# A Systematic Literature Review (SLR) to Evaluate the Role of Socioeconomic Factors Associated with Treatment Practices Among Oncology Patients

## Background

- Lower socioeconomic status correlates with increased cancer mortality and incidence, including in countries with universal healthcare coverage (1).
- In oncological care, patient factors influence mortality rate. Healthcare access has a major impact on cancer mortality, highlighting its critical role in treatment outcomes at all stages of the disease (1).
- In most high-income countries, the most common cancer types to be diagnosed in adults are colorectal, lung, female breast, and prostate cancers (2).
- Understanding the sociodemographic and socioeconomic factors influencing care outcomes in common malignancies that rely on screening and multimodal therapy, is crucial for addressing and mitigating disparities.

## Objective

- To explore how socioeconomic factors influence treatment patterns and outcomes within the field of oncology.
- To summarize how relevant socioeconomic variables such as poverty, income level, urban and rural distinctions, insurance status, education and employment status impact treatment patterns

## Methods

- The SLR was conducted based on the reporting standards of the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) (3).
- The selection of studies was guided by the PICOS (Population, Intervention, Comparator, Outcomes, Study Design) criteria (Table 1).
- The final selection of studies was limited to patients with prostate, breast, colorectal or lung cancer as these are the most commune type of cancer.
- Only studies reporting multivariate analyses (MVA) with reported odds ratios (ORs) were included in the analysis; abstracts were excluded, as they often provide limited information.

### **Database searches**

• The searches were conducted in Embase and MEDLINE to identify studies assessing sociodemographic and SES factors in patients with cancer.

## Table 1. PICOS criteria

### Population

Patients with prostate breast, colorectal or lung cancer

### Outcomes

 Socioeconomic factors associated with treatment patterns/ treatment receipt/ treatment choices



Interventions Any

Comparators No restrictions

### udy Design

Observational studies, including prospective, retrospective, ambispective, crosssectional studies

English • 2012-Current

### References

- 1. Kumachev A, Trudeau ME, Chan KK. Associations among socioeconomic status, patterns of care and outcomes in breast cancer patients in a universal health care system: Ontario's experience. Cancer. 2016 Mar 15;122(6):893-8. doi: 10.1002/cncr.29838. Epub 2015 Dec 22. PMID: 26696022.
- 2. Schwartz SM. Epidemiology of Cancer. Clin Chem. 2024 Jan 4;70(1):140-149. doi: 10.1093/clinchem/hvad202. PMID: 38175589.
- 3. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;372:n71. Published 2021 Mar 29. doi:10.1136/bmj.n71

Mansy Y<sup>1</sup>, Tran JTA<sup>2</sup>, Patel V<sup>3</sup>, Thakur D<sup>3</sup>, Musat M<sup>4</sup>, Grieve S<sup>3</sup>, Rizzo M<sup>5</sup>

<sup>1</sup>Cytel, Inc., Laval, QC, Canada; <sup>2</sup>Cytel Inc., Montreal, QC, Canada; <sup>3</sup>Cytel Inc., Toronto, ON, Canada, <sup>4</sup>Cytel Inc., Waltham, MA, USA; <sup>5</sup>Cytel Inc., London, UK

## Results

• From database searches, 1243 records were identified, of which 429 were screened at the full-text stage. A total of 46 studies were included in the analysis (Figure 1).

## Figure 1. PRISMA flow diagram



SES. socioeconomic status: OR. Odd ratio: MVA. multivariate analysis

- Among the 46 studies included in this analysis, the majority described outcomes among patients with prostate cancer (n=20), followed by patients with breast cancer (n=13), lung cancer (n=11), and colorectal cancer (n=4) (Figure 2).
- In terms of study design, majority of studies were database studies (n=30). (Figure 3).



• The majority of the includes studies were conducted within the US (n=39), with a smaller number originating from Canada (n=3), and singular instance from Korea, Norway, Australia, Uganda, Nigeria, and Namibia (Figure 4).





All Studies Breast





**Employment Status** 

## **Income Bracket**

Patients with lower income are less likely to receive cancer treatment • Among 74 analyses from 28 studies across all cancers, over half (55.4%) showed that patients with lower income were significantly less likely to receive treatment (Figure 5). Fewer analyses showed this trend among breast cancer studies (39%)

• When considering all analyses, the median (range) OR when referenced against the highest-income threshold or lowest-income threshold was 0.91 (0.47-1.74) and 1.15 (0.48-3.66), respectively (Figure 6).

• The greatest association between receipt of treatment and income bracket was observed among patients with lung cancer. In reference to the lowest or highestincome bracket, the median OR was 1.34 (0.84-1.66) and 0.84 (0.47-1.74), respectively







### cancer cancer **Residential Status**

## Residential status may be associated with cancer treatment

• Among 65 analyses from 25 studies across all cancer types, 20 (30.8%) showed that patients that lived a greater distance away from the treatment facility were less likely to receive treatment (Figure 7).

• This trend was lowest (17%) among patients with lung cancer.

### Figure 7. Number of studies reporting significant difference in receipt of treatment by residential status, by cancer type

		Signifcant studies	Nonsignifcant studie	S			
45							
20	17		2	10		16	
All Studies	9 Breast cance	er Colore	1	2 Lung	Pi	8 Tostate cance	er

• Data is heterogenous with median ORs (range) of 1.0 (0.6-2.0), 1.3 (0.63-1.9), and 1.2 (0.4-2.0) in reference to metropolitan residence, rural residence or living closest to treatment facility, respectively among all analyses (Figure 8).

Figure 8. Odds ratios for receipt of treatment based on insurance status, by Overall Prostate cancer Breast cancer Lung cancer Colorectal cancer • • • •

Reference: Metropolitan

Employment status does not associate with cancer treatment

• Among 7 analyses from 4 studies across all cancers, no studies showed a significant association between employment status and receipt of cancer treatment

Reference: Rural

Reference: Closest to facility

## **Insurance Status**

significant association.

### Figure 9. Number of studies reporting significant difference in receipt of treatment among based on insurance status, by cancer type



- Data is hete 11.1) and 1 insurance.
- In reference lung cancer status, by cancer type



## **Education Level**

- treatment (Figure 11).

### Figure 11. Number of studies reporting significant difference in receipt of treatment by education status, by cancer type

cancer

cancer



## **Discussion and Conclusions**

### Patient with medical insurance are more likely to receive treatment

• When considering studies that referenced either private or no insurance, among 47 analyses from 33 studies across all cancer types, 53% showed that patients without insurance were significantly less likely to receive cancer treatment (Figure 9). This trend was highest among studies in lung cancer, with 73% of analyses showing a

Significant studies	Nonsignificant studies	
Significant studies	Nonsignificant studies	

5	<b>11</b> 4	4	4 11	3 9			
idies	Breast cancer	Rectal cancer	Lung cancer	Prostate Cancer			
rogenous with median ORs (range) of 0.91 (0.14-4.1), 0.92 (0.48- 1 (0.63-2.43) in reference to private insurance, any insurance, or no espectively among all analyses (Figure 10).							
to private or any insurance, only studies including patients with had a median OR of less than 1.							
late notice for receipt of the star out becauter in surrouses							

Figure 10. Odds ratios for receipt of treatment based on insurance Overall Breast cancer Rectal cancer Lung cancer Prostate Cancer

## **Reference:** Private Reference: Uninsured Reference: Insured

### Education level may be associated with cancer treatment

• Among 30 analyses from 16 studies across all cancer types, 12 (40%) showed a significant association between higher education levels and likelihood of receiving

• More analyses were significant among breast cancer studies (58%).

• Data is heterogenous with median ORs (range) of 0.98 (0.71 - 1.78) and 0.98 (0.34-1.6), in reference to less than high school or more than a high school degree, respectively among all analyses (Figure 12).

### Figure 12. Odds ratios for receipt of treatment based on education level, by cancer type



Reference: ≤High School

• Low SES in cancer patients is associated with receiving less treatment, particularly considering factors such as income level and insurance status where the greatest trends were observed.

• Significant trends were observed for patients with lung cancer where higher income, insurance status, and closer proximity to treatment facility were associated with a higher likelihood of treatment.

• Factors such as residential status and education level had heterogeneous results. No trends were observed for the role employment status plays in receiving cancer treatment.

· Heterogeneity in data may be attributed to the various forms of treatments considered across the studies and the differences in factors adjusted for in the MVA.

