EE249

Impact of Emergency Department (ED) Involvement at Cancer Diagnosis on Healthcare Costs (HCC) Across Cancer Types in the Medicare Population

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BACKGROUND

- Late-stage cancer diagnoses drive higher healthcare costs (HCC) and resource use (HCRU) among Medicare beneficiaries.[1-3]
- Furthermore, a notable proportion of cancers are diagnosed through emergency department (ED) involvement rather than planned diagnostic pathways.[4]
- ED involvement is associated with poorer clinical outcomes and greater overall healthcare burden.[5]

OBJECTIVE

- This study aimed to quantify HCC associated with ED involvement at cancer diagnosis among Medicare beneficiaries across a broad range of cancer types.

METHODS

Retrospective Cohort Study Using SEER-Medicare Data (2009-2020)

STUDY DESIGN
Retrospective cohort study of Medicare Fee-for-Service beneficiaries with a SEER-confirmed invasive cancer diagnosis, index period 2010-2020.
Data: SEER-Medicare linked database

INCLUSION CRITERIA
- Medicare FFS beneficiary-linked SEER-Medicare database with SEER-confirmed primary cancer
- 12+ months cont. enrollment pre-index, 1+ post-index
- Cancer site matches study ICD-0-3 groupings

EXCLUSION CRITERIA
- Age <18 years at index
- Prior cancer during 12-month baseline
- In situ or non-malignant disease
- Diagnosed after death autopsy

Final Analytic Cohort: n = 818,120

INDEX DATE
- Earliest ICD-9/10 claim for cancer site with +1 month of SEER diagnosis month
- Imputed to the 15th of SEER diagnosis month if not found

BASELINE PERIOD
12 months pre-index
- Demographics, CCI, prior history

FOLLOW-UP PERIOD
From index until first of: Death, disenrollment, or subsequent primary cancer
- End of study period: December 31, 2020

PRIMARY OUTCOME:
- All-cause and cancer-related HCC (inpatient, outpatient, pharmacy) within first year after diagnosis
- Part D Pharmacy costs are included only in the all-cause HCC results

ROUTE OF DIAGNOSIS
Hierarchical assignment
- **Screening:** 2-month look-back CPT/HCPCs screening codes
- **ED:** ED visits within 30 days pre-index (inpatient with ED claim or outpatient with ED revenue code)
- **Outpatient:** outpatient billing codes
- **Other**: does not meet above criteria

STATISTICAL ANALYSIS
- Expenditures were adjusted using generalized linear models overall across 19 cancers and separately by individual cancer types
- Models were adjusted for age, sex, race/ethnicity, dual eligibility, CCI, year of diagnosis, and AJCC staging (except for non-staged hematologic cancers)

AJCC: American Joint Committee on Cancer; CCI: Charleston Comorbidity Index; CPT: Current Procedural Terminology; ED: Emergency Department; FFS: Fee-for-Service; HCC: Healthcare Costs; HCPCS: Healthcare Common Procedure Coding System; ICD: International Classification of Diseases; SEER: Surveillance, Epidemiology, and End Results

KEY RESULTS: ED INVOLVEMENT IS COMMON AND ASSOCIATED WITH HIGHER ALL-CAUSE HEALTHCARE COSTS

RESULTS

Study Population
- 818,120 Medicare beneficiaries with newly diagnosed invasive cancer (Table 1)
- Mean age: 74.4 years; 54.6% female

ED Involvement around Cancer Diagnosis
- Overall, **26.6% of patients had ED involvement** at cancer diagnosis
- Patients with ED involvement accounted for **39% of the total all-cause HCC** in the year following diagnosis

HCC by Diagnostic Route
- Patients diagnosed through ED involvement had higher adjusted all-cause HCC than those diagnosed through non-ED pathway in the first year across all cancers:
  - Mean HCC: $88,315 vs $62,813 per patient (SD: $24,886 for both; Table 2)

HCC Differences by Diagnostic Route and Cancer Type
- Higher first-year all-cause HCC associated with ED involvement were observed across all cancer types
- Incremental cost ranged from $6,409 (lung) to $104,862 (leukemia) for all-cause HCC (Figure 1)
- Results were consistent in sensitivity analyses using LRD summary staging, with estimates remaining largely unchanged.

Table 2. Mean Adjusted All-Cause HCC per Patient in the Year Following Diagnosis by Route of Diagnosis Across All Cancers

All-Cause HCC (USD)	ED Diagnosed	Non-ED Diagnosed
	Mean	Mean
Total Cost: Parts A & B (medical) + Part D (pharmacy)	**$88,315**	**$62,813**
Total Costs: Parts A & B (medical)	**$83,834**	**$56,695**
Total Costs: Parts D (pharmacy)	**$4,481**	**$6,118**
Acute Inpatient Hospitalization	$50,165	$22,160
All Outpatient	$11,415	$14,569
ER Visits	$643	$422
Provider Office Visits	$14,225	$15,788
Durable Medical Equipment	$647	$562
Total Post Acute Care	$7,381	$3,616
Long-term Acute Care Hospital	$1,440	$722
Inpatient Rehabilitation	$397	$283
Skilled Nursing Facility	$3,765	$1,463
Home Health Disease-Related Costs	$1,779	$1,148

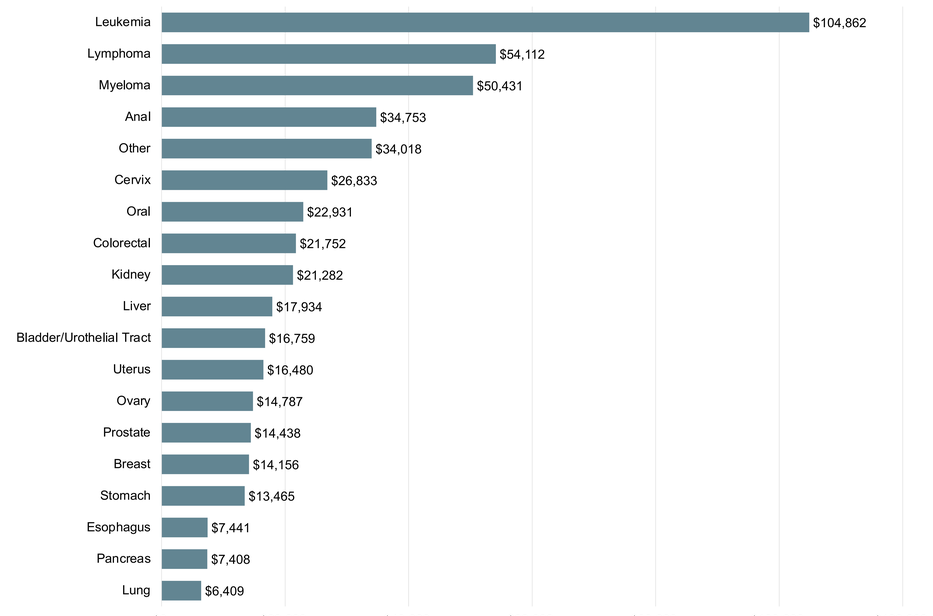
ED: Emergency Department; HCC: Healthcare Costs; ER: Emergency Room

Table 1. Baseline Characteristics Among Patients with Invasive Cancer Diagnosis, 2010-2020

Description	Overall Sample
Number of Patients	818,120
Age at Index	
Mean (years, SD)	74 (9.1)
Sex	
Female	54.6%
Race/Ethnicity	
Non-Hispanic White	82.8%
Non-Hispanic Black	8.9%
Hispanic	2.2%
Other/Unknown	6.0%
Original Reason for Entitlement	
Age	80.3%
Disability or ESRD	19.3%
Both	0.4%
Dual Eligibility	
Full	19.9%
Partial	6.1%
No or Unknown	74.0%
Stage*	
I	36.3%
II	16.7%
III	14.1%
IV	24.9%
Unknown/Missing	8.0%
Charleston Comorbidity Index (CCI)	
Mean	3.5
0	16.6%
1	15.0%
2	16.2%
3+	52.2%

*Among staged cancers. AJCC variable limited to non-heme cancers. The AJCC stage variable was used for this analysis. ESRD: End-Stage Renal Disease; SD: Standard Deviation.

Figure 1. Difference in First-Year All-Cause HCC Between ED- and Non-ED-Diagnosed Patients by Cancer Type



Pancreas n =26,242; Ovary n=8,020; Liver n=17,756; Stomach n= 10,229; Lung n= 158,706; Colorectal n= 86,078; Leukemia n=25,317; Myeloma n=17,805; Esophagus n= 7,294; Kidney n= 20,778; Lymphoma n= 28,844; Cervix n= 2,214; Bladder/Urothelial tract n=33,331; Anal n= 4,118; Uterus n=24,237; Other n = 16,746; Oral n= 18,499; Prostate n=141,083; Breast n=170,823
[1]Cancer groupings were defined according to SEER major cancer sites.
[2]'Other' cancer category includes thyroid, gallbladder, other digestive organs, and other uncategorized cancers. These cancers were combined to comply with SEER-Medicare cell suppression requirements.
ED: Emergency Department; HCC: Healthcare Costs. Displayed in USD

CONCLUSIONS

- ED involvement at diagnosis is associated with higher Medicare expenditures across cancer types and a disproportionate share of overall cancer-related costs
- Strategies to reduce emergency-driven cancer detection may significantly reduce the economic burden of cancer

LIMITATIONS

- The analysis did not adjust for unmeasured confounders such as symptom duration, performance status, or access to and timing of therapy
- Claims-based identification may introduce misclassification
- Limited generalizability beyond Medicare FFS
- Observational design limits causal interpretation

References

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Disclosures

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