

Social Determinants of Health and Treatment Receipt among Privately and Publicly Insured Adults Diagnosed with Cancer in the United States

Chia-Yun Hsu, BPharm, MS<sup>1</sup>, Julia Slejko, PhD<sup>1</sup>, Gabriel Henderson<sup>1</sup>, Charlene Tugwete, PharmD<sup>1</sup>, Eberechukwu Onukwugha, PhD<sup>1</sup>  
<sup>1</sup>Department of Practice, Sciences, and Health Outcomes Research, School of Pharmacy, University of Maryland, Baltimore



Introduction

- The ICD-10-CM diagnosis codes ranging from Z55 to Z65 (Z codes) capture individual-level social determinants of health (SDOH), such as ‘Z59.0 Homelessness’, ‘Z63.0 Problems in relationship with spouse or partner’, ‘Z57.31 Occupational exposure to environmental tobacco smoke’, etc. (CMS 2023)
- Information from Z codes could be used to develop tailored strategies to support patients' need and ultimately improve their health outcomes.
- Among individuals diagnosed with cancer, much of the population-level evidence is based on area-level SDOH, with limited attention to individual-level SDOH.

Objective

- This analysis describes the utilization of Z codes among adults (aged 18 years and older) diagnosed with cancer and explores the relationship with cancer treatment.

Methods

- We conducted a cross-sectional study using claims data from the 2016-2020 IQVIA PharMetrics® Plus for Academics and the 2016-2019 SEER-Medicare 5% Cancer File to identify individuals diagnosed with breast cancer (BC), colorectal cancer (CRC), lung cancer (LC), or prostate cancer (PC).
- We calculated the number of individuals with any Z code claims and examined the distribution of specific Z codes.
- For those diagnosed with metastatic cancer, we used logistic regression and generalized estimating equations (GEE) models to examine the relationship between Z code utilization and cancer treatment, adjusting for individual-level variables and state-level SDOH measures from PolicyMap.

Results

Table 1. Characteristics of individuals diagnosed with cancer

	PharMetrics Plus 2016-2020			SEER-Medicare 2016-2019		
	Overall n (%)	With Z codes n (%)	Without Z codes n (%)	Overall n (%)	With Z codes n (%)	Without Z codes n (%)
N	35,099 (100)	298 (100)	34,801 (100)	19,625 (100)	376 (100)	19,249 (100)
Age						
Mean (SD)	67.2 (12.0)	66.1 (13.0)	67.3 (12.0)	74.4 (8.3)	75.1 (9.6)	74.4 (8.3) <sup>b</sup>
Median (Q1-Q3)	68 (59 - 76)	66 (58 - 76)	68 (59 - 76)	74 (69 - 79)	75 (68 - 83)	74 (69 - 79)
Gender						
Male	14,646 (42)	88 (30)	14,558 (42) <sup>b</sup>	9,004 (47)	129 (34)	9,004 (47) <sup>b</sup>
Female	20,453 (58)	210 (70)	20,243 (58)	10,245 (53)	247 (66)	10,245 (53)
Charlson Comorbidity Index <sup>a</sup>						
Mean (SD)	0.8 (1.4)	1.3 (2.2)	0.8 (1.4) <sup>b</sup>	2 ( 2)	2.4 (2.5)	1.6 (2.0) <sup>b</sup>
Median (Q1-Q3)	0 (0 - 1)	0 (0 - 2)	0 (0 - 1)	1 (0 - 2)	2 (0 - 4)	1 (0 - 2)
Metastatic cancer						
No	30,978 (88)	240 (81)	30,738 (88) <sup>b</sup>	18,641 (97)	353 (94)	18,641 (97) <sup>b</sup>
Yes	4,121 (12)	58 (19)	4,063 (12)	608 ( 3)	23 ( 6)	608 ( 3)

<sup>a</sup> Excludes any malignancy and metastatic solid tumor  
<sup>b</sup> p-value<0.01; comparison between individuals with and without Z codes

Figure 1. Individual level: number of individuals diagnosed with cancer

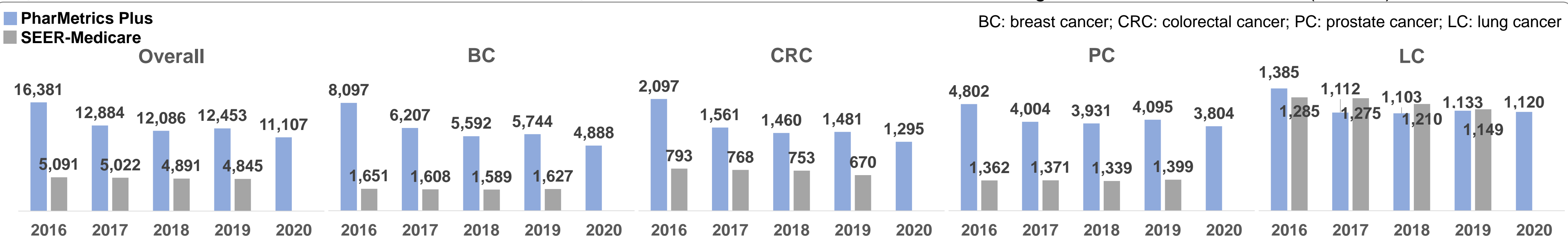


Figure 2. Individual level: rate of individuals with Z code claims in individuals diagnosed with cancer

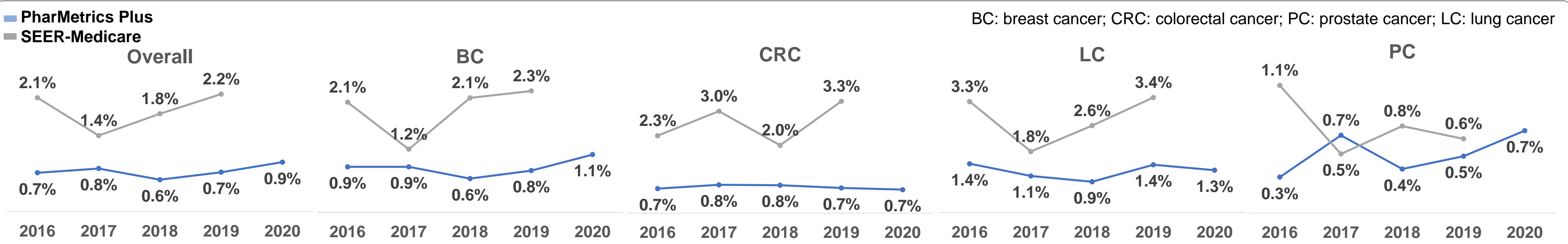


Table 2. Multivariable model of treatment receipt in individuals diagnosed with metastatic cancer

			PharMetrics Plus		SEER-Medicare
			Logistic OR (95% CI)	GEE OR (95% CI)	Logistic OR (95% CI)
Model 1: Crude					
Z code	(Ref: No)	Yes	0.83 (0.55-1.26)	0.83 (0.54-1.28)	1.18 (0.46-3.03)
Model 2: Adjusted using age and CCI					
Z code	(Ref: No)	Yes	0.84 (0.55-1.27)	0.84 (0.54-1.29)	1.13 (0.43-2.92)
Model 3: Adjusted using age, CCI, and state-level (SL) SDOH					
Z code	(Ref: No)	Yes	0.89 (0.58-1.37)	0.87 (0.56-1.35)	1.19 (0.45-3.16)
SL out-of-pocket medical costs	(Ref: Low)	Medium	1.06 (0.93-1.21)	1.09 (0.93-1.28)	1.63 (0.47-5.68)
		High	0.66 (0.57-0.75) <sup>a</sup>	0.70 (0.59-0.82) <sup>a</sup>	0.77 (0.17-3.49)
SL Food insecurity rate	(Ref: Low)	Medium	0.84 (0.69-1.02)	0.87 (0.69-1.10)	4.55 (1.04-19.86) <sup>a</sup>
		High	0.85 (0.72-1.01)	0.86 (0.70-1.05)	1.41 (0.31-6.32)
SL Fast-food restaurant rate	(Ref: Low)	Medium	0.74 (0.63-0.87) <sup>a</sup>	0.78 (0.65-0.95) <sup>a</sup>	1.23 (0.50-3.03)
		High	0.87 (0.71-1.07)	0.92 (0.73-1.17)	0.39 (0.08-1.93)
SL Home loan application denial rate	(Ref: Low)	Medium	1.82 (1.56-2.12) <sup>a</sup>	1.88 (1.56-2.27) <sup>a</sup>	0.41 (0.03-5.65)
		High	1.70 (1.36-2.12) <sup>a</sup>	1.71 (1.30-2.24) <sup>a</sup>	0.20 (0.02-2.20)

<sup>a</sup> p-value< 0.05

Conclusion

- The use of Z codes differed based on patient characteristics such as age, gender, comorbidity status, and cancer stage.
- The under-coding of Z codes, along with the role of state-level SDOH in the treatment models, underscores the need for additional research on individual-level SDOH and treatment receipt.

Bibliography

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