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Disparities in Access to Minimally Invasive Surgery

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OBJECTIVES

- Minimally invasive surgery (MIS) is associated with lower mortality, length of stay, and hospital re-admission compared to open surgery.
- Disparities in access to MIS are recognized across the United States.
- Our aim was to evaluate the community need evaluating cancer incidence and access to MIS, by examining whether community characteristics and cancer incidence are significant predictors of open surgical modality

METHODS

- Hospital catchments were defined by groups of ZCTAs that shared a minimum distance to a surgical hospital.
- Using data from IQVIA, we identified hospitals performing hysterectomy, prostatectomy, pulmonary lobectomy, colorectal procedures, and partial nephrectomy, and procedure modality within the catchment area.
- Cancer incidence, comorbidities, Social Vulnerability Index (SVI) and Rural-Urban Commuting Area (RUCA) scores were obtained from publicly available datasets and the Harvard Dataverse.
- We evaluated whether cancer incidence within a catchment predicts open surgical rates.
- A spline regression determined the inflection point of cancer incidence and open surgery rates to define an open surgical rate threshold.
- Using binomial logistic regression, we identified significant predictors of the open threshold.
- We stratified the model by urban (RUCA<4) and rural (RUCA>=4) designations.

RESULTS

Figure 1. MIS Deserts by ZCTA: Communities with Open Surgical Rate Threshold and Mid-High/High Cancer Quartile

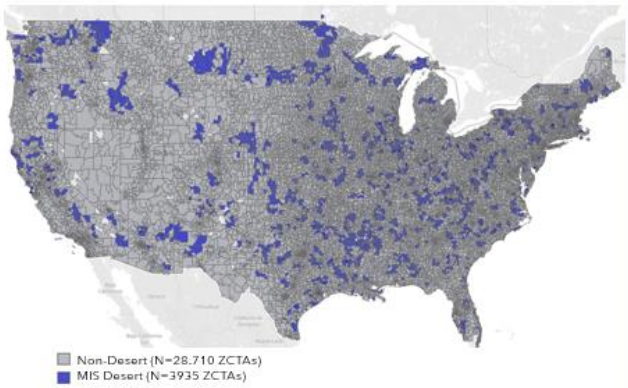

Table 1. Population characteristics associated with open surgical threshold

	OR	P-Value
Cancer Incidence-High	1.4	0.021
Cancer Incidence-Mid High	1.3	0.048
Cancer Incidence-Mid Low	1.2	0.2
SVI	2.9	<0.001
RUCA	1.2	<0.001

RESULTS

- The average cancer incidence within a catchment was 557 per 100,000 persons
- Communities with higher cancer incidence were more likely to be rural, older, and have higher comorbidity prevalence
- MIS deserts were defined by an open surgical threshold >=49.3%.
- Cancer quartiles significantly associated with the threshold when adjusting for RUCA and SVI (Table 1).
- A significant linear association exists between cancer quartile and open threshold.
- When stratifying by urban vs rural, the cancer incidence and open threshold relationship only exists in rural areas.

CONCLUSIONS

- Communities with the highest cancer incidence had significantly higher open surgical rates, RUCA, comorbidities, and age compared to lower incidence.
- Future studies are needed to further characterize MIS deserts using the physician density and travel distance.

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