Medical Expenditures Among Cancer Patients in the United States: Estimates from Medical Expenditure Panel Survey (MEPS) Data

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OBJECTIVE

To evaluate the direct annual costs of various types of cancer to patients in the United States from an all-payer perspective.

METHODS

Data Sources: 2018 Medical Expenditure Panel Survey (MEPS) Full-Year Consolidated Data File & Medical Conditions File [1,2].

Sample Selection

The 2018 MEPS Full-Year Consolidated Data File was merged with the Medical Conditions File (which contained ICD-10-CM codes from medical conditions reported by participants) on the unique person identifier to create a flag that identifies patients of each cancer type and distinguishes them from non-cancer participants.

Participants were classified as patients of bladder, breast, colorectal, kidney, or prostate cancer, as well as leukemia or non-Hodgkin's lymphoma patients based on ICD-10-CM codes found in the Medical Conditions File. The ICD-10-CM codes associated with these diagnoses are C67, C50, C18, C64, C61, C95, and C85 respectively.

Data were utilized to identify adults with bladder (n = 39), breast (n = 222), colorectal (n = 60), kidney (n = 39), and prostate cancer (n = 163), as well as leukemia (n = 42) and non-Hodgkin's lymphoma (n = 37).

The study population consisted of **22,849 adult survey participants**, and those not identified as cancer patients were classified as controls in the analysis.

Sociodemographic and clinical characteristics

Sociodemographic characteristics of cancer vs. non-cancer patients were examined, including characteristics such as age, sex, race/ethnicity, marital status, education, employment status, personal annual income, and insurance coverage [3].

Clinical characteristics of cancer vs. non-cancer patients were also examined, which included perceived health status, smoking status, and selected comorbidities.

Statistical Analysis

First, mean per-person medical expenditures in the year 2018 were assessed from an all-payer perspective, which encompassed the sum of third-party and out-of-pocket costs.

Expenditures were disaggregated into inpatient, outpatient, and pharmacy expenditures, and later summed and examined to determine mean annual costs per cancer and non-cancer patient.

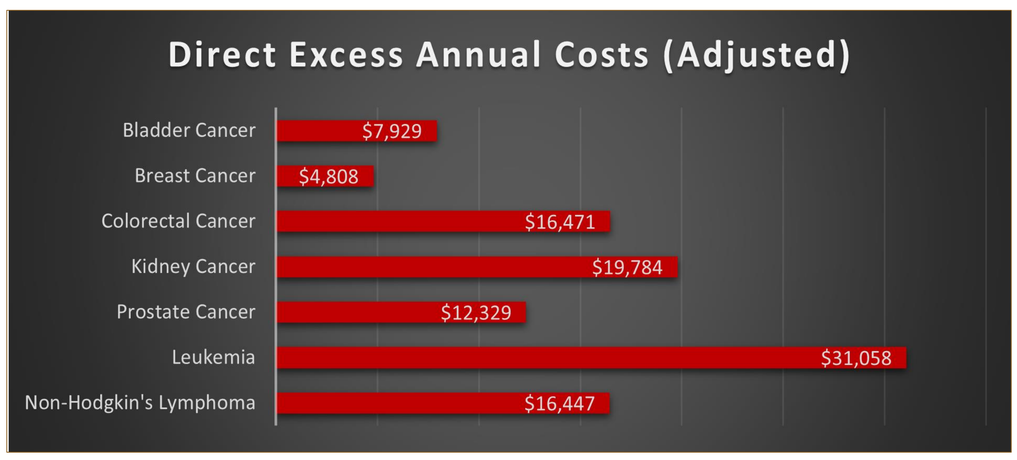
To assess the direct costs of cancer types, an excess cost approach was employed, where overall direct medical expenditures of cancer patients were compared with those of non-cancer patients using **multivariate linear least-squares regression** to control for possible confounders such as age, sex, race/ethnicity, smoking status, marital status, and years of education. All analyses were stratified by cancer type.

Variability measures were based on estimates of standard error derived by **using Taylor series linearization methods to account for the complex survey design** [3].

RESULTS

Malignancy Type	Direct Excess Annual Costs	Linearized Std. Error	N	P > |t|	95% Confidence Interval
Bladder Cancer	$7,929	$3,143	39	0.013	[$1,715, $14,143]
Breast Cancer	$4,808	$1,699	222	0.005	[$1,449, $8,167]
Colorectal Cancer	$16,471	$6,595	60	0.014	[$3,432, $29,510]
Kidney Cancer	$19,784	$8,727	39	0.025	[$2,529, $37,038]
Prostate Cancer	$12,329	$3,163	163	<0.0001	[$6,075, $18,582]
Leukemia	$31,058	$9,039	42	0.001	[$13,187, $48,929]
Non-Hodgkin's Lymphoma	$16,447	$6,321	37	0.01	[$3,951, $28,944]

Table 1. Excess annual costs when compared with non-cancer patients, while adjusting for age, sex, race, smoking status, marital status, and education.



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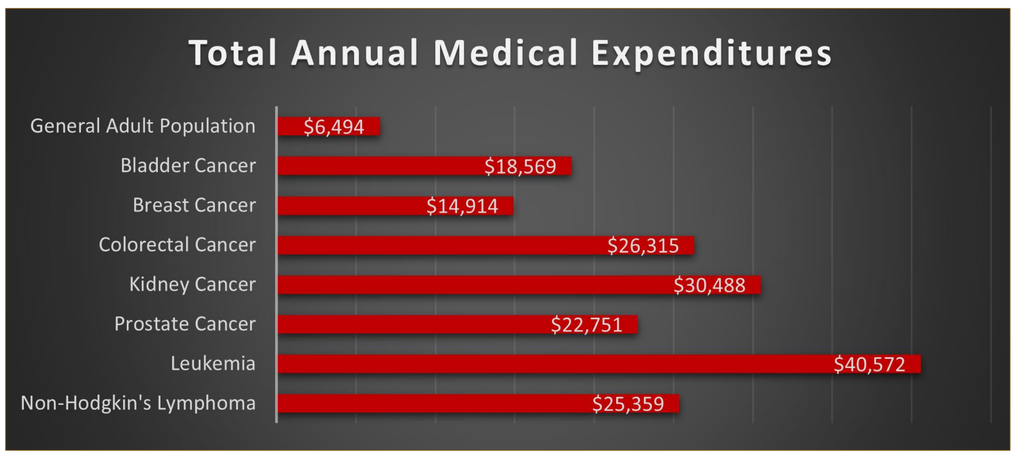

Figure 2. Average total annual medical expenditures by group, encompassing inpatient, outpatient, and pharmacy expenditures

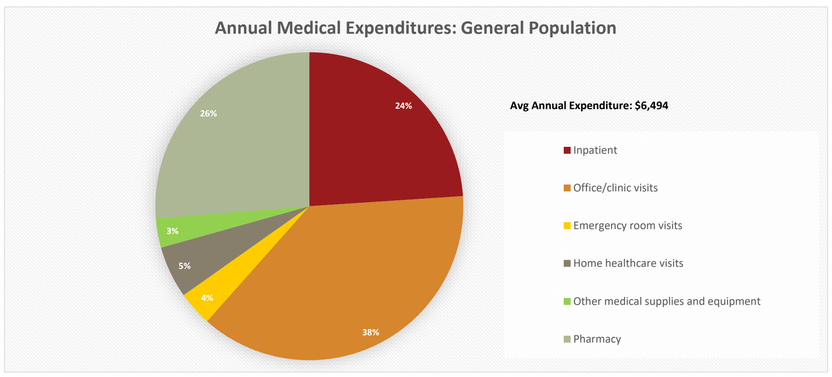

Figure 3. Annual medical expenditures among the general adult population

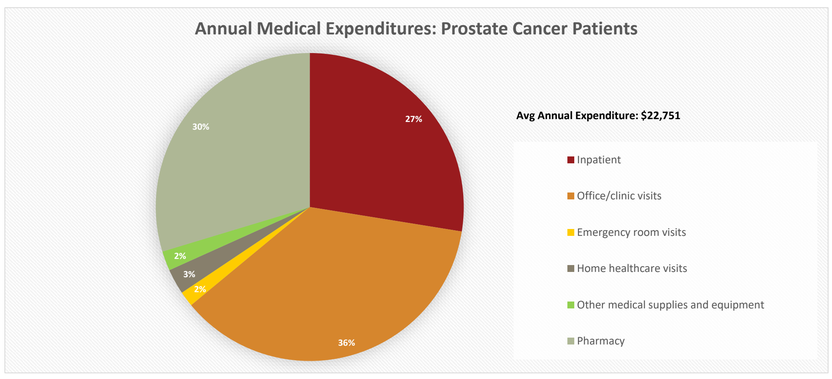

Figure 4. Annual medical expenditures among adult prostate cancer patients

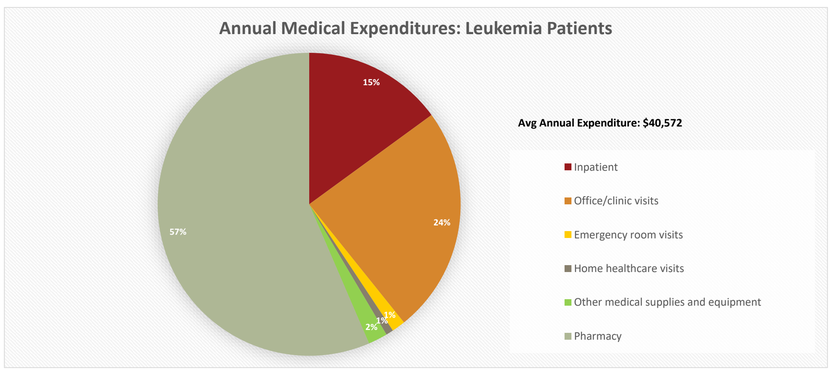

Figure 5. Annual medical expenditures among adult leukemia patients

RESULTS

When compared with non-cancer patients while controlling for potential confounders, cancer patients across all malignancy types incurred statistically significantly higher ($P \leq 0.05$) medical expenditures.

Bladder and **breast cancer** patients incurred excess annual direct costs of $7929 (P = 0.013) and $4808 (P = 0.005) respectively.

Colorectal, kidney, and prostate cancer patients experienced an excess of $16,471 (P = 0.014), $19,784 (P = 0.025), and $12,329 (P < 0.001) respectively.

Leukemia and non-Hodgkin's lymphoma patients incurred an annual excess of $31,058 (P = 0.001) and $16,447 (P = 0.01) respectively.

CONCLUSION

Cancer patients across various malignancy types face considerably greater medical costs than the general population.

Out of the 7 cancer types studied in this analysis, leukemia incurred the greatest excess annual costs, while breast cancer incurred the least.

These estimates can be used in future cost-effectiveness analyses (with additional cancer stage identification) and have implications for policymakers regarding optimal resource allocation and efforts to reduce the economic burden of cancer.

REFERENCES

[1] Agency for Healthcare Research and Quality. (2018). Medical Expenditure Panel Survey HC-209 2018 Full Year Consolidated Data File.

[2] Agency for Healthcare Research and Quality. (2018). Medical Expenditure Panel Survey HC-207 2018 Medical Conditions File.

[3] Miller JD, Foster T, Boulanger L, et al. Direct costs of COPD in the U.S.: an analysis of Medical Expenditure Panel Survey (MEPS) data. COPD. 2005;2(3):311-318. doi:10.1080/15412550500218221

[4] Zheng Z, Yabroff KR, Guy GP Jr, et al. Annual Medical Expenditure and Productivity Loss Among Colorectal, Female Breast, and Prostate Cancer Survivors in the United States. *J Natl Cancer Inst*. 2015;108(5):djv382. Published 2015 Dec 24. doi:10.1093/jnci/djv382

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