



## Background

- The financial burden of cancer is substantial for both individual patients and society
- Deductibles and co-payments for cancer treatment, supportive care, and related services, along with non-medical costs such as lost income and childcare, may be financially devastating even for cancer patients with medical insurance.
- Out of pocket costs have increased by an average of \$1170 per year for patients undergoing active cancer treatment compared to non-cancer respondents since 2000.
- The extent to which serious illnesses such as cancer contribute to bankruptcy remains controversial.

## Aims

- Compare incidence rate of personal bankruptcy (Chapters 7 & 13) for cancer patients after diagnosis to overall Western Washington rate.
- Estimate the conditional probability of personal bankruptcy following cancer diagnosis by cancer type.
- Identify patient- & treatment-related factors associated with the risk of bankruptcy.



## Methods

- Cancer cases (age >20) were identified in the Washington SEER registry for 1995-2000, and linked to Western District of Washington bankruptcy court records. Analyses were limited to patients reporting their first primary cancer, excluding cancers in situ or diagnosed at death.
- We calculated the yearly cumulative incidence of bankruptcy to compare to RAND's bankruptcy rate estimates based on 2000 Census data.
- The conditional probability of bankruptcy (i.e., the probability conditional on survival to the time point) was calculated by cancer type.
- We used competing risk regression to identify patient- and treatment-related factors associated with bankruptcy.

## Results

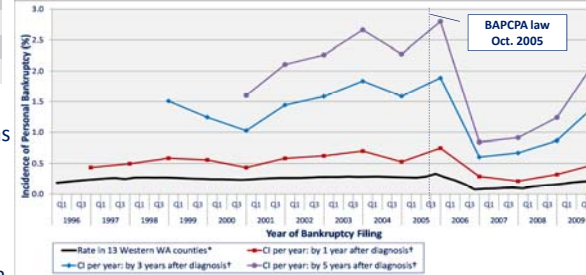
**Table 1: Demographics of Cancer Cases 1995-2009**

	Bankruptcy N=4728 (%)	No Bankruptcy N=226,994 (%)
Age ≥65	21	51
Female	55	49
Married	58	58
White	86	89
<b>Diagnosis</b>		
Lung	10	13
Thyroid	5	2
Leuk/Lymph	10	10
Uterine	4	3
Colorectal (CRC)	8	9
Melanoma	7	5
Breast	22	16
Prostate	12	17
Other	23	24

### Aim 1:

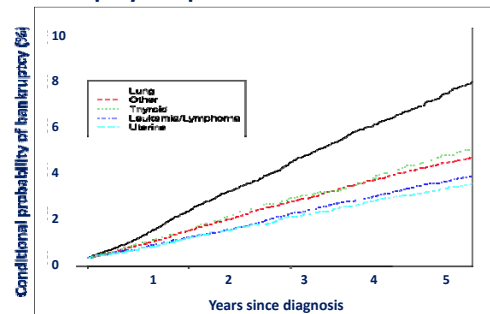
- In Figure 1, bankruptcy incidence was higher for cancer cases than overall bankruptcy rate.
- Following the Oct. 2005 Bankruptcy Abuse Prevention & Consumer Protection Act (BAPCPA), there was a marked decrease in cancer filings.

**Figure 1: Yearly cumulative incidence (CI) of bankruptcy after cancer vs. overall bankruptcy by year**



\*Overall personal bankruptcy rate for 13 Washington counties based on 2000 Census Population Estimates  
†Cumulative incidence by end of each year for cancer cases, allowing for the competing risk of death.

**Figure 2: Conditional probability of bankruptcy – top 5 cancers**



- After a mean follow-up of 4.3(sd=4.1) years, N=4728 (2%) had filed for bankruptcy.
- Bankruptcy filers tended to be younger and female more often than to non-filers.
- Thyroid and breast cancer cases were more likely to file than other cancers.
- Mean and median time to bankruptcy was 3.3 and 2.5 years, respectively.

## Results, continued

### Aim 3:

- In regression analysis (Table 2), age ≥65 at diagnosis was associated with a decreased risk of bankruptcy for all cancers (Hazard Ratio [HR] 0.3-0.5).
- Risk was higher for lung, colorectal & breast cancer cases receiving surgery (HR 2.0-4.1) and chemotherapy (HR 1.4-1.5).

**Table 2: Hazard Ratios\* of Bankruptcy**

	Lung	Thyroid	Leuk/ Lymph	Uterine	CRC	Melanoma	Breast	Prostate
Age ≥65	0.41	0.32	0.27	0.28	0.33	0.26	0.27	0.5
Female	0.8		n/a			1.28	n/a	n/a
Married	1.27						0.63	
<b>Stage</b>								
Regional†	0.47				0.35			
Distant†	0.68		0.74		0.75			
<b>Surgery</b>	1.99				4.14		3.28	
<b>Radiation</b>								
Chemo	1.46				1.52		1.34	
White				–			0.66	0.44

\*Hazard Ratios significant at  $\alpha < .05$ . Models adjusted for year of diagnosis and rural/urban residence.  
†Reference=Localized Stage at Diagnosis

## Limitations

- No data on current health insurance coverage and medical debt attributed to cancer.

## Conclusions and Implications

- Bankruptcy incidence after cancer diagnosis is higher than overall bankruptcy in Western Washington. Bankruptcy risk is highest for lung, thyroid, and leukemia/lymphoma cancer patients.
- Patients over age 65, who are typically on Medicare, have a substantially lower risk of bankruptcy than younger patients. Certain cancers face additional risks due to surgery and chemotherapy.
- Cancer may present financial stress for patients for years after diagnosis.

### Aim 2:

- The conditional probabilities were highest for lung, leukemia/lymphoma & thyroid cancers (Figure 2):

Year after diagnosis	1	2	5
Lung	1.5%	3.1%	7.7%
Leukemia/ Lymphoma	0.9%	2.0%	4.8%
Thyroid	0.6%	1.4%	3.6%

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