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The implications of cancer survivorship for spousal employment

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Abstract
Background The purpose of this research was to estimate employment effects for spouses of cancer survivors who were working at the time of the cancer diagnosis.
Methods Spouses of cancer survivors were drawn from the Penn State Cancer Survivor Survey. Comparable spouses of individuals without cancer were drawn from the Panel Survey of Income Dynamics. The final sample included 827 spouses of cancer survivors (542 husbands, 285 wives) and 2,766 spouses of individuals without cancer (1,459 husbands, 1,307 wives). Three employment outcomes were studied 2–6 years after diagnosis: whether working, whether working full time (35+ hours per week), and usual hours per week. We used propensity scores to match cases to controls 3:1.
Results Wives of cancer survivors had a lower probability (−7.5 percentage points) of being employed 2–6 years after diagnosis (p=0.036). They were slightly more likely to be working full time, while averaging 1.1 fewer hours per week overall, but these effects were not statistically significant. Cancer's effect on husbands was not significant for any of the employment outcomes. However, if survivor wives and husbands were working at follow-up, they had more than twice the odds of working full-time (wives OR = 2.18, p=0.0004; husbands OR = 2.65, p=0.012) and worked more hours per week than other spouses (wives 1.9, p=0.041; husbands 1.5, p=0.04).
Conclusions The implications to cancer survivors and their spouses of these results is that the employment of survivor spouses, especially of wives, is somewhat reshaped by cancer in the medium to long run. However, there is little or no effect on aggregate hours worked by spouses who were employed at diagnosis.

Keywords Cancer survivorship · Spouses · Employment · Outcome assessment · Propensity score

Introduction

Improvements in cancer screening and treatment, along with increasing cancer incidence attributable to an aging population, have made cancer survivorship an emerging chronic condition in the United States [1]. The average 5-year survival rate across all cancers has reached 64% [2], and it is now estimated that there are 12 million cancer survivors [3]. Employment is an important long-term outcome for cancer survivors. Previous research has shown that a cancer diagnosis may impact a survivor's decision to continue working [4–6], to return to work [7–9], and to carry out specific job functions [10, 11]. Other studies have also shown that a cancer diagnosis may impact wages and income [12, 13]. In the current environment of healthcare financing, loss of work may mean not only loss of income but also loss of access to affordable health insurance [8, 14, 15].

In contrast to employment outcomes for cancer survivors, relatively little is known about the employment outcomes of spouses of cancer survivors [6, 16, 17]. Approximately two-thirds of adult cancer survivors are married or living with a partner [18]. Among married or partnered couples, a cancer

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diagnosis becomes a shared experience, and the labor market decisions of spouses as well as survivors may be affected [19]. Whether the cancer diagnosis will result in spouses working more or less is not clear and may depend on many factors, including the spouse's gender. A spouse may choose to work less in order to provide more caregiving to the survivor or to assume more household responsibilities, or because of changing life priorities after the survivor's diagnosis with a life-threatening illness. Alternatively, the spouse may work more in order to secure access to affordable health insurance, to make up for the lost earnings of the survivor, or to deal with increased uncertainty about the future.

Whether a cancer diagnosis impacts the labor market decisions of a spouse is important for patients and families, and for public policy. If the cancer diagnosis increases the chance that a husband or wife reduces employment then families face a greater economic burden in addition to the uncertainty brought about by the disease. And it may be beneficial to formulate public policy that addresses this economic burden; for example work leave accommodations for employees whose spouses are diagnosed with cancer. While there has been a little research on the effect of general health shocks on the labor supply decisions of spouses, there are no studies in the literature that address the effect of cancer specifically on a broad range of spousal employment outcomes. The objective of this study was to determine whether having a spouse who is a cancer survivor impacts employment over the medium to long term. We studied three labor market outcomes 2–6 years following the survivor's diagnosis: 1) whether the spouse was working at all, 2) whether the spouse was working full time, and 3) the spouse's usual weekly hours of work. Historically, men and women have very different labor characteristics, so we estimated separate models for husbands and wives.

Methods

Data

Data for this study came from two sources: 1) a sample of spouses of cancer survivors was drawn from the Penn State Cancer Survivors Survey (PSCSS); and 2) a comparable set of controls married to individuals without cancer was drawn from the Panel Study of Income Dynamics (PSID). The Penn State Cancer Survivor Survey (PSCSS) is a longitudinal study of nearly 1,800 cancer survivors [4]. Details about the PSCSS have been published previously [10, 20]. These survivors were identified from the tumor registries at four medical centers: Penn State Milton S. Hershey Medical Center, Geisinger Health System, Lehigh Valley Hospital and Johns Hopkins medical center. Patients with all types of cancer (except superficial skin cancers) were eligible for the cancer survey. However, most cases diagnosed at Stage 4 were excluded, except for patients with cancers who had a good chance of surviving to the end of the study (e.g. leukemias and lymphomas). Also, because male urological cancers were not entered in the main cancer registry at one center, those cases were also excluded from the survey. All subjects were diagnosed with cancer during the 3-year period from 1997 through 1999. The survivors were first interviewed between October 2000 and December 2001 and then three more times at approximately 12-month intervals (in 2002, 2003, and 2004).

Information on both survivors and spouses was obtained at each interview. More specifically, during the first interview, survivors were asked retrospective questions about their own employment status and job characteristics at the time of diagnosis. They were also asked about the spouse's employment status and job characteristics at diagnosis. In the first interview, and at all subsequent interviews, survivors were also asked about their own and their spouse's current employment status and job characteristics.

Our comparison group of spouses of individuals without cancer was drawn from the PSID [21]. The PSID maintains a nationally representative sample of individuals and families in the U.S. population over time by following the children of initially-sampled families as they leave home and form new households. Since 1997, PSID interviews have been conducted every 2 years (in odd years) to collect information about the previous (even) year. While we excluded couples in the PSID where the spouse was a cancer survivor, we did not exclude couples if the other spouse had a history of cancer. This was done because spouses of cancer survivors were not asked whether they had a history of cancer in the PSCSS, therefore we could not exclude them in the PSCSS sample. To maintain comparability between the two samples, couples in the PSID were treated in a similar fashion. For the sample of wives of cancer survivors in the PSID, we excluded couples where the husband was a cancer survivor; however, we did not exclude the wife if she had a history of cancer. Similarly, for the sample of husbands in the PSID, we did not exclude the husband if he had a history of cancer.

A baseline reference date comparable to the date of diagnosis for cancer survivors was assigned to PSID couples by randomly drawing from the distribution of PSCSS diagnosis dates and assigning them to the PSID sample. We determined employment and job characteristics for the husband and the wife in the baseline month from monthly questions in the PSID about individual employment in the reference year, along with job beginning and ending dates. We also made use of monthly earnings for 1997 and 1999 reported in supplemental "t-2 individual

income files" constructed by the Institute for Social Research from the 1999 and 2001 interviews to fill between reference years. Once this baseline was constructed for the PSID couples, we constructed our samples and included variables in our models to compare couples in the PSCSS to couples in the PSID who had similar employment characteristics at baseline/diagnosis, considering both the husband's and wife's employment. In particular, we limited our husband and wife samples in both surveys to spouses who were working at diagnosis/baseline, to assure that we compared spouses in the cancer-and non-cancer samples with similar initial levels of attachment to the labor force.

In order to remove spouses who were likely to be in school or retired, we excluded those who were not working age, defined (in keeping with the survivor survey) as those aged 27–65 at follow-up. The characteristics of the husband and wife samples are summarized in Table 1, which shows that our sample contained 285 wives of cancer survivors from the PSCSS and 1,307 other wives from PSID, and 542 husbands of cancer survivors from PSCSS and 1,459 other husbands from PSID. At the second PSCSS interview, 69.4% of survivor spouses were 3–5 years post diagnosis. Time from diagnosis ranged from 27 to 70 months (mean= 46.2, SD=10.7).

Employment outcomes

Employment outcomes were measured in three ways: 1) whether the spouse was working at follow-up; 2) whether the spouse was working full time; and 3) usual weekly hours worked. These employment outcomes were measured in 2002 in both surveys. In the PSCSS, working was defined by respondents selecting the first option when asked in the 2002 interview, "Now I am going to ask you some questions about your current employment situation. Are you working for pay, temporarily laid off or on leave, unemployed and looking for work, retired, disabled and unable to work, a homemaker, a student or something else?" In the PSID, working was measured in April 2002 (the modal interview month in PSCSS) based on answers to the question, "In which months during 2002 were you working for [each employer identified during the year]?" In the PSCSS, respondents were asked about usual weekly hours for their current main job. In the PSID, respondents were asked about usual weekly hours for each employer, and we designated the job with the highest number of weekly hours as the main job.

Covariates

All analyses controlled for potential confounders, either by including them as regressors in multivariate models, or by including them in the prediction step of the propensity score matching analysis. We controlled for the age of the spouse using age categories to capture the nonlinear effect of age on employment. Younger age was expected to be associated with a relatively higher probability of employment and older age with a lower probability of employment. We also included the age difference between the spouse and the survivor. This effect could be positive or negative, since a younger spouse of an older survivor may be more likely to work in the longer term, or less likely if spouses tend to retire at the same (calendar) time. We controlled for race using a single indicator for nonwhite race, because the PSCSS population is largely white, with relatively few minority-group survivors represented. We also included an indicator of the presence of children under age 18 living at home. The effect of this variable is ambiguous. It may be positive if spouses with children at home choose to work more, or negative if spouses with children living at home choose to provide their own childcare. We included indicators for the level of education of both the spouse and the survivor, expecting that individuals with more education would be more likely to work. Several additional variables were included to proxy for differences in labor market conditions that may affect employment, and which might have differed between the cancer and non-cancer samples due to the geographic concentration of the survivor survey. Specifically, we included five indicators for region of the country, including the specific census divisions (Mid-Atlantic and South Atlantic) where the cancer survivors were recruited. We also included indicators for urbanicity of the spouse's metropolitan area based on Beale codes, and county-level measures of the unemployment rate and population density—two proxies for the availability of jobs. To control for the degree of connection to the labor force, we included a set of indicators for baseline hours of work for both the spouse and the survivor. We also tested models that replaced indicators of the spouse working at baseline with indicators of spouse's current work status, since labor supply decisions may be jointly determined. These did not differ substantial from the baseline models so were not reported. We also included an indicator of whether the survivor was working at baseline and, if so, the survivor's usual weekly hours (in categories).

Statistical analysis

Our statistical analysis was designed to estimate the average effect of treatment on the treated (ATT): the average effect on the probability of employment, the probability of full-time employment, and usual weekly hours of having a spouse who is a cancer survivor, controlling for other factors that may differ across the survivor and comparison group samples. The baseline analysis was propensity score matching. The propensity score for being the spouse of a

Table 1 Characteristics of spouses and survivors in cancer and non-cancer samples. Cancer sample is from the Penn State Cancer Survivor Survey; non-cancer sample is from the Panel Survey of Income Dynamics

Characteristic	Husbands			Wives		
	Cancer (N=542)	Non-cancer (N=1,459)	P-value	Cancer (N=285)	Non-cancer (N=1,307)	P-value
Months since diagnosis/baseline	45.9	45.2	0.1641	46.2	45.1	0.10
Survivor had recurrence	14.9%	–		15.4%	–	
Survivor stage						
Stage I	50.6%	–		33.3%	–	
Stage II	29.9%	–		35.1%	–	
Stage III	11.3%	–		17.2%	–	
Stage IV	5.7%	–		10.9%	–	
Unstaged	2.6%	–		35.1%	–	
Age			<0.0001			0.0002
<40	12.7%	30.5%		12.6%	29.3%	
40–50	35.4%	43.4%		30.5%	44.5%	
50–59	42.6%	23.6%		44.6%	23.8%	
60+	9.2%	2.5%		12.3%	2.4%	
Age difference from survivor	1.1	2.0	<0.0001	3.1	2.1	
Nonwhite	4.6%	26.0%	<0.0001	4.2%	25.0%	<0.0001
Children <18	36.5%	55.9%	<0.0001	31.9%	54.2%	<0.0001
Education			<0.0001			0.003
Less than high school	3.1%	5.6%		4.2%	4.5%	
High school	32.3%	37.1%		37.9%	37.6%	
Some college	24.5%	28.3%		20.0%	28.2%	
College	21.4%	18.8%		20.4%	19.2%	
Post college	18.6%	10.2%		17.5%	10.4%	
Survivor education			<0.0001			<0.0001
Less than high school	3.9%	7.9%		4.2%	7.5%	
High school	34.3%	36.0%		29.1%	36.4%	
Some college	17.0%	25.3%		18.6%	26.4%	
College	20.8%	19.9%		24.2%	18.9%	
Post college	24.0%	11.0%		23.9%	10.8%	
Region			<0.0001			<0.0001
Midwest	0.4%	27.5%		0.7%	28.2%	
South Atlantic	33.2%	20.2%		26.0%	21.5%	
South Central	0.6%	16.9%		0.0%	16.9%	
West	0.0%	18.0%		0.4%	16.7%	
Midatlantic	65.1%	12.2%		72.6%	12.2%	
Other	0.7%	5.2%		0.4%	4.5%	
Urbanicity			<0.0001			<0.0001
Urban	30.8%	45.6%		24.9%	45.3%	
Suburban	47.0%	34.3%		48.4%	33.8%	
Not urban	22.1%	20.1%		26.7%	20.9%	
County unemployment rate	5.1%	5.7%	<0.0001	5.2%	5.6%	<0.0001
County population density (pop/mile^2)			0.06			0.0004
<107	7.4%	27.1%		8.8%	27.5%	
107–357	29.7%	23.6%		31.9%	24.0%	
358–1,259	45.8%	21.6%		48.4%	21.7%	
1,260+	17.2%	27.7%		10.9%	26.7%	

Table 1 (continued)

Characteristic	Husbands			Wives		
	Cancer (N=542)	Non-cancer (N=1,459)	P-value	Cancer (N=285)	Non-cancer (N=1,307)	P-value
Survivor weekly hours at baseline			<0.0001			0.0009
<20	27.3%	16.9%		9.1%	3.8%	
20–34	15.5%	17.8%		5.6%	2.8%	
35–44	39.5%	47.4%		40.0%	44.3%	
45+	17.7%	17.9%		45.3%	49.0%	

cancer survivor was estimated using a logistic regression model with the covariates described above. Spouses in the PSID were then matched 3:1 to spouses in the PSCSS based on the propensity score. Matching was based on a *k*-nearest neighbor match with a min–max common support restriction. Note that after propensity score matching, the distributions of the patient characteristics were not significantly different, and further covariate adjustment is not needed. To capture the sampling variability in the propensity scores, as well as the variation induced by the matching procedure itself, we used a standard bootstrapping algorithm to compute our standard errors [22]. All reported inferences are based on the results of 1,000 bootstrap replicates.

We also performed subgroup analyses on spouses who continued working at follow-up. Previous research has found that, although women with breast cancer were less likely to work after their diagnosis, survivors who continued or returned to work worked longer hours and had higher earnings than similar working women who did not have breast cancer [5, 12]. Therefore, we also estimated conditional mean effects by modeling full-time employment and usual weekly hours for spouses who were working at follow up. The outcome of working full time was modeled using a logistic regression model that controlled for covariates. The outcome of average weekly hours worked was modeled using a linear regression model that controlled for covariates. All analyses were performed using Stata (version 11, College Station, TX) and the psmatch2 routines [23].

Results

Reflecting the increasing incidence of cancer at older ages, husbands and wives of cancer survivors were somewhat older than other spouses, with the majority of survivor spouses age 50 and older (Table 1). There were large differences in race between the PSCSS sample and the PSID sample; non-whites were more prevalent in the PSID, in keeping with the geographic differences in the populations sampled in each survey. Couples in the PSCSS were also less likely to have children under 18 living at home, were somewhat more educated, and were less likely to live in urban areas than couples in the PSID. At baseline/diagnosis, cancer survivors of both genders worked fewer hours per week (including none at all) compared to their counterparts among couples in the PSID.

Employment outcomes of spouses in 2002, 2–6 years following the cancer diagnosis, are described for the two samples in Table 2. All of the spouses in the analysis were working at baseline. At follow-up, wives of cancer survivors were somewhat less likely to be working than other wives. Husbands of cancer survivors were also somewhat less likely to be working at follow-up. The percent of wives working full time at follow-up was similar in the two samples, as was the percent of husbands working full time at follow-up. At follow-up, average weekly hours (including zero hours for spouses who quit working) were not significantly different for wives. However, the difference for husbands was significant, with husbands of cancer survivors averaging 40.5 h per week at follow-up compared to 42.9 h per week for other husbands.

In Table 3 we present a summary of the propensity score matching results. The probability of being employed 2–6 years after baseline/diagnosis was −7.5 percentage points lower for wives of cancer survivors (p=0.036). Wives of survivors were slightly more likely to be working full time (+3.5 percentage points) and worked 1.1 fewer hours per week overall, but these differences were not significantly different from zero.

The effects on husbands of cancer survivorship were generally small. Husbands of survivors had a lower likelihood of being employed (−0.6 percentage points) compared to other husbands, were 5.5 percentage points more likely to be working full time, and averaged an additional 1.3 h per week overall, but these effects were not statistically significant (Table 3).

Adjusted comparisons of the rate of full-time work and usual weekly hours for spouses who were still working at follow-up are shown in Table 4. Without adjusting for covariates, wives of survivors who were working at follow-up

Table 2 Description of baseline and follow-up employment for spouses in cancer and non-cancer samples. Note that individuals not working at follow-up are included in the percent working full time and average usual hours

Variable		Husbands			Wives		
		Cancer (*N*=542)	Non-cancer (*N*=1,459)	*P*-value	Cancer (*N*=285)	Non-cancer (*N*=1,307)	*P*-value
Baseline	Working	100.0%	100.0%	–	100.0%	100.0%	–
	Working full time	93.5%	96.3%	0.0080	74.4%	74.4%	0.9830
	Usual weekly hours (mean)	44.3	46.1	0.0008	37.5	37.6	0.8387
Follow-up	Working	88.9%	94.7%	<0.0001	83.2%	88.4%	0.0160
	Working full time	86.0%	88.8%	0.0810	64.6%	66.2%	0.6010
	Usual weekly hours (mean)	40.5	42.9	0.0018	31.6	33.2	0.1213

had 16% greater odds of working full time. After adjusting for covariates, the odds of working full time more than doubled (OR: 2.18; p=0.004). Similarly, comparing usually weekly hours worked among wives who were working at follow-up, wives of survivors worked almost two hours more per week than other working wives after adjusting for covariates (p=0.041).

The patterns for husbands who were still working at follow-up were similar. Without adjusting for covariates, husbands of survivors who were working at follow-up had 93% greater odds of working full time. After adjusting for covariates this increased to 2.7 times the odds of working full time (p=0.012). Survivor husbands also worked an average of about 1.5 h more per week (p=0.04) than other working husbands.

Discussion

To our knowledge this study is the first to rigorously quantify the effect of cancer survivorship on labor market outcomes of spouses. Two unpublished studies have considered the more general question of how spouses' labor supply is affected by unexpected health events or "health shocks" of their partners (including newly diagnosed cancers) [24, 25]. Health shocks are unexpected health events; a diagnosis of cancer would be considered a health shock, as would a diagnosis of diabetes, an acute myocardial infarction, or a stroke. Both studies used data from the Health and Retirement Study (HRS). Coile found that husbands slightly increased their labor market activities in response to shocks to their wives' health, but the effects were small and not significant [24]. By contrast, wives decreased their labor market activities aftershocks to their husbands' health, but these effects were not consistently significant in all models. The effects on wives' employment were strongest when husbands' health shocks were more severe, involving reduced function or life expectancy. Van Houtven and Coe studied the effect of one spouse's health shocks on the likelihood of the other spouse's retirement [25]. They found that husbands were significantly more likely to retire in response to their wives' health shocks, but that wives' retirement decisions were not affected by their husbands' health shocks. Both of these studies focused on the effect of newly diagnosed health problems, not on the longer-term effects of survivorship. Also, although cancer was included among the health shocks considered in these studies, they did not specifically focus on cancer.

In our study of the effects of cancer survivorship on spouses, we found that being married to a cancer survivor

Table 3 Results of propensity score matching analysis of labor market outcomes among spouses of cancer survivors

Outcome		ATT difference	95% confidence		Odds ratio	*P*-value
			Lower	Upper		
Wives N_{CSS} = 267 N_{PSID} = 365	Working	−7.5%	−14.5%	−0.5%	0.50	0.0360
	Working full time	3.5%	−6.6%	13.6%	1.16	0.4970
	Usual weekly hours (mean)	−1.1	−4.5	2.4	–	0.5470
Husbands N_{CSS} = 536 N_{PSID} = 583	Working	−0.6%	−5.6%	4.5%	0.94	0.8290
	Working full time	5.5%	−1.2%	12.3%	1.49	0.1080
	Usual weekly hours (mean)	1.3	−1.7	4.3	–	0.4070

ATT average effect of treatment on the treated

Table 4 Effect of cancer on working full time and usual weekly hours among spouses who were working at follow-up

		Cancer	Non-cancer	Difference	Unadjusted Odds ratio	Adjusted[a] Odds ratio	Coefficient[a]	*P*-value
Wives N_{CSS} = 237 N_{PSID} = 1,155	Working full time	74.9%	77.6%	2.7%	1.16	2.18	–	0.004
	Usual weekly hours (mean)	37.6	38.0	0.4	–	–	1.86	0.041
Husbands N_{CSS} = 482 N_{PSID} = 1,382	Working full time	93.8%	96.7%	2.9%	1.93	2.65	–	0.012
	Usual weekly hours (mean)	45.3	45.5	0.2	–	–	1.47	0.044

[a] Adjusted for demographics, education, region, urbanicity, unemployment rate, baseline hours and spouse employment. Working full time adjusted using a logistic regression model; usual weekly hours adjusted using a linear regression model

reduced the likelihood of wives being employed 2–6 years after diagnosis, but did not significantly affect their rate of full time work or average weekly hours. The reduction in the employment rate for survivor spouses was similar in magnitude to estimates for female survivors that we have previously reported [26]. Labor market outcomes of husbands of survivors were not significantly different from the outcomes of other husbands. One possible explanation for the lack of significant association is that many of the cancer survivors had early stage disease (Stage I and II). Spousal employment may be less affected when the survivor's disease carries a greater likelihood of survival.

While we found no evidence of a net reduction in hours averaged over all survivor spouses, we found that survivor spouses who were still employed at follow-up worked more than other employed spouses. Working wives of survivors had twice the odds of being employed full time and worked almost 2 h more per week compared to other working wives. Working husbands of survivors had more than twice the odds of being employed full time and worked an hour and a half more per week compared to other working husbands. This pattern is similar to findings reported by Bradley et al. for breast cancer survivors, who were less likely to work than other women, but worked approximately three more hours per week if working [5].

There are two differing, though not mutually-exclusive, explanations for the finding that working survivor spouses work more hours than other working spouses. It is possible that the explanation is behavioral: survivor spouses react to the cancer diagnosis by increasing their hours to secure health insurance that is only available to full-time workers, to help pay medical and other expenses associated with cancer survivorship, or to replace family income that is lost to cancer-related reductions in the employment of survivors. The other possible explanation is differential self-selection. Specifically, if a greater intrinsic predisposition toward work is required to make some spouses choose to keep working in spite of the cancer diagnosis, then restricting attention to spouses employed at follow-up may leave us with a sample of survivor spouses who are more pre-disposed on average towards work than spouses employed at follow-up who did not have to contend with their partner's cancer. To the extent this is true, the additional hours worked by survivor spouses could reflect an unmeasured difference in labor market attachment between working survivor spouses and other working spouses, rather than an increase in individual work effort per se. The available data do not allow us to discriminate between these two explanations, but the finding is true, in descriptive terms, in either case. We did perform exploratory models of the difference in hours between baseline and follow-up, but these results were no more informative than the models of hours presented. Future work should attempt to fit models that jointly estimate both the spouse and survivor decision.

One limitation of this study is that the data for couples with and without a cancer survivor come from different surveys. We used propensity score matching to adjust for observed differences between the two samples, including differences in local labor market conditions associated with the geographic differences in the samples, but we cannot rule out the possibility of unobserved differences associated with missing covariates or survey design. Early U.S. studies used population surveys to compare the employment of cancer survivors and other adults within the same data set [5, 12], but more recent research by Bradley and colleagues also combined primary data for a cancer sample with secondary data for controls [9, 15, 27, 28]. The samples of cancer survivors in general population surveys are often relatively small and typically include survivors treated over a very long time horizon (e.g. a few months to 30 or more years). The long time horizon blurs dramatic differences in cancer treatment over time and makes pre-diagnosis, baseline data difficult to obtain. Combining data sources allows researchers to invest in collecting data for a relatively larger sample of recently treated cancer survivors, while avoiding the cost of collecting data for controls.

Since we were limited to covariates available for both survivors and spouses in both the cancer survey and the PSID, we were unable to include a number of variables that are known to affect employment. These include job-related

health insurance benefits of the survivor and spouse at baseline, as well as chronic conditions of the survivor and spouse at baseline and follow-up [8, 10, 29].

It is also possible that findings based on the PSCSS cannot be generalized to the full population of cancer survivors in the United States. The PSCSS was drawn from the patient populations of four medical centers in two states. Minorities are underrepresented, and the sample is somewhat better educated and higher in socio-economic status than the U.S. population generally. Also, because of differences in institutional arrangements for financing disability-related and normal retirement, findings regarding the employment of cancer survivors and spouses in the U.S. are unlikely to generalize to other countries.

In large part, the study's limitations reflect the challenge of assembling a data set large and rich enough to study the employment of couples living with a history of cancer. It remains important, however, because this study is one of the first to systematically quantify the long-term effects of cancer on the employment of survivors' spouses. Although the wives of survivors are less likely to work 2–6 years after diagnosis, we find little evidence that cancer affects aggregate hours worked by spouses over the long term. While clinicians, public health officials, and cancer organizations undoubtedly need to attend to the effects of cancer on spouses, changes in spousal employment do not seem to be a major factor in the overall burden of cancer on survivors and their families.

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