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Original Research Article

The impact of cancer on employment among cancer survivors

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ABSTRACT

Background: This study investigates the short- and long-term effects of cancer on the probability of working and hours of work among male and female cancer survivors.
Methods: We used 1996-2010 data from the Health and Retirement Study and estimate the cancer effect on employment status and work hours among cancer survivors. In addition to the incidence of cancer, we control demographic and financial characteristics. The sample comprises 7,551 individuals. The prevalence estimate of cancer was 4.3% for males (N=562) and 5.2% for females (N=855). The average time since diagnosis was 5.07 years (SD=5.6; range: 1-38) for males and 7.76 years (SD=7.72 range: 1-40) for females.
Results: Female and male cancer survivors experience different labor market outcomes following diagnosis. For females, two years or less since diagnosis, the probability of working was eight percentage points ($p<0.01$) less than that for the control group. For males, there was a seven-percentage point ($p<0.01$) reduction between three and five years since diagnosis. Employed men, two years or less since diagnosis, worked 2.76 hours ($p<.10$) less per week; employed women, three to five years since diagnosis, worked 4.70 hours ($p<0.05$) less per week. For married men, the availability of a spouse's employer-provided health plan decreased the probability of working by nine percentage points. For married women, this effect was stronger by 15 percentage points.
Conclusions: The reduction in work following a cancer diagnosis causes survivors to experience a greater economic burden. Policymakers should formulate policies to decrease this economic burden.

Keywords: Cancer survivors, Employment, Hours of work, Economic burden, Health insurance

INTRODUCTION

In the United States, cancer has a major impact on society and is the second most frequent cause of death. According to the NCI (National cancer institute), the number of people surviving after a cancer diagnosis reached approximately 15.5 million in 2016 and will rise to approximately 20.3 million by 2026.[1] The five-year survival rates of those diagnosed with cancer have increased by 20 percentage points among white Americans and 24 percentage points among African-Americans. However, improvements in survival have been more pronounced among patients aged 50 to 64 than among those older than 65.[2] Advances in the treatment of cancer and the resulting increases in cancer survival rates have prompted researchers to examine the effect of cancer on survivors' employment. Past studies have examined survivors' quality of life and found that they continue to work and perform their usual work duties even after being diagnosed with cancer.[3-5] Overall, cancer has a negative impact on survivors' employment compared with that of the non-cancer control group. However, the literature on cancer's short- and long-run impacts has shown different results in terms of impact significance and size.[6-9] Bradley et al studied the long-term effect of cancer on survivors and concluded that

cancer survivors work significantly more than 40 hours per week.[6] Chirikos et al focused on the long-term economic burden of breast cancer survivors and found that, compared to the annual national average number of hours worked, survivors worked 455 hours less, whereas the people in a control group worked 259 hours less.[10] Maunsell et al found that three years post-diagnosis, breast cancer survivors who were employed worked 1.7 hours per week more than those in the non-breast cancer group.[11] Short et al estimated that both male and female cancer survivors work on average 3 to 5 hours per week less than individuals in a non-cancer group.[8] Bradley et al found that breast cancer survivors are less likely to work within six months after being diagnosed with cancer.[12]

Aim and objectives

The objective of this study was to examine the effect of cancer on the probability of working for samples of males and females. We specifically investigated the short- and long-term impacts of cancer on labor supply by taking advantage of panel data and including the number of years after the cancer diagnosis in our analysis. Using panel data improves the efficiency of estimates by increasing the degrees of freedom and reducing the collinearity among the explanatory variables.[13] In addition, we examined the hours worked by cancer survivors. We used a married couple's sample to control for the true effect of health insurance on the probability of working. Furthermore, we tested the hypothesis that cancer survivors who are married and insured by their spouses are less likely to work than survivors without spouses' health insurance and those in the married non-cancer group.

METHODS

Study design

The outcomes of interest are employment status and weekly hours worked. Aside from the incidence of cancer, we control for other explanatory variables that may affect one's decision to work, including demographic and financial characteristics. We control for age, level of education (less than high school, high school, college/some college, more than college), race/ethnicity (African-American, white/other, Hispanic, and non-Hispanic), spouse's health insurance, spouse's earning, type of occupation: white-collar 1 (includes managerial specialty operation and technical support; white-collar 2 includes sales, clerical, and administrative support or services; and blue-collar includes farming, forestry, fishing, mechanics and repair, construction trade and extractors, precision production, and operators), white-collar 2, blue-collar, presence of children younger than 18, and wealth (the value of a respondent's housing equity plus non-housing equity). In our analysis, we capture the impact of cancer through a categorical variable because the impact of cancer on employment is not linear.[14] The employment equation is as follows:

$$E_{it}^{*} = f(CA_{it}, X_{it}, SHI_{it}, SE_{it}, CD_{it})$$

where E_{it}^{*} is a binary variable that equals one if, in year t, respondent i replies "yes" to the question "are you currently gainfully employed?" and zero otherwise. Cancer (CA_{it}) is an ordinal variable ranging from 0 to 3 (0=no cancer, 1=cancer two years or less prior to interview, 2=between two and five years prior to interview, 3=cancer five or more years prior to interview) for an individual i at time t. The exogenous variables (X_{it}) include availability of spouse's health insurance, the natural log of spouse's earning (SE_{it}), and other chronic health diseases (CD_{it}). The employment equation is estimated using a probit model for panel data. Thus, the probit estimates are reported as marginal effects of the independent variables. We also estimated the average weekly hours worked for those employed. When the dependent variable is censored, it is common to use Heckman's sample-selection models to estimate the aforementioned model.[15] H_{it} is defined as the weekly average number of hours worked for individual i in year t, and as follows for those who were employed and reported a positive number of hours worked:

$$H_{it} = 0 \; if \; E_{it} = 0$$

$$H_{it} = \beta_0 + \beta_1 CA_{it} + X_{it}\beta_2 + \beta_3 SHI_{it} + \beta_4 SE_{it} + \beta_5 CD_{it} + \varepsilon_i \; if \; E_i = 1.$$

Study place and period

Participants come from the health and retirement study (HRS). The HRS is a representative national longitudinal U.S. sample of adults over 50 and has been a comprehensive source of information on the health and economic circumstances of the aging population for more than 20 years. The HRS is sponsored by the National institute on aging (grant number NIA U01AG009740) and is conducted by the University of Michigan. For our sample, we use the data collection period for the 1996-2010 interview (May 1996 through November 2011). We combine eight years (1996,1998, 2000, 2002, 2004, 2006, 2008 and 2010) of HRS core data files. One of the advantages of employing a large panel dataset is the ability to reduce the effect of endogeneity bias, and the estimates are more efficient compared with those from cross-sectional analyses.[16]

Selection criteria

To capture the short- and long-term impacts of cancer on the employment, we merge the HRS dates of cancer diagnosis with the RAND HRS file. The RAND HRS file is a cleaned version of the HRS core interviews. After excluding respondents older than 65 and observations with missing information, the sample comprise a total of n=7,551 individuals and N=30,020 observations. The data are unbalanced because the respondents entered the HRS at different times.

Procedure

Our non-cancer group consisted of the respondents who replied "no" to the question "Has a doctor ever told you that you have cancer or a malignant tumor of any kind?" Those who replied "yes" were placed in our cancer group. The prevalence estimate of cancer was 4.3 % for males (N=562) and 5.2 % for females (N=855). The average time since diagnosis was 5.07 years (SD=5.6; range: 1-38) for males and 7.76 years (SD=7.72; range: 1-40) for females (Figure 1).

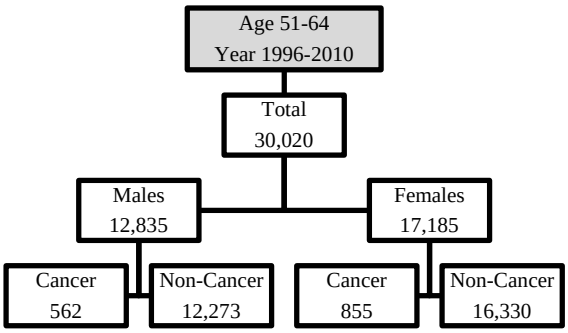

Figure 1: Diagram of sample.

Statistical analysis

Overall, this sample can be described as comprising predominantly white, middle-aged individuals (mean age is 58 and 56 for men and women, respectively) with a high school education or better. Males and females with cancer were significantly different from the respective control groups of individuals at their age. Smaller percentages of those with cancer worked (68% versus 76% and 56% versus 64% for males and females, respectively), but those who worked and had cancer worked nearly the same number of hours per week as those in the corresponding control group (41% versus 43% for men; for women, 36% in both groups).

RESULTS

Likelihood of employment

Estimating our labor supply equation, we first report results from the probit employment equation (Table 2). The key results are the coefficients for the number of years since the first cancer diagnosis. Overall, cancer survivors are less likely to be employed. However, the results tend to be different for males and females. Male cancer survivors are more likely to be economically impacted in the long term (-0.47, $p<0.05$), whereas female cancer survivors are more likely to be impacted immediately after their diagnosis or a few years after it (-0.43, $p<0.01$). Rather than reporting the coefficient estimates from the probit model, we present the marginal effects (MEs). For binary independent variables, the MEs measure how much predicted probabilities change when the binary independent variable changes from 0 to 1, with all other variables held constant at their means.

$$\text{Marginal Effect } X_k = pr(Y = 1|X, X_k = 1) - pr(Y = 1|X, X_k = 0).$$

The change in the probability of working for a unit increase in each covariate when all the other covariates are kept constant at their mean values is depicted in (Table 3). The marginal effects on the probability of working show that more than five years after diagnosis, holding all covariates constant at their mean, the effect of cancer on males is negative and statistically significant (-0.07, $p<0.05$). This effect is also negative but not statistically significant for females (-0.03). Two years or less after diagnosis, the effect of cancer on females is negative and statistically significant (-0.08, $p<0.01$). This same effect is also negative but not statistically significant for males (-0.03). Overall, the likelihood of employment for female cancer survivors decreases by eight percentage points in the short term, and for male cancer survivors by three percentage points in the long term. This finding supports the results of Bradley et al.[6,17] For both genders, for three years or between three and five years after diagnosis, the coefficient estimates are negative but not statistically significant. As the findings suggest, for females, the short-term impact of cancer is larger and significant, whereas, for males, the same impact is larger and significant as the number of years since diagnosis increases. Overall, the effect of cancer is larger for females than for males. Other chronic health conditions have negative effects on the likelihood of employment, and these effects are statistically significant. They are larger for males than for females. Among them, stroke has the largest and high blood pressure has the lowest effects for males (-0.15, $p<0.01$; -0.02, $p<0.10$) and females (-0.14, $p<0.01$; 0.02, $p<0.10$).

The effects of other explanatory variables, including demographical, socioeconomic, and lifestyle variables, are summarized as follows: Female smokers were 4 percentage points less likely to be employed compared with female non-smokers ($p<0.01$) and male smokers 2 percentage points less likely to be employed ($p<0.10$). Female blue-collar workers were 5 percentage points less likely to be employed compared with female white-collar workers ($p<0.05$) and male blue-collar workers 8 percentage points less likely to be employed compared with male white-collar workers ($p<0.01$). Women with children younger than 18 tended to work 10 percentage points less ($p<0.01$). The presence of children younger than 18 had a positive nonsignificant effect (0.02) on men's employment status. Education had a positive effect on both genders' likelihood of employment. Hispanic males were 4 percentage points more likely to be employed, whereas Hispanic females were 5 percentage points less likely to be employed ($p<0.05$), compared with non-Hispanic individuals. Spouse's earnings had a significant positive effect on the likelihood of employment ($p<0.01$). However, the size of the effect was negligible for both males and females (0.01). According

to Bradley et al, this finding may reflect "assortative mating or complementarities in the consumption of time of older men and women" (p=0.1319).[14]

Employment-based health insurance is an important contributor to labor supply decisions in the United States.

Table 1: Descriptive statistics for married males and married females.

Variables	Males			Females		
	Cancer (N=562)	Non-cancer (N=12,273)	Total (N=12,835)	Cancer (N=855)	Non-cancer (N=16,330)	Total (N=17,185)
Labor supply (%)	67.79%***	75.60%	75.26%	55.91%***	64.72%	64.28%
Age (years)	59.59***	58.04	58.11	56.97***	56.25	56.29
Years since diagnosis	5.07			7.76		
>High school (%)	10.32***	15.64	15.40	11.70***	13.66	13.56
High school (%)	28.47*	32.75	46.86	37.78*	37.79	37.79
College/some (%)	30.78	22.86	23.21	25.50	26.39	26.35
<College (%)	30.43***	28.75	28.82	25.03***	22.16	22.30
White/other (%)	89.32***	89.51	89.50	89.94***	88.59	88.65
Black (%)	10.68***	10.49	10.50	10.06***	11.41	11.35
Hispanics (%)	3.20***	10.60	10.28	5.15***	9.65	9.43
Wealth† (%)	5.54***	4.42	4.46	3.87***	4.33	4.31
High blood pressure (%)	45.73***	41.15	41.35	43.04***	35.96	36.32
Diabetes (%)	14.95***	13.09	13.17	12.40***	9.77	9.90
Lung (%)	2.85***	3.50	3.47	6.55***	3.96	4.09
Heart (%)	20.11***	13.85	14.13	9.94***	8.66	8.72
Stroke (%)	2.85***	2.87	2.87	3.86***	2.06	2.15
Psychiatric problems (%)	12.10***	7.39	7.60	16.49***	14.06	14.18
Smoking (%)	70.82***	66.24	66.44	52.75***	47.66	47.91
Drinking (%)	2.67***	5.17	5.06	0.70***	0.85	0.84
White collar 1 occupation (%)	37.37***	34.11	34.25	36.96***	33.00	33.19
White collar 2 occupation (%)	26.16	19.61	19.90	54.97	53.93	53.98
Blue collar occupation (%)	36.48***	46.28	45.85	8.07***	13.08	12.83
Spouse's health insurance (%)	19.93*	15.29	15.49	37.19*	36.18	36.23
Hours work (%)	40.94***	43.45	43.34	35.93***	36.20	36.77
Spouse's earning‡	5.32***	5.87	5.85	5.85***	6.01	6.00

† Wealth is computed as total of all assets excluding the secondary residence, and divided by 100,000, ‡ Spouse's earning is measured by its natural logarithm, *Significantly different from sample without cancer at p<0.10, **p<0.05, ***p<0.01.

Cancer survivors may decide to remain in the labor market to maintain their insurance against treatment expenses.[14] To control for the potential endogeneity of health insurance in labor supply, we include spouse's health insurance in our estimation instead of employer-provided health insurance.[14-18] Spouse's health insurance has a significant negative effect on the likelihood of employment for both men (-0.09, p<0.01) and women (-0.15, p<0.01). In another specification, we also test the hypothesis that married women with cancer and spouse's health insurance are less likely to work due to the interaction between spouse's insurance coverage and cancer. The influence of spouse's health insurance on the probability of working for cancer survivors is depicted in (Table 4). The results show that the effect of spouse's health insurance on female cancer survivors' labor supply is negative (-1.09) and strongly significant (p<0.01). Further, the effect of spouse's health insurance on male cancer survivors' labor supply is negative (-0.73) and significant (p<0.05). Our results support Bradley et al finding that the likelihood of employment for cancer survivors whose spouses have employer-provided health insurance is significantly different from that of survivors without spouse's health insurance.[6]

Hours worked

The results from the Heckman sample selection model for hours worked is shown in (Table 5). Because our data have a panel structure, the regular Heckman command in Stata does not work. We first estimate the selection equation via xtprobit to obtain estimates of Mill's ratio.

We then use Mill's ratio as an explanatory variable in the wage equation, where only the truncated dependent variable is considered, and we estimate this equation to obtain the probability that the selection variable equals one. However, since we conducted the two-stage analysis manually, we must correct the standard errors in the second stage by bootstrapping both regressions' error terms (using xtprobit and xtreg) simultaneously to account for the inter-equation correlation between them. The number of replications was set at 50.[13]

Table 2: Probit coefficient estimates, a sample of married.

Variables	Males (N=12,936)	Se.	Females (N=17,669)	Se.
Years since diagnosis with cancer (years)				
≤2	-0.22	(0.18)	-0.43***	(0.14)
>2 to <5	-0.15	(0.20)	-0.25	(0.18)
≥ 5	-0.47**	(0.21)	-0.14	(0.12)
Age	-0.18***	(0.01)	-0.12***	(0.01)
Child 0-18	0.16	(0.11)	-0.52***	(0.08)
>High school	-0.09	(0.13)	-0.52***	(0.11)
College/some	0.21*	(0.11)	0.19**	(0.08)
<College	0.43***	(0.12)	0.26***	(0.10)
African American	-0.13	(0.13)	0.04	(0.10)
Hispanic	0.27**	(0.14)	-0.28**	(0.12)
Wealth†	0.01	(0.01)	-0.01***	(0.01)
High blood pressure	-0.14*	(0.07)	-0.09*	(0.05)
Diabetes	-0.50***	(0.09)	-0.29***	(0.08)
Lung disease	-0.66***	(0.18)	-0.54***	(0.12)
Heart disease	-0.53***	(0.10)	-0.34***	(0.09)
Stroke	-0.88***	(0.23)	-0.73***	(0.17)
Psychiatric problems	-0.88***	(0.14)	-0.66***	(0.07)
Smoking	-0.16*	(0.09)	-0.22***	(0.06)
Drinking	0.15	(0.12)	0.06	(0.19)
White-collar2 occupation	-0.10	(0.11)	-0.10	(0.08)
Blue-collar occupation	-0.53***	(0.10)	-0.29**	(0.11)
Spouse's health insurance	-0.61***	(0.08)	-0.78***	(0.04)
Spouse's earning‡	0.06***	(0.01)	0.06***	(0.01)
Constant	12.23***	(0.60)	8.11***	(0.30)
δ_{μ}	1.18***	(0.07)	1.05***	(0.05)
Number of respondents	3,391		4,160	
Log likelihood	-4965		-7838	

Reference groups are no children under 18 residing with respondent, high school diploma, white collar1 occupation, non-Hispanic, white/other, no spouse's health insurance, no chronic health conditions, no smoking, and no drinking. Robust standard errors in parentheses. † Wealth is computed as total of all assets excluding the secondary residence, and divided by 100,000. ‡ Spouse's earning measured by its natural logarithm. *** p<0.01, ** p<0.05, * p<0.1.

The bootstrapped results for hours worked are depicted in (Table 5). The results suggest that two years or less after their cancer diagnosis, employed men work 2.76 hours less per week (p<0.10) than employed men without cancer and employed women work 1.45 hours less per week than employed women without cancer, however, the result is not statistically significant. Our finding disagrees with the result by Bradley et al in terms of the direction of the coefficient.[14] They found that employed women with breast cancer work three and a half hours more per week compared with women without cancer. Employed female survivors, between two and five years since cancer diagnosis, work 4.70 hours less per week (p<0.05) than those without cancer. The same result for employed men is negative (-0.64) and nonsignificant. Five years or more after their cancer diagnosis, employed women work 2.70 hours per week less and employed men work 2.25 hours per week less. However, these results are nonsignificant. Other comorbidities have no significant effect on hours worked. With regard to the health insurance effect, employed women cancer survivors whose spouses have health insurance work 1.93 hours less per week (p<0.01) and employed men cancer survivors whose spouses have health insurance work 1.42 hours less (p<0.10). These coefficients imply that spouse's insurance coverage increases the probability that both female and male cancer survivors will work less.

DISCUSSION

Increasing the rate of cancer survival increases the rate at which cancer survivors return to work. Thus, the examination of the economic burden on cancer survivors is critical for alleviating their work-related concerns. This study aimed to investigate the effect of cancer on the labor market outcomes for a sample of married people. The two outcomes of interest were employment status and hours worked.

Table 3: Marginal effects of probit coefficient estimates.

Change in y given unit change in x	Males	Se.	Females	Se.
Cancer years since diagnosis (year)				
≤2	-0.03	(0.03)	-0.08***	(0.03)
>2 to <5	-0.02	(0.03)	-0.05	(0.03)
≥ 5	-0.07**	(0.04)	-0.03	(0.02)
Age	-0.03***	(0.01)	-0.02***	(0.00)
Child 0-18	0.02	(0.01)	-0.10***	(0.01)
>High school	-0.01	(0.02)	-0.10***	(0.02)
College/some	0.03**	(0.02)	0.03**	(0.02)
<College	0.06***	(0.02)	0.05***	(0.02)
African American	-0.02	(0.02)	0.01	(0.02)
Hispanic	0.04**	(0.02)	-0.05**	(0.02)
Wealth†	0.01	(0.00)	-0.01***	(0.00)
High blood pressure	-0.02*	(0.01)	-0.02*	(0.01)
Diabetes	-0.08***	(0.01)	-0.06***	(0.02)
Lung disease	-0.11***	(0.03)	-0.10***	(0.02)
Heart disease	-0.08***	(0.02)	-0.07***	(0.02)
Stroke	-0.15***	(0.04)	-0.14***	(0.03)
Psychiatric problems	-0.14***	(0.02)	-0.13***	(0.01)
Smoking	-0.02*	(0.01)	-0.04***	(0.01)
Drinking	0.02	(0.02)	0.01	(0.04)
White collar2 occupation	-0.01	(0.01)	-0.02	(0.01)
Blue collar occupation	-0.08***	(0.01)	-0.05**	(0.02)
Spouse's health insurance	-0.09***	(0.01)	-0.15***	(0.01)
Spouse's earning‡	0.01***	(0.00)	0.01***	(0.00)

The panel structure of the data allowed us to improve the efficiency of the results by observing changes over time. To control for the short- and long-term impact of cancer, we grouped individuals into people who did not have cancer, people diagnosed with cancer two years or less prior to their interview, those diagnosed three or between three and five years prior, and those diagnosed five or more years prior. We conducted separate analyses for males and females since it has been shown in the related labor market literature that there is a gender labor market attachment differential. We found that the short- and long-term effects of cancer on employment vary by gender. Our results indicate that the probability of working for female cancer survivors is 8 percentage points ($p<0.01$) less in the short-term (two years or fewer since diagnosis) and the probability of working for male cancer survivors is 7 percentage points ($p<0.01$) at three or between three and five years since diagnosis. We also found that, in the years immediately following their diagnosis, employed men work 2.76 hours ($p<0.10$) per week less than other employed men. Further, three to five years after their diagnosis, employed women work 4.70 hours ($p<0.05$) per week less than employed women in the non-cancer group. The availability of health insurance coverage under a spouse's employer-provided health plan has a considerable effect on survivors' return to work. Past studies have shown large negative effects of spouse's health insurance on labor supply.[17-19] Our estimates of the effect of spouse's health insurance support the results of past studies and suggest that the effect on cancer surviving wives is large and that, for both genders, those with access to health insurance through their spouse's employer are less likely to be employed. Furthermore, those with cancer and access to health insurance through their spouse's employer are less likely to work than those with health insurance through their own employer.

Limitations

Limitations of current study were; first, the effect of cancer on employment differs depending on the type of cancer. However, in the HRS dataset, information on cancer types is restricted and not publicly available. Second, the stage of cancer is another factor affecting cancer survivors' employment status and return to work which is not taken into account. However, there are no details on the stage of cancer in the HRS dataset.

Table 4: Influence of spouse's health insurance on probability of cancer vs. non-cancer group, a sample of married.

Variables	Males	Se.	Females	Se.
Spouse's health insurance	-0.62***	(0.09)	-0.77***	(0.05)
Cancer	-0.34**	(0.14)	-0.20	(0.12)
Cancer & spouse's health insurance	-0.73**	(0.29)	-1.09***	(0.16)
Age	-0.18***	(0.01)	-0.12***	(0.01)
Child 0-18	0.16	(0.11)	-0.52***	(0.10)
>High school	-0.09	(0.13)	-0.52***	(0.11)
College/some	0.21*	(0.11)	0.19**	(0.08)
<College	0.43***	(0.12)	0.26**	(0.10)
African American	-0.13	(0.13)	0.04	(0.10)
Hispanic	0.27**	(0.14)	-0.28**	(0.11)
Wealth†	0.01	(0.00)	-0.01***	(0.00)
HBP	-0.14**	(0.07)	-0.09	(0.06)
Diabetes	-0.50***	(0.09)	-0.29***	(0.09)
Lung disease	-0.66***	(0.18)	-0.54***	(0.14)
Heart disease	-0.54***	(0.10)	-0.34***	(0.10)
Stroke	-0.89***	(0.22)	-0.74***	(0.25)
Psychiatric Prob.	-0.88***	(0.13)	-0.66***	(0.09)
Smoking	-0.17*	(0.09)	-0.22***	(0.06)
Drinking	0.15	(0.12)	0.06	(0.22)
White-collar1 occupation	-0.10	(0.11)	-0.10	(0.08)
Blue-collar occupation	-0.53***	(0.10)	-0.29**	(0.12)
Spouse's earning‡	0.06***	(0.01)	0.06***	(0.01)
Constant	12.25***	(0.60)	8.09***	(0.38)
δ_{μ}	1.18***	(0.07)	1.04***	(0.06)
Log likelihood	-4966		-7840	

Table 5: Coefficient estimates with bootstrapped standard errors using Heckman sample estimation for weekly hours worked, conditional on working.

Variables	Males	Se.	Females	Se.
Cancer years since diagnosis (year)				
≤2	-2.76*	(1.45)	-1.45	(1.79)
>2 to <5	-0.64	(1.72)	-4.70**	(2.04)
≥ 5	-2.25	(2.53)	-2.70	(1.72)
Age	-0.61***	(0.08)	-0.18	(0.15)
Child 0-18	0.62	(0.91)	0.38	(1.43)
>High school	-2.47**	(1.16)	0.56	(1.39)
College/some	1.19	(1.27)	0.83	(1.01)
<College	1.19	(1.26)	1.50	(1.06)
African-American	-1.77	(1.27)	0.15	(1.10)
Hispanic	-0.96	(1.29)	0.29	(1.22)
Wealth†	0.03	(0.03)	-0.04	(0.06)
High blood pressure	0.54	(0.92)	0.23	(1.03)
Diabetes	0.16	(1.16)	0.30	(1.34)
Lung disease	-0.87	(2.23)	1.18	(2.22)
Heart disease	1.47	(1.61)	0.22	(1.42)
Stroke	1.30	(3.50)	0.82	(3.58)
Psychiatric problems	0.85	(2.34)	0.92	(1.29)
Smoking	-1.73**	(0.87)	1.03	(0.66)
Drinking	0.69	(1.03)	-3.82	(2.41)
White-collar 2	0.35	(0.94)	-1.76*	(0.99)
Blue-collar	0.97	(0.84)	0.55	(1.43)
Spouse's health insurance	-1.42*	(0.83)	-1.93***	(0.60)
Spouse's earning‡	-0.01	(0.09)	-0.01	(0.07)
Constant	78.88***	(4.39)	45.97***	(8.02)

CONCLUSION

Advances in early screening and detection of cancer and the aging of the US population have resulted in an increasing number of cancer survivors. Consequently, the economic burden associated with surviving cancer will likely rise. The financial burden on cancer survivors due to the reduction in hours worked is an indirect economic burden of cancer (in addition to the direct costs for cancer treatment) incurred by cancer survivors and their families. And, this effect is more significant for women. Our findings suggest that women with cancer are more likely to reduce their labor supply than men. Policymakers may seek to formulate policies that decrease this financial burden. In addition, our findings have important policy implications for health care reform in regard to health insurance because health insurance is predominantly provided by employers in the United States and, whether survivors decide to work depends on whether they have health insurance. Our results suggest that as we move from employer-provided health insurance to health insurance through a spouse's employer, labor supply may decrease. Thus, an increase in the availability of public health insurance may result in a greater reduction in the probability of working.

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