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By Scott Ramsey, David Blough, Anne Kirchhoff, Karma Kreizenbeck, Catherine Fedorenko, Kyle Snell, Polly Newcomb, William Hollingworth, and Karen Overstreet

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ABSTRACT Much has been written about the relationship between high medical expenses and the likelihood of filing for bankruptcy, but the relationship between receiving a cancer diagnosis and filing for bankruptcy is less well understood. We estimated the incidence and relative risk of bankruptcy for people age twenty-one or older diagnosed with cancer compared to people the same age without cancer by conducting a retrospective cohort analysis that used a variety of medical, personal, legal, and bankruptcy sources covering the Western District of Washington State in US Bankruptcy Court for the period 1995–2009. We found that cancer patients were 2.65 times more likely to go bankrupt than people without cancer. Younger cancer patients had 2–5 times higher rates of bankruptcy than cancer patients age sixty-five or older, which indicates that Medicare and Social Security may mitigate bankruptcy risk for the older group. The findings suggest that employers and governments may have a policy role to play in creating programs and incentives that could help people cover expenses in the first year following a cancer diagnosis.

The financial burden of cancer can be substantial for patients and their families. Data from the Medical Expenditure Panel Survey suggest that \$1.3 billion (6.5 percent) of the \$20.1 billion spent on cancer care in the non-elderly population each year comes directly from the patients themselves.¹ Deductibles and copayments for cancer treatments, supportive care, and related services, along with nonmedical costs such as child care and lost income, may be financially devastating, even for cancer patients with medical insurance.²

The financial burden of cancer may be particularly severe for patients who are unable to work during treatment.^{3,4} Between 40 percent and 85 percent of cancer patients stop working during initial treatment, with absences ranging from forty-five days to nearly six months.^{4,5} Many

survivors also face long-term health barriers to working for years after treatment ends.⁴ A comparison of earnings of breast cancer patients and age- and work-matched healthy controls found that the patients' average annual individual earnings fell \$3,600 in the five years following diagnosis, while average annual individual earnings for a noncancer comparison group increased \$1,800.⁶ Additionally, a cancer diagnosis can affect all wage earners in a household.

Many people look to bankruptcy laws for protection when debt repayments overwhelm their net income. The extent to which cancer and other serious illnesses contribute to personal bankruptcy filings remains controversial. An important weakness in the illness and bankruptcy debate is the fact that with the exception of one study evaluating spinal cord injury,⁷ research has relied on self-reporting—that is, individuals'

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statements about their health and financial affairs, as well as their interpretation of the primary reason that led to their decision to file for bankruptcy.

Furthermore, the observed prevalence of medically related bankruptcy is dependent on the researcher's definition of *medically related*. Studies find that between 53 percent⁸ and 62 percent^{9–13} of debtors report medical debt at the time of filing for bankruptcy, and 2 percent¹⁴ to 50 percent¹⁵ indicate that medical problems were the cause of their bankruptcy. Melissa Jacoby and coauthors found that 25 percent of people underreported their medical obligations in bankruptcy court records when compared to information from direct surveys of out-of-pocket medical expenses.¹⁶

An additional problem with available studies is that there is no record of the date of onset of the medical condition or conditions reported to be associated with filing for bankruptcy. Thus, the typical time between the onset of serious illness and bankruptcy filing is generally unknown. Of particular relevance to this study, the incidence of and time before bankruptcy filing among the 1.5 million adults diagnosed with cancer in the United States each year are also unknown.

Accordingly, the purpose of this study was to determine the incidence and time course of bankruptcy filings among patients newly diagnosed with cancer. To generate accurate estimates, we linked data from federal bankruptcy records from the period 1995–2009 with both a population-based cancer registry and an age-, sex-, and ZIP code-matched random sample of individuals without cancer from LexisNexis. We were particularly interested in identifying specific cancer types that might be associated with a higher risk of bankruptcy. Additionally, we sought to identify personal factors at the time of cancer diagnosis that might be associated with a person's risk of filing for bankruptcy.

Study Data And Methods

STUDY POPULATION Our study included a populationwide registry of people with cancer and a randomly sampled age-, sex-, and ZIP code-matched population of people without cancer. ZIP code matching was used to control for socioeconomic status within a region and regional access to medical care.

Cancer cases were identified using the Cancer Surveillance System of Western Washington, a population-based cancer registry that is part of the National Cancer Institute's Surveillance Epidemiology and End Results (SEER) program. We included people diagnosed with cancer between January 1, 1995, and December 31, 2009.

We excluded people who were younger than twenty-one years at the time of the diagnosis, who had in situ stage cancer (very early cancer that had not spread to neighboring tissue) at diagnosis, or who had cancer that was diagnosed only at the time of death.

The control population was identified using the LexisNexis data repository, the largest commercially available repository of public record data in the United States. Information in the repository is drawn from more than 10,000 sources, including white pages listings; voter registration records; personal and real property records; and—through data exchanges—credit card issuers, publishers, and manufacturers. The LexisNexis repository is commonly used for business functions such as deterring and detecting fraud, authenticating and verifying identity, and conducting civil and criminal investigations. As of April 2012 there were 4,532,591 people age eighteen or older from Washington State included in the LexisNexis database, representing 88 percent of the state's adult population.

To eliminate people with cancer from the LexisNexis cohort, we first linked LexisNexis records with the SEER records using a probabilistic algorithm that included name, sex, address of residence, and month and year of birth. Seven percent of the people from the LexisNexis database were excluded from the study because they had a positive match with the SEER database.

We then matched each patient from the database who met the inclusion criteria above to a person in the noncancer LexisNexis database. The match criteria were year of birth, ZIP code of residence, and sex. Because of the nature of the LexisNexis data, we were not able to match the most elderly of patients, and thus we excluded patients over the age of ninety. We found matches for 197,840 (86 percent) of the 228,430 patients who were under ninety-one and eligible in the SEER records. The primary reason for failing to find a match was the inability to find an age- and sex-matched person within the same ZIP code as the patient.

The cancer and control cohorts were both linked with the records of the US Bankruptcy Court for the Western District of Washington. The court serves nineteen counties in western Washington, including all thirteen counties in the Cancer Surveillance System of Western Washington, and has complete electronic case files dating from June 1991. We included filings from January 1, 1995, through December 31, 2009. The bankruptcy database includes each debtor's name and address and bankruptcy filing information, including the type of bankruptcy, number of creditors, and assets and liabilities at the time of bankruptcy. Joint filings are indi-

cated as such, and information on the codebtor is included.

We included only two types of bankruptcy: those covered by Chapter 7 or Chapter 13 of the US Bankruptcy Code. Debtors filing under Chapter 7 typically liquidate eligible assets such as bank accounts, investments, and second cars or homes to pay creditors and then are discharged from their eligible debts—which exclude, for example, child or spousal support and certain income taxes. Under Chapter 13 debtors file a repayment plan to pay back all or a portion of their debts and retain ownership of most of their assets. Seventy percent of personal bankruptcies filed in the United States are Chapter 7 cases,¹⁷ although all medical bills are eligible for discharge in a bankruptcy under either Chapter 7 or 13.

We linked SEER records to the bankruptcy records using a probabilistic algorithm that included the debtor's name, sex, and address of residence, as well as the last four digits of his or her Social Security number. We linked LexisNexis records to the bankruptcy records using a probabilistic algorithm that included name and address of residence. For patients who filed for bankruptcy multiple times, we included only the first filing after their cancer diagnosis.

The study was approved by the Institutional Review Board of the Fred Hutchinson Cancer Research Center.

ANALYSES We used Kaplan-Meier analysis to estimate the incidence of bankruptcy for the cancer patient and control populations. Accounting for death allowed us to use multivariate Cox regression analysis to estimate hazard rates for bankruptcy, focusing on cancer diagnosis as the factor of interest.

Separate multivariate Cox regression models were created for all cancer patients combined plus the controls, as well as for each of the nine separate cancer types with the highest incidence of bankruptcy (with a matched control group). In each model the dependent variable was defined as time to first bankruptcy after diagnosis for the cancer cohort and time to first bankruptcy after index date for the control cohort (the index date was the date of diagnosis of the matching cancer case).

Independent variables included marital status and a time-dependent covariate to reflect the date of implementation of the Bankruptcy Abuse Prevention and Consumer Protection Act of 2005. This law, designed to make it more difficult for debtors to file a Chapter 7 or 13 bankruptcy, was passed by Congress on April 14, 2005, and signed into law on April 20 and implemented on October 17 of the same year. Fol-

lowing its enactment, Chapter 7 filings dropped to 57 percent of previous personal bankruptcy filings before returning to previous levels by 2009.¹⁷

All regression analyses used age as the time scale. That is, age at diagnosis or index date was the start for follow-up. Data on race was not available for the LexisNexis population and therefore could not be included in the model.

LIMITATIONS We note some limitations of our choices for the analysis. Person-level information about people's financial situation at diagnosis was not available. SEER does not collect this information, and financial information is incompletely and inconsistently available in the bankruptcy records. Neither database collects information on health insurance, although it is reasonable to assume that nearly all people age sixty-five or older are insured by Medicare.

Treatment choices may influence bankruptcy risk. Although SEER does collect information on whether patients received surgery, radiation therapy, chemotherapy, or hormone therapy, we did not include treatment type in the regression models because treatment choices might have been influenced by patients' financial situation at the time of diagnosis.

The study was limited to western Washington. Washington State ranks twenty-second of the fifty states in terms of bankruptcy filings per capita, with 5.04 filings per 1,000 people.¹⁸

Study Results

Between 1995 and 2009 there were 197,840 people in the western Washington SEER data who were diagnosed with cancer and met the inclusion criteria for our study. During that same time period, 4,408 (2.2 percent) of those people filed for bankruptcy protection after being diagnosed with cancer (83 percent of them under Chapter 7 and 17 percent under Chapter 13). Of the matched 197,840 controls, who were not diagnosed with cancer, 2,291 (1.1 percent) filed for bankruptcy over the same time period (73 percent of them under Chapter 7 and 27 percent under Chapter 13). Compared to cancer patients who did not file for bankruptcy, those who did were more likely to be younger, female, and non-white and to have localized or regional stage disease (versus distant stage) at diagnosis, using SEER staging criteria (Exhibit 1).

There was a substantial increase in bankruptcy filings, including among cancer patients, in the months leading up to the signing of the Bankruptcy Abuse Prevention and Consumer Protection Act of 2005, followed by a precipitous decline in filings for both cancer patients and people in the control group in the following

EXHIBIT 1

Demographic And Cancer-Related Characteristics Of Cancer Patients, By Bankruptcy Status, Western Washington State, 1995–2009

Characteristic	Total		Bankruptcy		No bankruptcy	
	Number	Percent	Number	Percent	Number	Percent
AGE (YEARS)						
<40	14,180	7	830	19	13,350	7
40–64	96,032	49	2,751	62	93,281	48
65+	87,628	44	827	19	86,801	45
SEX						
Male	98,202	50	1,945	44	96,257	50
Female	99,638	50	2,463	56	97,175	50
RACE						
White	174,027	88	3,771	86	170,256	88
Nonwhite	23,813	12	637	14	23,176	12
MARITAL STATUS						
Married	117,455	59	2,579	59	114,876	59
Other or unknown	80,385	41	1,829	41	78,556	41
RESIDENCE						
Urban	170,186	86	3,655	83	166,531	86
Large rural	10,620	5	254	6	10,366	5
Small rural	4,773	2	84	2	4,689	2
Isolated	2,678	1	39	1	2,639	1
Unknown	9,583	5	376	9	9,207	5
CANCER TYPE						
Breast	34,195	17	1,017	23	33,178	17
Colorectal	17,244	9	362	8	16,882	9
Leukemia/lymphoma	19,743	10	450	10	19,293	10
Lung	24,227	12	280	6	23,947	12
Melanoma	10,750	5	310	7	10,440	5
Prostate	32,966	17	555	13	32,411	17
Thyroid	4,980	3	231	5	4,749	2
Uterine	6,346	3	191	4	6,155	3
Other	47,389	24	1,012	23	46,377	24
STAGE AT DIAGNOSIS						
Localized	98,728	50	2,588	59	96,140	50
Regional	43,921	22	1,119	25	42,802	22
Distant	46,534	24	563	13	45,971	24
Unstaged	8,657	4	138	3	8,519	4

SOURCE Authors' analysis. **NOTES** The individual cancer types listed are those with the highest cumulative incidence of bankruptcy among all cancer types examined from the National Cancer Institute's Surveillance Epidemiology and End Results (SEER) program. Chi-square tests for bankruptcy versus no bankruptcy were significant ($p < 0.001$) for all characteristics except for marital status ($p = 0.24$).

months (Exhibit 2). This trend held true for both younger and older people. The lowest rates of bankruptcy filing were during 2006–07. In the ensuing years, bankruptcy filings increased more quickly than during any previous period, probably because of the financial crisis and recession as well as the adaptation of debtors and bankruptcy professionals to the new law.

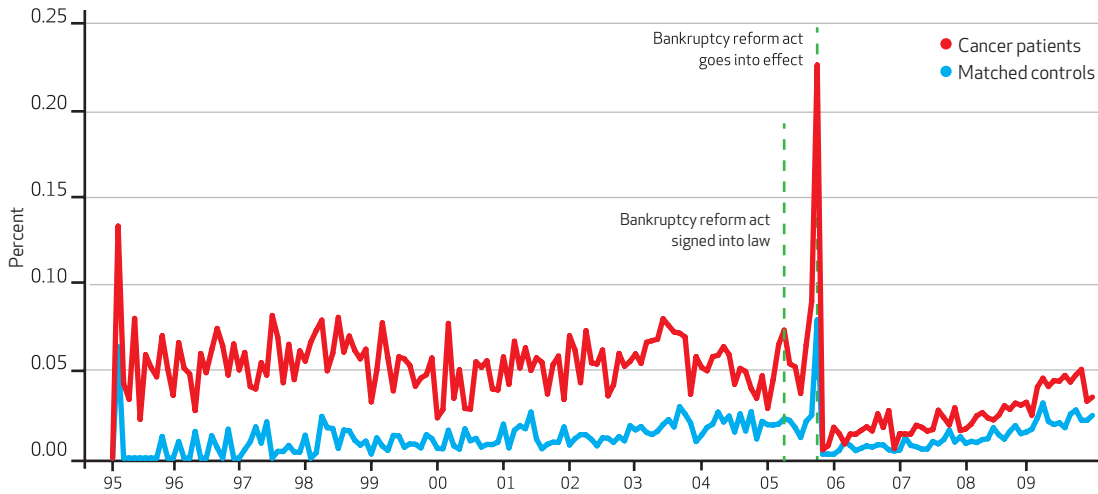
The proportion of the cancer cohort that filed for bankruptcy within one year of diagnosis was 0.52 percent, compared to 0.16 percent within one year of the index date for the control group. For bankruptcy filings within five years of diagnosis or index date, the proportion of cancer

patients was about 1.7 percent, compared to 0.7 percent for the control group. The incidence rates for bankruptcy at one year after diagnosis, per 1,000 person-years, for the cancers with the highest overall incidence rates were as follows: all cancers 6.1, thyroid 9.3, lung 9.1, uterine 6.8, leukemia/lymphoma 6.2, colorectal 5.9, melanoma 5.7, breast 5.7, and prostate 3.7.

Bankruptcy filing rates differed greatly by age: Younger people with cancer experienced the highest bankruptcy rates across all cancer types (Exhibit 3). In addition, compared to younger cohorts, bankruptcy filing rates were much lower for people age sixty-five or older.

EXHIBIT 2

Monthly Rate Of Bankruptcies For Cancer Patients And Matched Group Without Cancer, Western Washington State, 1995-2009



SOURCE Authors' analysis. **NOTE** People in the group without cancer were matched to cancer patients by age, sex, and ZIP code of residence.

Across all cancers, the Cox proportional hazards regression model showed that cancer patients had a significantly higher rate of bankruptcy than people without cancer. The probability that a cancer patient would go bankrupt was 2.65 times greater than that of someone without cancer (Exhibit 4). The bankruptcy reform law of 2005 had a strongly negative impact on bankruptcy filings, with filings after 2005 declining to 57 percent of the level of filings before that year. People who were not married were 1.24 times more likely than married people

to file for bankruptcy.

Across all regression models that considered individual cancer types versus control groups, people with cancer were consistently and significantly more likely to file for bankruptcy than people without cancer, and people in both groups were more likely to file for bankruptcy before the law change than after. People with lung cancer were 3.8 times more likely than controls to go bankrupt—a larger difference than was the case with any other type of cancer (Exhibit 4). The 2005 bankruptcy law had less

EXHIBIT 3

Bankruptcy Rates Per 1,000 Person-Years For Cancer Patients And Matched Group Without Cancer, Western Washington State, 1995-2009

Cancer type	Age (years)									
	20-34		35-49		50-64		65-79		80-90	
	Cancer	Control	Cancer	Control	Cancer	Control	Cancer	Control	Cancer	Control
Breast	13.95	3.23	7.98	3.03	4.95	2.27	2.12	0.96	1.29	0.48
Colorectal	11.71	1.96	9.27	2.24	5.55	2.10	2.90	0.87	1.13	0.61
Leukemia/lymphoma	9.62	2.07	9.20	3.13	5.06	1.86	3.57	1.21	0.47	0.44
Lung	2.83	0.00	12.49	2.45	8.82	2.02	5.03	0.99	1.28	0.50
Melanoma	8.30	3.84	7.14	2.74	3.10	2.10	1.94	0.89	1.40	0.45
Prostate	— ^a	— ^a	6.49	2.52	3.47	1.71	2.44	0.87	0.65	0.82
Thyroid	11.37	3.92	9.05	2.06	6.01	2.91	4.05	1.83	0.00	0.00
Uterine	18.02	1.77	10.45	4.93	5.33	2.27	2.96	1.06	1.51	0.45
Other	9.53	3.33	9.19	2.46	6.45	2.04	2.88	1.03	0.62	0.58
All	10.06	3.15	8.55	2.75	5.01	2.04	2.76	0.98	0.94	0.57

SOURCE Authors' analysis. **NOTES** People in the group without cancer were matched to cancer patients by age, sex, and ZIP code of residence. The individual cancer types listed are those with the highest cumulative incidence of bankruptcy among all cancer types examined from the National Cancer Institute's Surveillance Epidemiology and End Results (SEER) program. ^aIn our study there were no instances of prostate cancer for men under age thirty-five.

EXHIBIT 4

Hazard Rates For Bankruptcy Filing Of Cancer Patients And Matched Group Without Cancer, Western Washington State, 1995–2009

Cancer type	No. of cancer patients and controls	Hazard rate			
		Cancer ^a	After new bankruptcy law ^b	Nonmarried ^c	Group-law interaction ^d
Breast	68,390	2.41	0.55	1.52	0.79
Colorectal	34,488	3.02	0.60	1.22	0.59
Leukemia/lymphoma	39,486	3.00	0.67	1.11	0.53
Lung	48,454	3.80	0.61	1.16	0.59
Melanoma	21,500	2.08	0.49	1.03	0.74
Prostate	65,932	2.32	0.49	1.30	0.75
Thyroid	9,960	3.46	0.62	1.29	0.53
Uterine	12,692	2.28	0.47	1.36	0.92
Other	94,778	2.97	0.58	1.11	0.64
All	395,680	2.65	0.57	1.24	0.67

SOURCE Authors' analysis. **NOTES** Hazard rates were calculated using Cox proportional hazards regression models and were significantly different from 1 ($p = 0.05$) except in the following cases: leukemia/lymphoma, lung, and melanoma for nonmarried versus married people; and melanoma and uterine for group-law interaction. People in the group without cancer were matched to cancer patients by age, sex, and ZIP code of residence. The individual cancer types listed are those with the highest cumulative incidence of bankruptcy among all cancer types examined from the National Cancer Institute's Surveillance Epidemiology and End Results (SEER) program. ^aReference is no cancer. ^bReference is before October 17, 2005, when the Bankruptcy Abuse Prevention and Consumer Protection Act of 2005 went into effect. ^cReference is married. Nonmarried is single, divorced, widowed, or marital status unknown. ^dReference is cancer. This accounts for the differential impact of the Bankruptcy Abuse Prevention and Consumer Protection Act of 2005 on those with cancer versus those without cancer.

of an effect on the likelihood of filing among cancer patients than among people without cancer.

Because of the difference in bankruptcy risk by age, we reran the Cox regression models after stratifying the two groups into people age sixty-five or older and people younger than sixty-five. Because of the change in bankruptcy laws, we also reran the Cox regression models with only those patients who were diagnosed after the new bankruptcy law took effect. The hazard ratios for cancer and bankruptcy risk did not change appreciably in either cohort in these separate analyses.

Discussion

Linking SEER and federal bankruptcy records for the period 1995–2009, we found that cancer patients had a rate of bankruptcy that was 2.65 times higher than that of people without cancer. Furthermore, the rate appeared to vary across cancer types, with notably higher rates for patients with thyroid cancer. This may be because thyroid cancer affects younger women more often than other cancers do.¹⁹ Compared to men, younger women are more likely to live in single-income households and to have lower wages and lower rates of employment, and therefore less access to high-quality health insurance—leaving them more financially vulnerable.

EFFECTS OF AGE It is notable that among

people with cancer, the youngest age groups had up to ten times the rate of bankruptcy filings that older age groups had. Although most households have some control over their “financial health” over time, cancer is generally a sudden and unexpected event. In this context, the risk of bankruptcy will be influenced by the following factors: debt load before the illness, assets, presence and terms of the patient's health and disability insurance, number of dependent children, and incomes of others in the household at the time of the cancer diagnosis.²⁰

The youngest cohorts in our study were diagnosed at an age when debt-to-income ratios are typically highest—often unavoidably, because people are paying off student loans, purchasing a home, or starting a business. All working-age people who develop cancer face loss of income and, in many cases, loss of employer-sponsored insurance, both of which can be devastating for households in which the patient is the primary wage earner. As noted above, studies have shown that 40–85 percent of cancer patients stopped working during their initial cancer treatment, with some being absent from work for nearly six months.⁵

In contrast, people age sixty-five or older generally have Medicare insurance and Social Security benefits. These older people are likely to have more assets and possibly more income than working-age people. However, it is likely that having stable insurance (specifically,

coverage not tied to employment) plays a major role in mitigating the risk of bankruptcy for those over age sixty-five.

CHANGES IN THE LAW The Bankruptcy Abuse Prevention and Consumer Protection Act of 2005—the most substantial revision of the US bankruptcy laws since 1978—had a profound impact on bankruptcy filings. The number of personal bankruptcies filed rose from approximately 1.0–1.4 million per year to more than 2.0 million in 2005.^{21,22} The year following enactment of the new law, filings fell to less than 600,000. By 2009, the end of our study period, bankruptcy rates for cancer patients were approaching levels seen prior to implementation of the 2005 bankruptcy law, with a strong upward trend.²²

Many provisions in the 2005 bankruptcy law were aimed at reducing so-called frivolous filings among those with past financial indiscretions who were seeking an easy way to discharge their debts.²³ Clearly, people experiencing a major health event such as cancer do not fall into this category. Most courts and legal representatives counsel people not to file for bankruptcy until the issue causing financial distress is resolved. Shortly before the 2005 bankruptcy law was implemented, it is likely that the uncertainty surrounding the new law caused many debtors to file for bankruptcy, and those who had cancer were probably also motivated by the uncertainty regarding the outcome of their illness.¹¹ All of the October 2005 bankruptcy filings in our study occurred prior to October 17, when the new law took effect.

It is likely that substantial proportions of the people who filed “early”—that is, before their cancer therapy was completed—remained at risk of incurring new medical debt after the bankruptcy discharged their existing debt. In the two months following the enactment of the bankruptcy law, only ten cancer patients in our study filed for bankruptcy (2 percent of yearly filings), as opposed to sixty-two filings (14 percent) in the same period in 2004. This difference suggests that cancer patients indeed may have filed earlier than planned because of the uncertainties created by the new law.

Conclusion

This study found strong evidence of a link between cancer diagnosis and increased risk of bankruptcy. Although the risk of bankruptcy for cancer patients is relatively low in absolute terms, bankruptcy represents an extreme manifestation of what is probably a larger picture of economic hardship for cancer patients. Our study thus raises important questions about the factors underlying the relationship between cancer and financial hardship.

Future studies that include information on patients’ financial and insurance status at the time of diagnosis and throughout their treatment will be needed to fully understand the relationship among cancer, financial difficulties, and bankruptcy. Also important is the impact of cancer on the patient’s ability to remain employed, since most health insurance is obtained through the workplace.²⁴ These factors are particularly important in younger working-age populations, in which employment, income, insurance status, and personal assets vary greatly.

We believe that cancer care facilities and oncology practitioners should assess the financial health of their patients as a matter of course. Because temporary inability to work is often unavoidable during therapy, patients and their families should be encouraged to make financial preparations to the greatest extent possible. More generally, this study underlines the importance for cancer care providers of carefully considering the use of services that have limited evidence of substantial benefit and potential high out-of-pocket costs.

As a policy issue, there may be a role for employers and governments in creating programs or incentives to reduce the likelihood of financial insolvency, given that bankruptcies are “lose-lose” events for debtors and creditors alike. An example would be tax incentives to encourage employers to provide supplemental insurance policies with fixed sums to cover household and out-of-pocket expenses in the first year following a cancer diagnosis.

Finally, future studies of cancer patients who declare bankruptcy should examine the impact of this event on their cancer-related outcomes and later ability to obtain health insurance and access to health care. ■

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