

Stereotactic Body Radiation Therapy (SBRT) Utilization Among Patients with Early-Stage Lung Cancer Identified Through Multidisciplinary Early Detection Programs

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OBJECTIVE:

To compare SBRT utilization and sociodemographic composition of a diverse early-stage lung cancer cohort stratified by diagnostic care model: Multi-Disciplinary Clinic or Single-Disciplinary Clinic.

BACKGROUND

- Sociodemographic disparities persist in the diagnosis and treatment of early-stage non-small cell lung cancer (NSCLC), with Black, Medicaid-insured, and uninsured patients continuing to experience lower rates of curative treatment (surgical resection or stereotactic body radiotherapy [SBRT]).
- Although multidisciplinary programs for lung cancer screening (LCS) and incidental lung nodule management may mitigate gaps in early detection and intervention, their downstream effect on treatment modality allocation has not been well characterized, particularly in a sociodemographically heterogeneous population.
- Evaluating the sociodemographic composition and treatment modality allocation across diagnostic care models affords the opportunity to identify the patient populations and treatment patterns each care model captures.

METHODS

Study Population

- Patients with clinical stage I NSCLC diagnosed at Thomas Jefferson University – Center City campus (Philadelphia, PA) between January 1st, 2018 – April 30th, 2025, were included for analysis.

Data Sources

- Patients with a stage I lung cancer diagnosis were identified through four primary data sources: Jefferson LCS and Nodule Program Registry, Thoracic Surgery Database, SBRT Database, and the Electronic Health Record (EHR; Cancer Center Tumor Registry or ICD-10 code C34.0).
- All cases underwent manual chart review to identify the study-eligible subset with clinical stage I NSCLC diagnosed at the Center City campus.
- Diagnostic care model was assigned based on definitions below. Demographics, baseline characteristics, and oncologic details were extracted from the EHR (IRB control# 17D.150).
- Among 1,017 individuals diagnosed with stage I lung cancer, 773 cases were included in the final study cohort. Median follow-up time for the cohort, measured from the date of diagnostic care model visit, was 46.6 months.

Diagnostic Care Model Definitions

- Multi-Disciplinary Clinic (MDC):** A clinical stage I NSCLC diagnosed through concurrent institutional programs staffed by both Radiation Oncology and Thoracic Surgery including Lung Nodule Conference or Clinic, LCS Program, and Thoracic Multidisciplinary Clinic.
 - Patients with this diagnosis who saw both Radiation Oncology and Thoracic Surgery within a 3-month interval were also included in this categorization.
- Single-Disciplinary Clinic (SDC):** A clinical stage I NSCLC diagnosed outside of a multidisciplinary care model mechanism.

Statistical Analysis

- Descriptive statistics, chi-square tests, independent t-tests, Fisher's exact tests, Fisher-Freeman-Halton exact tests, and one-way ANOVAs were used to compare baseline characteristics and across diagnostic care model and treatment modality.
- Multivariable logistic regression was performed to identify factors independently associated with diagnostic care model.
- All analyses were 2-sided and used a significance threshold of $p < 0.05$.
- No artificial intelligence (AI) was used in content creation.

RESULTS

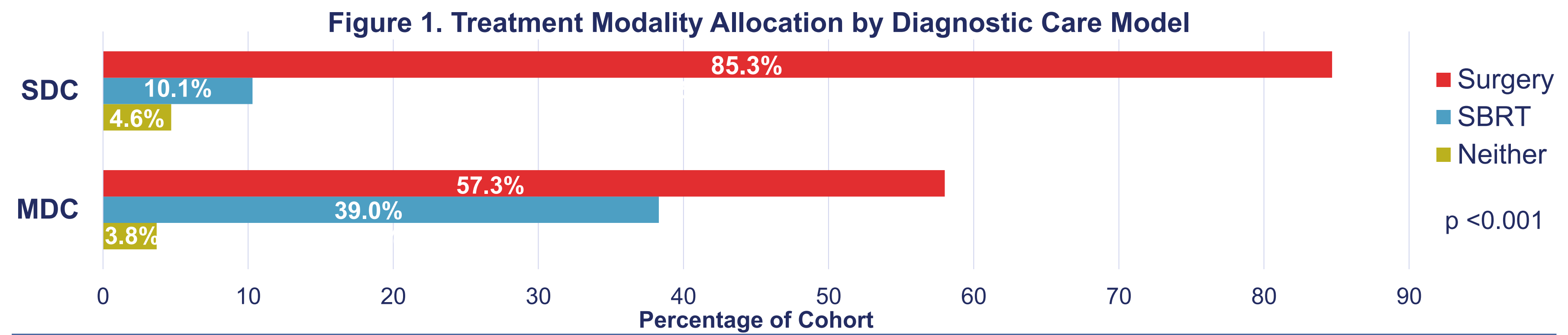


Table 2. Multivariate Predictors of MDC (vs. SDC)		
Covariate	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Age	1.03 (1.01-10.5)*	1.03 (1.01-1.05)*
Race		
Black / African-American	2.20 (1.57-3.09)*	1.74 (1.20-2.53)*
White	1.00	1.00
Other	1.71 (1.04-2.81)*	1.66 (0.94-2.93)
Insurance		
Medicare	1.66 (1.13-2.42)*	1.13 (0.73-1.74)
Medicaid / Dual Eligible / Uninsured	3.06 (1.93-4.84)*	2.02 (1.21-3.39)*
Commercial	1.00	1.00
Smoking		
Current	1.30 (0.93-1.82)	1.16 (0.81-1.67)
Former	1.00	1.00
Never	0.63 (0.43-0.92)*	0.67 (0.44-1.03)
Charlson Comorbidity Index		
Low (0-3)	1.00	1.00
Medium (4-5)	1.56 (0.87-2.81)	0.99 (0.46-1.74)
High (≥ 6)	1.97 (1.15-3.38)*	0.95 (0.49-1.83)
DLCO, % Predicted		
<40%	2.24 (1.24-4.03)*	1.52 (1.05-2.21)*
40-60%	1.93 (1.36-2.73)*	1.58 (0.85-2.94)
>60%	1.00	1.00
Not available	1.18 (0.72-1.91)	0.77 (0.45-1.30)

* p<0.05; OR >1 indicates greater likelihood of MDC pathway

DISCUSSION

- SBRT utilization was nearly 4-fold higher in the MDC cohort (MDC vs. SDC: 39.0% vs. 10.1%, $p<0.001$), and the rate of curative treatment exceeded 95% in both groups. (**Figure 1**)
- Patients who received SBRT were older, poorer performance status, and more likely to have a prior lung cancer diagnosis compared to the surgical cohort. (**Data not shown**)
- Compared to the SDC cohort, patients evaluated through MDC were older, more likely to be of minority race, more likely to be Medicaid-insured or uninsured, and less physiologically fit – with higher comorbidity burden, poorer performance status, and poorer pulmonary function. (**Table 1**)
- On multivariate analysis, age, race, insurance status, and lung function remained independently associated with receipt of multidisciplinary care after adjusting for comorbidity index and smoking status. (**Table 3**)

CONCLUSIONS:

- In this urban and sociodemographically diverse cohort, curative-intent treatment rates were uniformly high across diagnostic care models.
- SBRT utilization was significantly higher among lung cancer patients evaluated through MDC, reflecting an older, higher-comorbidity, and more underserved case mix.
- Historically underserved patients are more likely to receive lung cancer diagnostic care and treatment through multidisciplinary programs, which consequently provide greater SBRT access for high-risk individuals.

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