The Impact of Routine Cancer Screening on Disparities in Cancer Diagnosis Stages Among Socioeconomic Populations

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BACKGROUND

- Pronounced disparities exist in cancer incidence, stage at diagnosis, and mortality by geography, including between metropolitan and non-metropolitan regions[1]
- Residing in a metropolitan vs non-metropolitan location is associated with greater differences in mortality than incidence, suggesting access disparities in early detection may be important contributors[1]
- The Health Resources and Services Administration (HRSA) has identified Medically Underserved Areas (MUAs) which have a shortage of primary care health services within geographic areas[2]

OBJECTIVE

This study aimed to investigate the relationships between routine cancer screenings, incidence and stage of cancer diagnosis, and residence in MUAs

METHODS

- Claims data were collected for a population with commercial insurance through either high-risk plans or small-employer group insurance for 2018 through 2022
- Cancer incidence, rate of cancer screening, frequency of physician visits, and stage of cancer diagnosis,[3] along with participant demographics and comorbidities were extracted
- By zipcode, residents of MUAs[4] were categorized as medically underserved, while those not residing in an MUA were categorized as medically served **(Figures S1a, S1b)**
- Comparisons were performed between medically undeserved vs medically served using χ^2 with Bonferroni adjustments

LIMITATIONS

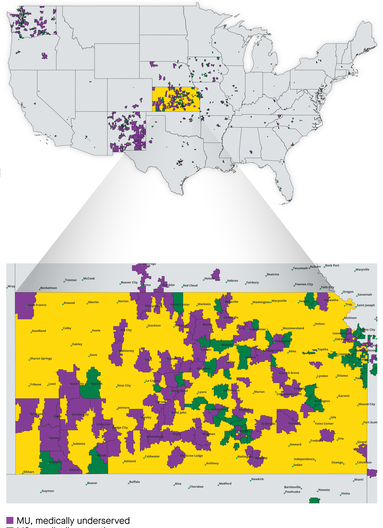
- The plan population was geographically concentrated in a few regions and may not be representative of the full United States population **(Figures S1a, S1b)**
- Insufficient sample size was available to assess differences between medically served and medically underserved populations by cancer type

Figure S1a. Geographic Distribution of Plan Participants

Distribution of plan participants in the continental United States, with concentrations in Iowa, Kansas, New Mexico, and Washington State. Medically underserved areas are represented in purple; medically served areas are represented in green.

Figure S1b. Plan Participants in Kansas Showing Geographic Pattern of MU and MS Areas

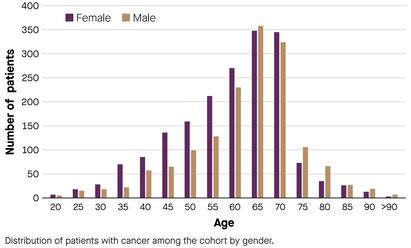
Detailed map of plan participants in Kansas. Purple regions are medically underserved, green are medically served.



KEY RESULTS: PARTICIPATION IN SCREENING WAS ASSOCIATED WITH REDUCED DISPARITIES BETWEEN MEDICALLY SERVED AND UNDERSERVED POPULATIONS

- A total of 68,767 people 18 years and over had claims between 2018-2022, of which 28,774 were aged 50 years or more (**Figure 1**, **Table 1**)
- Of those aged 50+, 12,074 were medically underserved (MU) and the balance (16,700) were medically served (MS)
- A majority of plan members (45,449/68,767) had no recorded claims for either primary care visits or cancer screening
- Plan members were concentrated in Iowa, Kansas, New Mexico, and Washington State (**Figures S1a**, **S1b**), with MU (purple) and MS (green) areas in each state
- Among the population aged 50+, 6.6% (1913/28,774) were newly diagnosed with cancer over the observation period
  - 8.7% were diagnosed in the MU population and 5.2% were diagnosed in the MS population ($p < 0.01$)
- Among those aged 50+ and not participating in screening and without a primary care visit, cancer incidence and late-stage cancer incidence were significantly higher in the MU population vs the MS population (**Figure 2**)
  - 11.6% were diagnosed in the MU population and 6.6% were diagnosed in the MS population ($p < 0.05$)
  - 3.7% had late-stage cancer in the MU population compared with 1.4% in the MS population ($p < 0.001$)
- These differences between the MU and MS populations were attenuated among those participating in screening, whether or not they had a primary care visit
  - A significant increase was observed in early-stage cancer in the MU population with both screening and primary care visits (3.6% vs 1.7%, $p < 0.01$)

Figure 1. Number of Individuals With Cancer by Age at Diagnosis



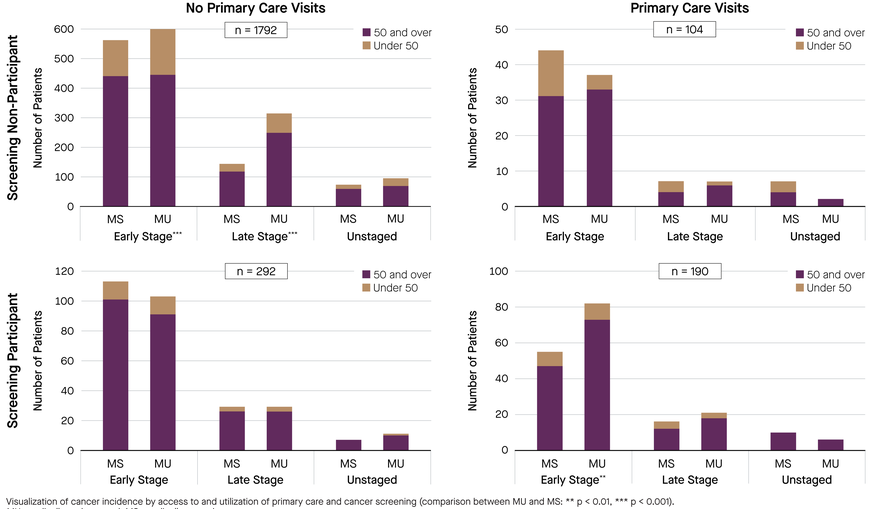
Distribution of patients with cancer among the cohort by gender.

Table 1. Number of Plan Members by Age, Healthcare Resource Utilization, and Cancer Status

	Medically Served		Medically Underserved	
	18+	50+	18+	50+
No PCP Visits	**33,175**	**12,988**	**22,882**	**9240**
No Screening	26,909	9379	18,540	6750
No Cancer*	26,127	8758	17,530	5965
Stage I/II***	562	441	600	466
Stage III/IV***	145	119	315	249
Unstaged	75	61	95	70
Screening	6266	3609	4342	2490
No Cancer*	6117	3475	4199	2363
Stage I/II	113	101	103	91
Stage III/IV	29	26	29	26
Unstaged	7	7	11	10
PCP Visits	**7091**	**3712**	**5619**	**2834**
No Screening***	2643	891	2063	782
No Cancer*	2586	852	2017	741
Stage I/II	44	31	37	33
Stage III/IV	7	4	7	6
Unstaged	6	4	2	2
Screening	4448	2821	3556	2052
No Cancer	4367	2752	3447	1955
Stage I/II**	55	47	82	73
Stage III/IV	16	12	21	18
Unstaged	10	10	6	6
Grand Total	**40,266**	**16,700**	**28,501**	**12,074**

Counts of plan members with claims from 2018-2022 separated by utilization of primary care and cancer screening, cancer status and stage, age, and availability of medical services. (difference in proportion with each cancer status between MU and MS: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$).
MU, medically underserved; MS, medically served.

Figure 2. Number of Patients With Cancer by Healthcare Utilization



Visualization of cancer incidence by access to and utilization of primary care and cancer screening (comparison between MU and MS: ** $p < 0.01$, *** $p < 0.001$).
MU, medically underserved; MS, medically served.

CONCLUSIONS

- Disparities in cancer incidence and stage at diagnosis were observed between medically underserved and medically served areas
- Among those aged 50+ who did not participate in cancer screening, medically underserved individuals were significantly more likely to be diagnosed with late-stage cancer than medically served individuals, particularly among those who also did not have primary care
- No difference was observed between medically served and medically underserved populations in those who participated in cancer screening

References

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4. Health Resources and Services Administration (HRSA). Shortage areas. Rockville, MD: HRSA, 2021b. https://data.hrsa.gov/topics/health-workforce/shortage-areas.

Disclosures

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