## ORIGINAL ARTICLES

# Financial Status, Employment, and Insurance Among Older Cancer Survivors

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**BACKGROUND:** Few data are available about the socioeconomic impact of cancer for long-term cancer survivors.

**OBJECTIVES:** To investigate socioeconomic outcomes among older cancer survivors compared to non-ancer patients.

**DATA SOURCE:** 2002 Health and Retirement Study.

**STUDY DESIGN:** We studied 964 cancer survivors of > 4 years and 14,333 control patients who had never had cancer from a population-based sample of Americans ages ≥ 55 years responding to the 2002 Health and Retirement Study.

**MEASURES:** We compared household income, housing assets, net worth, insurance, employment, and future work expectations.

**ANALYSES:** Propensity score methods were used to control for baseline differences between cancer survivors and controls.

**RESULTS:** Female cancer survivors did not differ from non-cancer patients in terms of income, housing assets, net worth, or likelihood of current employment (all P> 0.20); but more were self-employed (25.0% vs. 17.7%; P=0.03), and fewer were confident that if they lost their job they would find an equally good job in the next few months (38.4% vs. 45.9%; P=0.03). Among men, cancer survivors and noncancer patients had similar income and housing assets (both P≥0.10) but differed somewhat in net worth (P=0.04). Male cancer survivors were less likely than other men to be currently employed (25.2% vs. 29.7%) and more likely to be retired (66.9% vs. 62.2%), although the P value did not reach statistical significance (P=0.06). Men were also less optimistic about finding an equally good job in the next few months if they lost their current job (33.5% vs. 46.9%), although this result was not significant (P= 0.11).

**CONCLUSIONS:** Despite generally similar socioeconomic outcomes for cancer survivors and noncancer patients ages ≥55 years, a better understanding of employment experience and pessimism regarding work prospects may help to shape policies to benefit cancer survivors.

## INTRODUCTION

More than two-thirds of all newly diagnosed cancers occur in individuals over 55 years of age [1]. Given a 5-year survival rate for all cancers exceeding 65% [2] and a 50% chance of surviving 20 years [3], older individuals comprise a large and growing population of cancer survivors.

Although the physical and psychological consequences of cancer survivorship are becoming better understood [4,5], few data are available about the socioeconomic impact of cancer. In a cohort of near elderly individuals, those who develop a new major chronic condition suffered large reductions in labor income and savings within 2 years of diagnosis [6]. Some studies suggest that cancer survivors may have lower employment rates than others; however, these studies mostly examine recently diagnosed cancer survivors and focus on specific cancer types such as breast cancer [7–10], head and neck cancer [11], and prostate cancer [12]. Few data are available about long-term socioeconomic indicators [5]. Existing evidence that income losses reduce quality of life among cancer survivors [13] raise the question of how aging cancer survivors fare as they near or pass retirement age.

We studied a population-based sample of older Americans to compare socioeconomic outcomes for long-term survivors (>4 years) of cancers of all types with that of a matched cohort of individuals who were never diagnosed with cancer. In addition to employment status, we also examined household income, assets, net worth, insurance, and future work expectations. We hypothesized that a history of cancer and its treatment may have a long-lasting negative effect on work opportunities and future socioeconomic status. Because of the growing numbers of cancer survivors, it becomes increasingly important for general internists to understand how cancer effects the life and opportunities of these individuals, as negative effects on socioeconomic status can also influence physical and psychological health.

## DATA SOURCES AND METHODS

### Data

We used data from the Health and Retirement Study (HRS), a nationally representative longitudinal study in the United States sponsored by the National Institute on Aging and conducted by the University of Michigan [14,15]. Designed to assess physical and mental health, insurance coverage, financial status, labor market status, and retirement planning of aging Americans, the study follows individuals born in 1947 or earlier who were noninstitutionalized at baseline. The response rates for the longitudinal survey are at least 80%; all cohorts oversampled Hispanics, Blacks, and Florida residents. The study population was surveyed every 2 years beginning in the early 1990s. We defined our outcomes using data from the 2002 wave, the most recent data available when we conducted our study, and we used data from previous waves to define and characterize our study cohorts.

### Cohort Population

As described previously [4], we defined long-term cancer survivors as individuals with a history of cancer, other than nonmelanoma skin cancer, diagnosed more than 4 years before the 2002 wave of the HRS survey. To identify cancer, we used the question "Has a doctor ever told you that you have cancer or a malignant tumor, excluding minor skin cancer?" Of the 16,696 respondents to the 2002 wave of the HRS survey, 2,313 reported a previous cancer. The 14,333 respondents who reported no history of cancer comprised the control group. Fifty individuals who did not respond to the question or whose responses conflicted with that of previous waves were excluded from analyses. Of the 2,313 individuals reporting a history of cancer, we excluded 856 who reported that the cancer was diagnosed in 1998 or later, 332 for whom we did not know the year of diagnosis, 2 who were diagnosed at less than 18 years of age, and 159 who reported a "new cancer" diagnosis or that they had received treatment for their cancer during the past 2 years, leaving a cohort of 964 long-term cancer survivors.

### Socioeconomic Outcomes

Respondents reported household income in the previous year, housing equity, and other assets. The sum of housing equity and other assets comprises a measure of net worth. In addition, respondents provided information about health insurance (categorized as Medicare, Medicaid, private, other, or uninsured), and whether they had prescription drug coverage. They reported their current employment status (working, unemployed, disabled, retired, or homemaker); and if working, whether they were self-employed, the hours worked per week, and whether they had missed work because of their health in the past year. To measure future work expectations, employed individuals were asked the following question "Suppose you lose your job this month. What is the chance that you could find an equally good job in the same line of work within the next few months?"

### Covariates

Respondents provided information about age, race, ethnicity, sex, education, place of birth, whether they had ever smoked cigarettes, number of children, self-rated childhood health, maternal and paternal education, whether they ever lived with grandparents during childhood, paternal job loss during childhood, and family socioeconomic status during childhood. We used indicators of socioeconomic status in childhood because previous research has shown that children who experience socioeconomic disadvantage are at high risk of suffering from multiple health problems by the time they reach adulthood [16,17]. Moreover, we selected covariates that would allow us to control for differences in cancer survivors and controls *before* they developed cancer.

### Analyses

We stratified all analyses by sex to allow for sex-specific effects of survivorship. Because cancer survivors differed from controls subjects in terms of age and some other health-related factors, we used propensity score methods to allow comparisons of cancer survivors with noncancer patients who were similar in observable characteristics [18,19]. Propensity score methods, a less parametric alternative to regression adjustment in situations where there are observed differences between treatment groups, are being used with increasing frequency in observational studies [20–25]. This approach, which involves comparing patients matched or stratified according to their propensity to be in a treatment versus comparison group, attempts to balance patient characteristics between groups, *as would occur in a randomized* experiment (e.g., if one could randomize individuals to being a cancer survivor or not). Propensity score methods permit control for all observed confounding factors that might influence both group assignment and outcome using a single composite measure. Regression-based approaches have been shown to be sensitive to departures from the specified relationship between confounders and outcomes, particularly when models include many potential confounders and there are large observed differences between treatment groups [26]. Moreover, a propensity score based approach has the advantage of either explicitly eliminating or implicitly downweighting observations for which observed characteristics overlap little with the other group. Thus, it uses only observations with sufficient overlap with respect to the confounding variables in estimating an effect from the data.

To conduct the propensity score adjustment, we used a logistic regression model to calculate the propensity of being a cancer survivor based on all covariates described above and then assigned each study participant a population-overlap weight equal to his or her propensity to be in the opposite group (i.e., if p is the predicted probability of being a cancer survivor, the weight=p for non-ancer survivors, and 1-p for cancer survivors) [27]. Like more commonly discussed inverse probability weighting techniques [28], this balances observed characteristics across treatment and control groups. However, in this case, characteristics are balanced to resemble those among overlapping portions of the treatment and control distributions of observed characteristics. This approach also minimizes the variance of our estimates, which can be excessively large in inverse probability weighting techniques

when individuals have a very low propensity score. Our results are robust to alternative propensity score matching approaches used recently in related analyses of cancer survivors both with and without trimming of cancer survivors who have the fewest matches from the noncancer survivor sample [29]. These approaches include 10-nearest neighbor matching and 10-nearest neighbor matching with trimming. Because results are nearly identical with these alternative approaches, for the sake of brevity, we show results from the weighting technique alone.

We used the Pearson statistic corrected for the survey design to compare whether the outcomes of interest were more or less prevalent among cancer survivors than among individuals with no cancer history. The inclusion of the propensity score weight controls for the patient demographics that were included in the propensity analysis. A P value of < 0.05 was used to indicate statistical significance.

In secondary analyses, we repeated all analyses with standard regression rather than the propensity score analyses, and results were quite similar. However, for men, these analyses demonstrated some small statistically significant differences in the likelihood of cancer survivors having Medicare over private insurance, having more days missed from work, and differences in assets. We chose to report only the propensity-adjusted results because we were concerned that some of these associations could be explained by the large age differences between cancer survivors and patients without cancer, which are better adjusted for in the propensity weighted analyses.

Analyses were conducted using Stata software, version 8 (StataCorp LP, College Station, Texas). Because the study used publicly available anonymous data, the Harvard Medical School Human Studies Committee deemed the protocol exempt from review.

## FINDINGS

The cohort included 964 cancer survivors who had a mean (SD) age of 68 (8.7) years for men and 69 (9.7) years for women. In a subset of cancer survivors for whom information about the type of cancer was available (N=433), the most frequently identified cancer types among women were breast cancer (36%), endometrial cancer (19%), cervix cancer (10%) and colon cancer (6%); the mean (SD) number of years since cancer diagnosis was 15.0 (9.6). Among men, the most frequently identified cancer types were prostate cancer (20%), bladder cancer (13%), colon cancer (12%) and renal cancer (6%); the mean (SD) number of years since diagnosis was 10.1 (6.8). Other types of cancer were represented in fewer than 2% of patients. Table 1 and Table 2 show the characteristics of cancer survivors and patients with no history of cancer, before and after (a single column reflecting distributions in both groups) propensity score adjustment for women and for men. Although cancer survivors were older than patients without cancer and tended to differ on other characteristics, after propensity score adjustment, all observed characteristics were equally balanced between the two groups.

Table 3 shows the current financial, insurance, and employment status of cancer survivors and individuals without a history of cancer, stratified by sex. Among women, cancer survivors did not differ from individuals with no cancer history

in terms of household income, assets, and net worth (all P> 0.20), but they were slightly more likely to be uninsured, although this finding did not reach statistical significance (6.0% vs. 4.0%; P=0.08). Also, insurance type and whether costs of medications were covered or not did not differ significantly between the two groups. Women did not differ in likelihood of current employment (29.5% of cancer survivors vs. 30.0% of individuals without cancer; P=0.74), but among working women, cancer survivors were more likely than other women to be self-employed (25.0% vs. 17.7%; P=0.03). Working cancer survivors did not differ from other working women in the number of hours worked per week or the likelihood of missing days from work (both P>0.20), but fewer female cancer survivors were confident that if they lost their job this month they would find an equally good job in the next few months (38.4% vs. 45.9%; P=0.03).

Table 3 shows that among men, cancer survivors and noncancer patients had similar income and assets (both P≥ 0.10), although they differed somewhat in net worth, with cancer survivors more likely to have net worth between $50,000 and $900,000 (P=0.04). Male cancer survivors did not differ from other men in likelihood of being uninsured or the type of insurance, but among those on medication, they were less likely than individuals without cancer to have the costs of those medications covered (P=0.005). Male cancer survivors were less likely than other men to be currently employed (25.2% vs. 29.7%) and more likely to be retired (66.9% vs. 62.2%), although this result did not reach statistical significance (P=0.06). Among working men, hours worked per week and likelihood of missing work due to health problems differed little across groups (both P>0.10). Among men who were working, fewer felt confident they could find an equally good job if they lost their job (33.5% vs. 46.9%), although this finding did not reach statistical significance (P=0.11).

## DISCUSSION

Encouragingly, we found relatively little socioeconomic impact of cancer survivorship in this cohort of older Americans. We observed similar income and assets, and few differences in employment and insurance. Male cancer survivors had a somewhat narrower distribution of net worth compared to men without cancer, whereas there were no differences in net worth between female cancer survivors and women without cancer. Men have traditionally been primary earners in the family, particularly individuals in the birth cohorts studied. Male cancer survivors may have pursued fewer high-risk earning strategies, thus protecting themselves from relatively low levels of wealth, but also missing opportunities for creating extreme wealth.

We observed that older male cancer survivors had a decreased likelihood of remaining in the workforce although this result did not reach statistical significance. Among working individuals, cancer survivors did not differ from others in hours worked or likelihood of work absences due to health. This in contrast to Yabroff et al. [30] who find more days lost from work among cancer survivors until 12 years after diagnosis. Among working women, self-employment was more common among cancer survivors. Survivors may choose self-employment because it implies a higher degree of autonomy, independence, and flexibility, which may be more acceptable to

**Table 1. Characteristics of Female Cancer Survivors and Patients with no History of Cancer, before and after Propensity Score Adjustment**

| Patient characteristic | Before propensity adjustment | | | Distribution in both cohorts after propensity adjustment |
| --- | --- | --- | --- | --- |
| | Cancer survivors (N = 617) | Patients with no history of cancer (N = 8,242) | P value* | |
| Age in years (%) | | | <0.001 | |
| < 60 | 15.0 | 15.9 | | 15.1 |
| 60–64 | 20.2 | 20.7 | | 20.3 |
| 65–69 | 19.2 | 15.5 | | 18.9 |
| 70–74 | 19.6 | 14.4 | | 19.2 |
| 75–79 | 14.2 | 12.9 | | 14.2 |
| ≥80 | 11.8 | 20.7 | | 12.3 |
| Race (%) | | | 0.17 | |
| White | 88.9 | 85.7 | | 88.7 |
| Black | 7.4 | 10.3 | | 7.6 |
| Other | 3.8 | 4.0 | | 3.8 |
| Hispanic ethnicity (%) | 4.7 | 6.8 | 0.10 | 4.8 |
| Education (%) | | | 0.59 | |
| No formal education | 3.2 | 4.0 | | 3.1 |
| Grade school or less | 19.9 | 20.3 | | 19.8 |
| High school | 35.6 | 36.4 | | 35.7 |
| Some college | 20.4 | 20.4 | | 20.4 |
| College graduate | 10.0 | 7.8 | | 9.9 |
| Graduate school | 8.9 | 8.3 | | 8.9 |
| Unknown | 2.1 | 2.7 | | 2.1 |
| Place of birth (%) | | | 0.15 | |
| New England | 4.4 | 5.1 | | 4.4 |
| Middle Atlantic | 18.2 | 15.1 | | 18.0 |
| East North Central | 17.3 | 17.5 | | 17.4 |
| West North Central | 12.0 | 10.6 | | 11.9 |
| South Atlantic | 14.1 | 14.5 | | 14.2 |
| East South Central | 8.7 | 7.9 | | 8.7 |
| West South Central | 8.5 | 10.3 | | 8.6 |
| Mountain | 4.0 | 3.1 | | 3.9 |
| Pacific | 6.8 | 6.0 | | 6.8 |
| Born outside of U.S. | 5.3 | 9.1 | | 5.5 |
| Ever smoked cigarettes (%) | | | 0.01 | |
| Yes | 35.4 | 29.4 | | 35.0 |
| No | 61.4 | 67.6 | | 61.9 |
| Unknown | 3.2 | 3.0 | | 3.1 |
| Number of children (%) | | | 0.13 | |
| 0 | 12.8 | 11.2 | | 12.6 |
| 1–2 | 38.0 | 36.9 | | 38.1 |
| 3–4 | 36.1 | 34.8 | | 36.1 |
| ≥5 | 11.4 | 15.8 | | 11.7 |
| Unknown | 1.6 | 1.2 | | 1.6 |
| Rating of health as a child (%) | | | 0.20 | |
| Excellent/very good | 76.5 | 75.6 | | 76.5 |
| Good | 15.3 | 18.0 | | 15.5 |
| Fair/Poor | 8.0 | 6.3 | | 7.9 |
| Unknown | 0.1 | 0.1 | | 0.1 |
| Mother's education (%) | | | 0.09 | |
| ≤8 years | 35.5 | 40.7 | | 36.0 |
| > 8 years | 53.7 | 48.8 | | 53.3 |
| Unknown | 10.8 | 10.5 | | 10.8 |
| Father's education (%) | | | 0.80 | |
| ≤ 8 years | 40.1 | 41.1 | | 40.1 |
| > 8 years | 42.2 | 42.5 | | 42.2 |
| Unknown | 17.7 | 16.4 | | 17.6 |
| Lived with grandparents when a child (%) | 25.1 | 23.4 | 0.43 | 24.9 |
| Father lost job when a child (%) | 19.4 | 19.0 | 0.78 | 19.4 |
| Family socioeconomic status when a child (%) | | | 0.52 | |
| Pretty well off | 7.3 | 6.9 | | 7.3 |
| About average | 60.6 | 62.8 | | 60.9 |
| Poor | 30.2 | 27.8 | | 30.0 |
| It varied | 0.8 | 1.2 | | 0.8 |
| Unknown | 1.0 | 1.4 | | 1.1 |

*Using the Pearson $\chi^2$ statistic corrected for the survey design. All variables in the table were included in the propensity score model.

**Table 2. Characteristics of Male Cancer Survivors and Patients with no History of Cancer, before and after Propensity Score Adjustment**

| Patient characteristic | Before propensity adjustment | | | Distribution in both groups after propensity score adjustment |
|---|---|---|---|---|
| | Cancer survivors (N = 347) | Patients with no history of cancer (N = 6091) | P value* | |
| Age in years (%) | | | <0.001 | |
| < 60 | 8.3 | 17.4 | | 8.7 |
| 60–64 | 12.9 | 24.5 | | 13.4 |
| 65–69 | 12.0 | 17.8 | | 12.4 |
| 70–74 | 22.3 | 14.4 | | 22.1 |
| 75–79 | 24.2 | 11.9 | | 23.3 |
| ≥80 | 20.2 | 14.0 | | 20.1 |
| Race (%) | | | 0.60 | |
| White | 89.4 | 87.7 | | 89.3 |
| Black | 7.6 | 8.5 | | 7.6 |
| Other | 3.0 | 3.9 | | 3.1 |
| Hispanic ethnicity (%) | 3.2 | 6.9 | 0.02 | 3.4 |
| Education (%) | | | 0.03 | |
| No formal education | 6.0 | 3.5 | | 5.8 |
| Grade school or less | 17.7 | 20.5 | | 17.9 |
| High school | 25.1 | 29.2 | | 25.4 |
| Some college | 21.2 | 17.6 | | 20.9 |
| College graduate | 14.3 | 11.6 | | 14.1 |
| Graduate school | 14.8 | 14.5 | | 14.8 |
| Unknown | 1.0 | 3.1 | | 1.1 |
| Place of birth (%) | | | 0.33 | |
| New England | 6.2 | 5.3 | | 6.3 |
| Middle Atlantic | 20.7 | 16.4 | | 20.4 |
| East North Central | 21.8 | 18.0 | | 21.5 |
| West North Central | 10.1 | 11.0 | | 10.1 |
| South Atlantic | 12.4 | 13.7 | | 12.6 |
| East South Central | 8.0 | 7.2 | | 7.9 |
| West South Central | 8.3 | 9.8 | | 8.3 |
| Mountain | 2.7 | 3.4 | | 2.7 |
| Pacific | 3.9 | 5.8 | | 4.1 |
| Born outside of U.S. | 5.8 | 8.3 | | 6.0 |
| Ever smoked cigarettes (%) | | | 0.24 | |
| Yes | 36.0 | 40.7 | | 35.9 |
| No | 61.3 | 55.5 | | 61.5 |
| Unknown | 3.8 | 2.7 | | 2.6 |
| Number of children (%) | | | 0.13 | |
| 0 | 16.8 | 12.2 | | 16.6 |
| 1–2 | 34.5 | 39.3 | | 34.8 |
| 3–4 | 32.8 | 34.4 | | 32.9 |
| ≥5 | 14.4 | 12.3 | | 14.2 |
| Unknown | 1.5 | 1.8 | | 1.5 |
| Rating of health as a child (%) | | | 0.86 | |
| Excellent/very good | 78.5 | 77.7 | | 78.4 |
| Good | 17.1 | 17.2 | | 17.1 |
| Fair/Poor | 4.1 | 5.0 | | 4.3 |
| Unknown | 0.2 | 0.1 | | 0.2 |
| Mother's education (%) | | | 0.71 | |
| ≤8 years | 37.4 | 37.4 | | 37.4 |
| > 8 years | 51.0 | 51.0 | | 51.1 |
| Unknown | 11.0 | 11.7 | | 11.5 |
| Father's education (%) | | | 0.87 | |
| ≤ 8 years | 37.6 | 39.1 | | 37.9 |
| > 8 years | 46.7 | 46.0 | | 46.5 |
| Unknown | 15.8 | 15.0 | | 15.7 |
| Lived with grandparents when a child (%) | 24.6 | 23.6 | 0.71 | 24.5 |
| Father lost job when a child (%) | 23.9 | 20.5 | 0.17 | 23.5 |
| Family socioeconomic status when a child (%) | | | 0.13 | |
| Pretty well off | 10.2 | 6.7 | | 10.0 |
| About average | 52.3 | 60.0 | | 52.6 |
| Poor | 33.4 | 30.3 | | 33.4 |
| It varied | 1.4 | 1.1 | | 1.4 |
| Unknown | 2.7 | 1.8 | | 2.6 |

*Using the Pearson $\chi^2$ statistic corrected for the survey design. All variables in the table were included in the propensity score model.

**Table 3.  Financial Status, Insurance, and Employment, of Cancer Survivors and Individuals Without Cancer, Stratified by sex**

| | Women | | | | Men | | | |
|---|---|---|---|---|---|---|---|---|
| | Total N | Adjusted proportion of cancer survivors | Adjusted proportion of patients with no history of cancer | P value* | Total N | Adjusted proportion of cancer survivors | Adjusted proportion of patients with no history of cancer | P value* |
| *Income, assets, and net worth* | | | | | | | | |
| Household income | 8859 | | | 0.50 | 6438 | | | 0.63 |
| < $20,000 | | 32.0 | 31.5 | | | 17.7 | 19.4 | |
| $20,000–39,999 | | 26.3 | 27.1 | | | 29.8 | 28.0 | |
| $40,000–59,999 | | 15.2 | 15.5 | | | 19.1 | 18.3 | |
| $60,000–79,999 | | 7.0 | 9.2 | | | 14.0 | 11.5 | |
| $80,000–99,999 | | 6.3 | 5.5 | | | 6.5 | 6.9 | |
| ≥$100,000 | | 13.2 | 11.2 | | | 12.8 | 15.9 | |
| Assets | 8859 | | | 0.81 | 6438 | | | 0.10 |
| < $10,000 | | 26.4 | 26.2 | | | 17.6 | 17.8 | |
| $10,000–49,999 | | 18.0 | 20.2 | | | 18.0 | 19.2 | |
| $50,000–149,999 | | 19.5 | 19.3 | | | 20.3 | 19.0 | |
| $150,000–299,999 | | 14.2 | 13.2 | | | 14.7 | 15.5 | |
| $300,000–599,99 | | 11.1 | 11.2 | | | 19.8 | 14.2 | |
| ≥$600,000 | | 10.8 | 10.0 | | | 9.7 | 14.3 | |
| Net worth | 8859 | | | 0.54 | 6438 | | | 0.04 |
| < $50,000 | | 26.1 | 24.6 | | | 14.0 | 17.9 | |
| $50,000–99,999 | | 9.6 | 12.3 | | | 11.0 | 10.6 | |
| $100,000–249,999 | | 24.2 | 23.6 | | | 26.3 | 23.0 | |
| $250,000–499,999 | | 17.9 | 18.7 | | | 21.3 | 20.7 | |
| $500,000–899,999 | | 12.0 | 11.7 | | | 18.7 | 14.8 | |
| ≥$900,000 | | 10.1 | 9.1 | | | 8.7 | 13.1 | |
| *Insurance* | | | | | | | | |
| Insurance status | 8859 | | | | 6438 | | | 0.84 |
| Uninsured | | 6.0 | 4.0 | 0.08 | | 2.2 | 2.5 | |
| Insured | | 94.0 | 96.0 | | | 97.8 | 97.5 | |
| Type of insurance (among insured) | 8429 | | | 0.59 | 6155 | | | 0.33 |
| Medicare | | 58.6 | 57.6 | | | 69.7 | 66.7 | |
| Medicaid | | 2.4 | 2.1 | | | 0.2 | 0.5 | |
| Private | | 35.5 | 37.7 | | | 22.0 | 25.5 | |
| Other | | 3.5 | 2.6 | | | 8.2 | 7.3 | |
| Are the costs of your medications covered? (among patients on medications) | 7426[†] | | | 0.76 | 4867[†] | | | 0.005 |
| Completely | | 10.9 | 9.4 | | | 8.3 | 10.5 | |
| Mostly | | 39.6 | 40.6 | | | 34.8 | 44.8 | |
| Partially | | 28.5 | 29.4 | | | 30.3 | 25.7 | |
| Not at all | | 21.0 | 20.6 | | | 26.4 | 18.6 | |
| Unknown | | 0 | 0 | | | 0.1 | 0.4 | |
| Has long-term care insurance | 8859 | | | 0.52 | 6438 | | | 0.76 |
| Yes | | 11.1 | 12.0 | | | 11.7 | 12.3 | |
| No | | 88.9 | 88.0 | | | 88.3 | 87.7 | |
| *Employment* | | | | | | | | |
| Current employment | 8859 | | | 0.74 | 6438 | | | 0.06 |
| Working now | | 29.5 | 30.0 | | | 25.2 | 29.7 | |
| Unemployed | | 1.3 | 1.5 | | | 0.2 | 1.3 | |
| Disabled | | 5.1 | 6.4 | | | 5.5 | 5.7 | |
| Retired | | 38.5 | 35.9 | | | 66.9 | 62.2 | |
| Homemaker | | 24.1 | 24.8 | | | 0.7 | 0.0 | |
| Unknown | | 1.6 | 1.4 | | | 1.5 | 1.1 | |
| Self-employed (among those currently working) | 2520 | 25.0 | 17.7 | 0.03 | 2522 | 32.2 | 29.4 | 0.58 |
| Hours working per week (among those currently working) | 2520 | | | 0.42 | 2522 | | | 0.11 |
| < 40 | | 47.6 | 47.9 | | | 39.7 | 29.2 | |
| 40 | | 27.9 | 33.3 | | | 18.6 | 32.4 | |
| > 40 | | 22.1 | 17.4 | | | 36.2 | 36.3 | |
| Unknown | | 2.4 | 1.5 | | | 5.4 | 2.2 | |
| Missed days from work because of health | 2520 | | | 0.46 | 2522 | | | 0.15 |
| Yes | | 42.2 | 38.9 | | | 40.1 | 30.3 | |
| No | | 57.8 | 61.1 | | | 59.9 | 69.7 | |

### Table 3. (Continued)

| | Women | | | | Men | | | |
|---|---|---|---|---|---|---|---|---|
| | Total N | Adjusted proportion of cancer survivors | Adjusted proportion of patients with no history of cancer | P value* | Total N | Adjusted proportion of cancer survivors | Adjusted proportion of patients with no history of cancer | P value* |
| Suppose you were to lose your job this month. What do you think are the chances that you could find an equally good job in the same line of work within the next few months? (mean) | 1944[‡] | 38.4 | 45.9 | 0.03 | 1470[‡] | 33.5 | 46.9 | 0.11 |

*Using the Pearson $\chi^2$ statistic corrected for the survey design. A second set of propensity score models was used for the final four comparisons that included only individuals who reported that they were currently working.

[†]Asked only of those with insurance. Dually eligible individuals (those reporting Medicare and Medicaid) are assigned to Medicare. Individuals reporting Medicare and private insurance were assigned to Medicare unless they report that their private plan was the primary insurance plan.

[‡]Asked only of those currently working and not self-employed.

them. Alternatively, more self-employment among cancer survivors may reflect discrimination by employers because of concerns about their health. We did not find more self-employment among men, who may be more likely to be the primary insured individual in the family and may rely more on employer-sponsored insurance, particularly for men who are not eligible for Medicare. Another recent report also found relatively similar employment outcomes for cancer survivors who were free of disease, although cancer survivors with recurrent or new cancers were less likely to remain employed [31].

Although we observed a trend towards more uninsurance among women cancer survivors overall, insurance status among cancer survivors and noncancer patients was quite similar. A recent study likewise found small differences in insurance status [32]. Nevertheless, male cancer survivors taking medications were less likely than others to have the costs of those medications covered, which could have substantial financial effect, particularly given the high costs of newer cancer-related medications. The availability of prescription coverage for Medicare beneficiaries via Medicare Part D may help, although out of pocket expenses can be high for patients who require expensive medications.

Both female and male cancer survivors were less optimistic about finding an equally good job in the next few months if they lost their current job, although this result was not statistically significant for men. Other studies have documented general future uncertainty [33], and cancer survivorship may affect individuals in ways that cannot be assessed by traditional measures of earnings and assets. The result could also be explained by expected or experienced discrimination from employers.

The sex differences in employment and financial outcomes for cancer survivors could be explained by differences in the types of cancers survived, either due to differences in the severity of sequelae, or because some cancers, such as breast cancer, are associated with higher socioeconomic status compared with other cancers. In addition, age, comorbidities, family responsibilities, marital status, cultural norms, and education may affect decisions to retire [26].

Our findings should be interpreted in light of several limitations. First, we relied on survey data that may be subject to response bias and recall bias. Second, we studied elderly cancer survivors with all types of cancers, yet variations in employment outcomes are likely to differ by age and cancer type [34]. More negative employment outcomes have been shown for head and neck cancers [11, 35] than for other cancer types [7–10]. Although we had information about cancer type for a subset of patients, we had insufficient power to conduct analyses within these subgroups. Third, we had limited information about previous treatments for cancer survivors; combining patients with more and less aggressive treatments may have masked differences in outcomes related to treatment. Data suggest, however, that adjuvant therapy for patients with breast cancer does not affect employment status [7,8]. Nevertheless, in our cohort of patients with various cancer types, we cannot rule out the possibility that differences in comorbidity from cancer-directed treatments to organs such as the heart and kidneys might influence the health status for some cancer survivors in the cohort. Fourth, because propensity score methods control for observed characteristics only, any unobserved differences between cancer survivors and others could affect our results. Fifth, our cohort of cancer survivors consisted of many patients whose cancer diagnosis occurred years earlier (mean of 15 years for women and 10.1 years for men). We only had information on the number of years since cancer diagnosis for a subset of the cohort, and sample sizes were too small to determine whether larger differences in socioeconomic outcomes might have been evident for cancer survivors with more recent versus more distant cancer diagnoses. In addition, although the Health and Retirement Study did not specifically validate its question about history of cancer, other studies have demonstrated the validity of self-reported comorbidity information [36–38]. Finally, the study may have been underpowered to identify small differences, particularly in the male cohort where we had only 347 cancer survivors. For example, while we had adequate power to detect a difference of approximately 2 percentage points in rates of uninsurance for women (e.g., 4.0% vs. 6.1%), for men we had power to detect a difference of more than 3 percentage points (e.g., 2% vs. 5.2%).

## CONCLUSIONS

Long-term cancer survivors and individuals without cancer ages 55 years or older showed relatively similar socioeconomic outcomes. However, male cancer survivors were more likely to

leave the workforce for retirement and had less generous prescription drug coverage. Among women, cancer survivors and others were equally likely to be employed, but employed women cancer survivors more often opted for self-employment. Both men and women cancer survivors were less optimistic than others about their future work. A better understanding of cancer survivors' labor market experience and pessimism regarding work prospects would help to shape labor market policies that might help cancer survivors and all individuals with chronic conditions, to maintain work longer. Examples of such policies might include antidiscrimination policies, policies limiting or prohibiting the exclusion of individuals with pre-existing conditions, changes in the structure of health insurance that might contain costs of employer sponsored health insurance coverage, or policies to foster flexible workplace conditions and access to resources such as employee assistance programs.

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