Employment Decrease Among Patients Newly Diagnosed with Early- versus Late-Stage Cancers in the U.S.

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INTRODUCTION

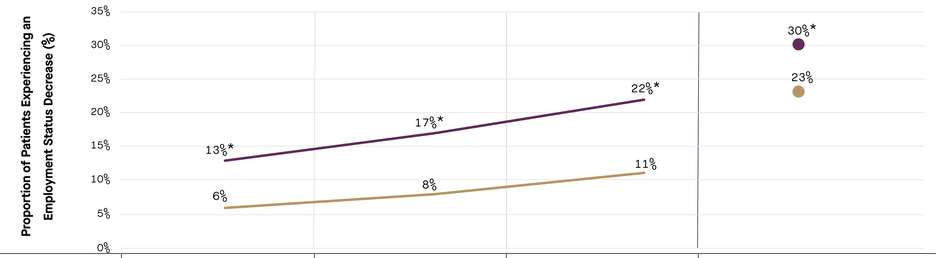
- National costs for cancer care (medical services and oral prescription drugs) were estimated to be $200.7 billion in 2020 (2019 United States [U.S.] dollars)[1]
- Patient out-of-pocket cost burden for cancer was estimated to be more than $16 billion in the U.S. in 2019[2]
- In addition to direct medical costs, cancer is associated with other indirect economic burdens for both patients and caregivers,[3] including negative impacts on employment status, absenteeism, and presenteeism[4]
- While it is well documented that patients diagnosed with late-stage cancers have elevated medical costs compared to those diagnosed with early-stage cancers,[5] very limited research is available focusing on the impact of stage at diagnosis[6] on indirect costs of cancers (such as employment status change)

OBJECTIVE

- To estimate the magnitude of employment decrease among employees newly diagnosed with earlier (non-metastatic) vs. late-stage (metastatic) cancer in the U.S.

KEY RESULTS: EMPLOYMENT DECREASE WAS GREATER AND OCCURRED EARLIER IN PATIENTS NEWLY DIAGNOSED WITH METASTATIC VERSUS NON-METASTATIC CANCER

Figure 1. Cumulative Proportions of Patients Experiencing an Employment Status Decrease

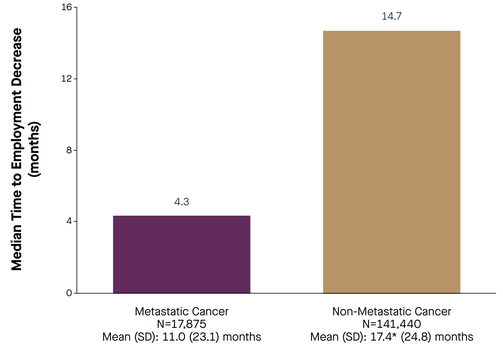


	Months 1-3	Months 4-6	Months 7-12	Full Post-Index Period
Metastatic	N=59,433	N=53,595	N=46,012	N=59,433
Non-metastatic	N=615,502	N=579,731	N=538,408	N=615,502

Employment status decrease was defined as changing from Active Full Time status to either Part Time or Quit Job status, or from Part Time to Quit Job and was measured during the full post-index period and during months 1–3, 4–6, and 7–12 after cancer diagnosis.
*p-value <0.001

- During all time periods assessed, the proportion of patients who experienced a decrease in employment status was approximately twice as high in patients newly diagnosed with metastatic cancer vs. those diagnosed with non-metastatic cancer (p<0.001 for all comparisons; **Figure 1**)

Figure 2. Time to Employment Decrease



SD= Standard Deviation.
*p-value <0.001

- The median time to an employment decrease was shorter for metastatic vs. non-metastatic patients (4.3 vs. 14.7 months, respectively; **Figure 2**)

CONCLUSIONS

- Patients diagnosed with later-stage cancer had significantly greater rates and earlier onset of employment decrease than patients diagnosed with cancer at earlier stages
- Earlier cancer detection may reduce the disruptive effects of cancer on the life and work of patients and attenuate the economic burden on employers

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DISCLOSURES

Study funded by GRAIL, LLC, a subsidiary of Illumina, Inc. ZC and KC are employed by GRAIL, LLC, a subsidiary of Illumina, Inc, with equity in Illumina, Inc. OT, JN, and MS were or are employed by IBM Watson Health, which received funding from GRAIL, LLC, a subsidiary of Illumina, Inc., to conduct this study.

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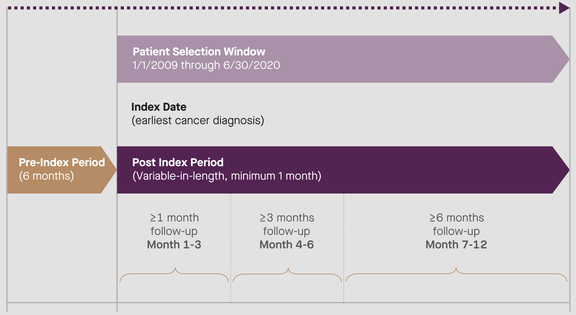
METHODS

- This observational, retrospective cohort study of de-identified U.S. healthcare claims data spanning from June 30, 2008 to June 30, 2020 used the IBM® MarketScan® Commercial Claims and Encounters database to select employees aged 18-64 and newly diagnosed with cancer (≥1 inpatient or 2 outpatient claims ≥30 days apart and >6 months with no prior cancer claims; **Figure 3**; **Figure 4**)
- The index date was defined as the date of the earliest cancer diagnosis
- The full post-index period was variable in length (minimum 1 month) starting on the index date and ending with the earliest of
  1. disenrollment,
  2. end of study period (June 30, 2020), or
  3. a claim for metastasis diagnosis among patients in the non-metastatic cohort
- Patients were stratified by metastatic status at cancer diagnosis
- Employment status decrease was defined as changing from Active Full Time to either Part Time or Quit Job, or from Part Time to Quit Job, and was measured during the full post-index period and during months 1–3, 4–6, and 7–12 months after cancer diagnosis

Figure 3. Study Schema



SUPPORTING DATA

Patient Characteristics

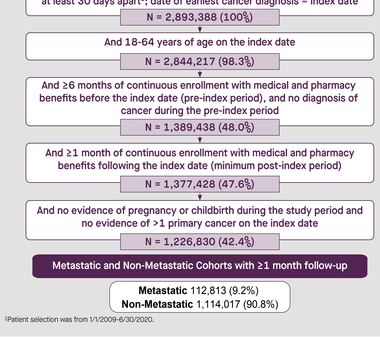
- Employment status change from cancer diagnosis was assessed for the 53% of metastatic and 55% of non-metastatic patients with Active Full Time (98%) or Active Part Time (2%) status in the month prior to cancer diagnosis
- A total of 1,226,830 patients were eligible for employment analysis (**Figure 4**)
- Patients were a mean age of 54 years, about half were female, and a minority (9.2%) were identified with metastases at cancer diagnosis (**Table 1**)
- Duration of follow-up was shorter for patients with metastatic versus non-metastatic cancer (**Table 1**); this may have been influenced by differences in survival

Limitations

Beyond those common in claims data analysis, this study has several limitations:

- Pathological findings for determining precise cancer stage are unavailable in claims data, so metastasis diagnosis (secondary cancer) was used as a proxy for late (advanced) cancer stage
- The different lengths of follow-up for metastatic versus non-metastatic cohorts could have biased the results
  - Non-metastatic cancer patients had longer follow-up, and thus more opportunity to demonstrate reduction in employment status or incur work loss
  - To account for these differences, we reported outcomes during the first 3 months and incrementally during the first year after cancer diagnosis, in addition to the full post-index period
- This study used data from individuals in the U.S. with commercial insurance, and the results may not be generalizable to patients outside the U.S., to patients with other insurance, or to patients without insurance

Figure 4. Patient Attrition



[1]Patient selection was from 1/1/2009-6/30/2020.

Table 1. Patient Demographics and Clinical Characteristics[1]

	Metastatic N= 112,813	Non-Metastatic N= 1,114,017	*p*-value
Age (Mean [SD])	54.4 (8.2)	54.1 (8.3)	<0.001
Median	56.0	56.0	
Age category, years (N [%])			<0.001
18–24	913 (0.8)	9,781 (0.9)	
25–34	2,611 (2.3)	27,629 (2.5)	
35–44	9,453 (8.4)	97,567 (8.8)	
45–49	11,769 (10.4)	119,113 (10.7)	
50–64	88,067 (78.1)	859,927 (77.2)	
<50	24,746 (21.9)	254,090 (22.8)	
Sex (N [%])			<0.001
Male	50,547 (44.8)	540,258 (48.5)	
Female	62,266 (55.2)	573,759 (51.5)	
Duration of follow-up, months (Mean [SD])	20.9 (22.1)	31.7 (27.6)	<0.001
Median	13.1	23.5	
End of follow-up due to (N [%]):			<0.001
End of enrollment	99,761 (88.4)	843,700 (75.7)	
End of study period	13,052 (11.6)	178,570 (16.0)	
Claim for metastasis	n/a	91,747 (8.2)	
NCI Comorbidity index (Mean [SD])	0.37 (0.84)	0.30 (0.80)	<0.001
Cancer Type (N [%])[2]			
Breast	21,244 (18.8)	205,417 (18.4)	0.001
Lung or bronchus	12,328 (10.9)	24,914 (2.2)	<0.001
Colon or rectum	10,792 (9.6)	49,078 (4.4)	<0.001
Pancreas	4,142 (3.7)	7,511 (0.7)	<0.001
Liver	1,937 (1.7)	8,178 (0.7)	<0.001
Head or neck	3,845 (3.4)	20,408 (1.8)	<0.001
Esophageal	1,379 (1.2)	4,147 (0.4)	<0.001
Ovarian	3,087 (2.7)	10,856 (1.0)	<0.001
Cervical	571 (0.5)	7,449 (0.7)	<0.001
Other	53,488 (47.4)	776,059 (69.7)	<0.001

n/a= not applicable; NCI = National Cancer Institute (modified Charlson Comorbidity Index); SD = Standard Deviation.
[1]Demographic characteristics were measured on the index date and clinical characteristics were measured during the 6-month pre-index period, unless otherwise specified.
[2]Cancer type was measured on the index date.