment of their comorbid conditions.

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Table 1

Demographic and health characteristics of elderly community-dwelling Medicare survivors and enrollees without cancer.

Characteristics	Cancer Survivors n=1,392 weighted %	No Cancer n=8,426 weighted %	X ² p-value
Sex			
Female	44.5	59.6	0.000
Age			
65-74	40.6	49.8	0.000
75-84	45.7	38.0	
85 and over	13.7	12.2	
Income, \$			
Less than \$25,000	50.0	54.1	0.011
Race			
African American	7.0	7.5	0.228
White	88.5	87.0	
Other	4.4	5.5	
Hispanic or Latino	4.0	5.8	0.006
Education			
Above high school	45.6	42.2	0.026
High school diploma	30.8	30.4	
No high school	23.6	27.4	
Number of non-cancer comorbidities			
0-1	27.6	29.7	0.203
2-3	51.6	48.8	
4+	20.8	21.5	
Number of limitations in activities of daily living			
0	70.5	72.5	0.136
1-2	20.7	19.9	
3+	8.8	7.6	
Self-reported health status			
Excellent, very good, or good	74.4	80.1	0.000
Fair or poor	25.7	19.9	
Insurance covering medications			
Medicaid	5.8	6.9	0.001
Employer	46.5	39.7	
Partial	12.5	13.0	
None reported	35.3	40.4	
Experience in Survey			
Year 1	34.8	35.7	0.305
Year 2	23.4	24.9	
Year 3	21.6	20.0	
Year 4	20.3	19.4	

p-value <0.05 noted in italics.

Table 2

Unadjusted cost-related nonadherence, spending less on basic needs, and cost-reduction strategies by cancer status, n=9,818

	Cancer Survivors n=1,392		No Cancer n=8,426		X ² p-value
	n	weighted %	n	weighted %	
Cost-Related Nonadherence	142	10.3	927	11.2	0.426
Spending Less on Basic Needs	<i>92</i>	<i>6.3</i>	<i>751</i>	<i>9.0</i>	<i>0.004</i>
Cost-Reduction Strategies					
Use Generics	705	50.9	4,267	50.6	0.851
Free Samples	732	52.3	4,345	51.6	0.647
Use Mail-order/Internet	<i>498</i>	<i>36.3</i>	<i>2,566</i>	<i>31.1</i>	<i>0.000</i>
Obtain Outside US	98	6.9	602	7.4	0.529
Compare Pharmacies	320	22.7	1,933	23.6	0.487

p-value <0.05 noted in italics.

Table 3

Cost-related medication nonadherence, spending less on basic needs, and cost-reduction strategies among elderly Medicare cancer survivors compared to enrollees without cancer^{*}

Outcome	Unadjusted OR	95%CI	Adjusted OR [*]	95% CI
Cost-Related Nonadherence				
Cancer	0.92	(0.75 1.13)	1.00	(0.81 1.24)
No Cancer (referent)				
Spending Less on Basic Needs				
Cancer	<i>0.68</i>	<i>(0.52 0.88)</i>	<i>0.71</i>	<i>(0.54 0.94)</i>
No Cancer (referent)				
Use Generics				
Cancer	1.01	(0.90 1.14)	1.03	(0.91 1.16)
No Cancer (referent)				
Free Samples				
Cancer	1.03	(0.91 1.16)	1.06	(0.94 1.21)
No Cancer (referent)				
Use Mail-order/Internet				
Cancer	<i>1.26</i>	<i>(1.12 1.43)</i>	<i>1.13</i>	<i>(1.00 1.29)</i>
No Cancer (referent)				
Obtain Outside U.S.				
Cancer	0.93	(0.73 1.18)	1.02	(0.79 1.31)
No Cancer (referent)				
Compare Pharmacies				
Cancer	0.95	(0.82 1.10)	1.06	(0.92 1.23)
No Cancer (referent)				

OR = odds ratios

CI = confidence intervals

Statistically significant findings ($p < 0.05$) noted in italics.

^{*} ORs adjusted for sex, age group, race, income, health status, number of comorbidities, medication insurance and year of survey experience

Table 4

Characteristics of elderly Medicare cancer survivors with and without cost-related medication nonadherence.

Characteristics	Reported CRN n=142 weighted %	No Reported CRN n=1,250 weighted %	X ² p-value
Sex			
Female	44.4	44.5	0.991
Age			
65-74	49.8	39.6	0.075
75-84	38.2	46.5	
85 and over	12.0	13.9	
Income, \$			
Less than \$25,000	62.2	48.6	0.011
Race			
African American	13.0	6.4	0.033
White	81.7	89.3	
Other	5.3	4.3	
Hispanic or Latino			
Hispanic	1.7	4.3	0.017
Education			
Above high school	49.1	45.2	0.365
High school diploma	25.4	31.4	
No high school	25.5	23.4	
Number of non-cancer comorbidities			
0-1	27.6	27.6	0.167
2-3	45.8	52.3	
4+	26.6	20.1	
Number of limitations in activities of daily living			
0	66.3	71.0	0.133
1-2	20.8	20.7	
3+	13.0	8.3	
Self-reported health status			
Excellent, very good, good	71.6	74.7	0.444
Fair or poor	28.4	25.3	
Medication Insurance			
Medicaid	8.8	5.5	0.002
Employer	33.3	48.0	
Partial	10.4	12.7	
None reported	47.5	33.9	
Experience in Survey			
Year 1	33.5	35.0	0.152
Year 2	18.4	23.9	
Year 3	29.0	20.7	
Year 4	19.1	20.4	

Characteristics	Reported CRN n=142 weighted %	No Reported CRN n=1,250 weighted %	X ² p-value
Cancer type			
Lung, Pancreas, or Ovarian	11.6	10.2	0.061
Breast	13.1	21.4	
Prostate	27.8	32.3	
Colorectal	13.9	8.7	
Other	33.6	27.4	

Statistically significant findings ($p < 0.05$) noted in italics.

Table 5

Cost-related medication nonadherence, spending less on basic needs, and use of cost-reduction strategies among male and female elderly Medicare cancer survivors and enrollees without cancer.

Outcome	Male				Female			
	Unadjusted OR	95% CI	Adjusted OR*	95% CI	Unadjusted OR	95% CI	Adjusted OR*	95% CI
Cost-Related Nonadherence								
Breast cancer	--	-- --	--	-- --	0.52	(0.31 0.85)	0.54	(0.32 0.92)
Prostate cancer	0.91	(0.59 1.39)	1.05	(0.69 1.62)	--	---	--	---
Colorectal Cancer	0.86	(0.36 2.10)	0.76	(0.30 1.92)	2.19	(1.07 4.49)	2.53	(1.27 5.06)
Lung, Pancreas, Ovarian	0.54	(0.15 1.91)	0.42	(0.11 1.59)	1.32	(0.70 2.49)	1.27	(0.63 2.54)
Other Cancer	1.60	(0.99 2.60)	1.72	(1.05 2.82)	0.77	(0.45 1.29)	0.79	(0.47 1.32)
No Cancer	Referent				Referent			
Spending Less on Basic Needs								
Breast cancer	--	-- --	--	-- --	0.68	(0.43 1.07)	0.72	(0.44 1.20)
Prostate cancer	0.58	(0.34 0.98)	0.70	(0.42 1.18)	--	---	--	---
Colorectal Cancer	0.28	(0.07 1.23)	0.22	(0.05 1.08)	2.24	(1.18 4.22)	2.63	(1.30 5.31)
Lung, Pancreas, Ovarian	0.29	(0.04 2.32)	0.17	(0.02 1.48)	1.22	(0.54 2.75)	1.05	(0.47 2.36)
Other Cancer	0.69	(0.38 1.25)	0.66	(0.37 1.17)	0.51	(0.23 1.14)	0.50	(0.22 1.13)
No Cancer	Referent				Referent			
Cost-Reducing Strategies								
Use Generics								
Breast cancer	--	-- --	--	-- --	1.06	(0.80 1.39)	1.07	(0.81 1.40)
Prostate cancer	1.03	(0.85 1.24)	1.06	(0.87 1.29)	--	---	--	---
Colorectal Cancer	0.96	(0.60 1.54)	0.99	(0.61 1.59)	1.19	(0.70 2.00)	1.31	(0.77 2.21)
Lung, Pancreas, Ovarian	1.31	(0.77 2.23)	1.24	(0.69 2.21)	0.83	(0.52 1.32)	0.73	(0.44 1.22)
Other Cancer	1.28	(0.95 1.74)	1.28	(0.92 1.76)	0.73	(0.54 0.97)	0.72	(0.54 0.97)
No Cancer	Referent				Referent			
Free Samples								
Breast cancer	--	-- --	--	-- --	0.95	(0.74 1.21)	0.95	(0.74 1.22)
Prostate cancer	1.19	(0.99 1.44)	1.21	(0.99 1.48)	--	---	--	---
Colorectal Cancer	1.05	(0.68 1.61)	1.07	(0.68 1.68)	1.61	(1.00 2.59)	1.79	(1.12 2.87)
Lung, Pancreas, Ovarian	1.04	(0.59 1.84)	1.01	(0.56 1.83)	0.93	(0.58 1.48)	0.88	(0.55 1.42)
Other Cancer	1.24	(0.87 1.76)	1.21	(0.86 1.70)	0.75	(0.53 1.08)	0.77	(0.54 1.09)
No Cancer	Referent				Referent			
Use Mail-order/Internet								
Breast cancer	--	-- --	--	-- --	1.55	(1.21 2.00)	1.39	(1.06 1.81)
Prostate cancer	1.24	(1.00 1.54)	1.16	(0.94 1.44)	--	---	--	---
Colorectal Cancer	0.70	(0.38 1.29)	0.74	(0.38 1.44)	0.83	(0.44 1.56)	0.77	(0.36 1.66)
Lung, Pancreas, Ovarian	1.09	(0.58 2.06)	1.18	(0.60 2.32)	1.24	(0.73 2.11)	1.16	(0.69 1.96)
Other Cancer	1.17	(0.86 1.58)	1.06	(0.75 1.51)	1.02	(0.75 1.39)	1.01	(0.75 1.37)
No Cancer	Referent				Referent			
Obtain Outside U.S.								

Outcome	Male				Female			
	Unadjusted OR	95% CI	Adjusted OR *	95% CI	Unadjusted OR	95% CI	Adjusted OR *	95% CI
Breast Cancer	--	-- --	--	-- --	1.03	(0.66 1.59)	1.13	0.71 1.79)
Prostate Cancer	0.95	(0.66 1.38)	1.04	(0.71 1.51)	--	-- --	--	-- --
Colorectal Cancer	1.05	(0.27 4.04)	1.00	(0.26 3.88)	0.81	(0.32 2.07)	0.98	(0.37 2.58)
Lung, Pancreas, Ovarian	0.21	(0.03 1.65)	0.18	(0.02 1.42)	0.62	(0.24 1.60)	0.67	(0.26 1.67)
Other Cancer	1.27	(0.72 2.25)	1.34	(0.75 2.40)	0.80	(0.46 1.38)	0.88	(0.51 1.53)
No Cancer	Referent				Referent			
Compare Pharmacies								
Breast Cancer	--	-- --	--	-- --	0.89	(0.67 1.17)	0.97	(0.72 1.32)
Prostate Cancer	1.03	(0.80 1.33)	1.11	(0.85 1.46)	--	-- --	--	-- --
Colorectal Cancer	1.26	(0.71 2.23)	1.22	(0.67 2.20)	1.19	(0.68 2.11)	1.54	(0.83 2.88)
Lung, Pancreas, Ovarian	1.14	(0.60 2.14)	1.09	(0.55 2.14)	0.56	(0.29 1.09)	0.58	(0.30 1.14)
Other Cancer	1.33	(0.96 1.85)	1.45	(1.04 2.03)	0.75	(0.51 1.10)	0.80	(0.55 1.17)
No Cancer	Referent				Referent			

†High Mortality† Cancers include lung, pancreatic, and ovarian cancers

**Breast Cancer (n=279); Prostate Cancer (n=457); Colorectal Cancer (n=138); Lung, Pancreas, Ovarian (n=142); Other Cancer (n=353).

OR = odds ratios

CI = confidence intervals

Statistically significant findings ($p < 0.05$) noted in italics.

* ORs adjusted for age group, race, income, health status, number of comorbidities, medication insurance and year of survey experience.