More than one: Evaluating intra-system variation in the implementation and impact of lung cancer screening

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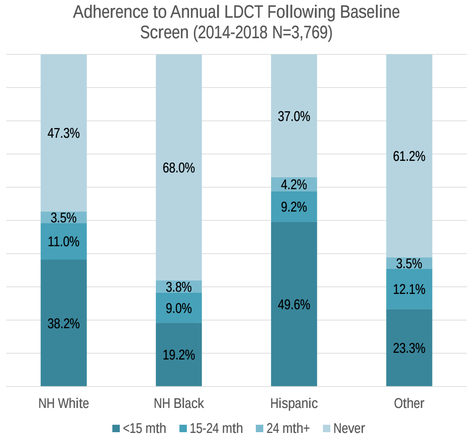
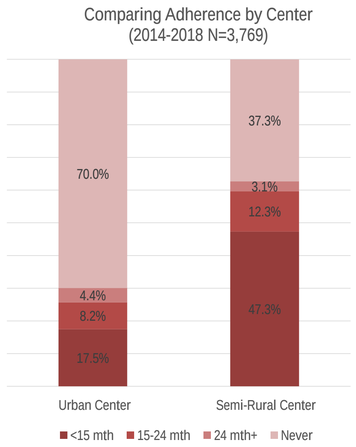
Purpose

- In 2015, supported by recommendations from the United States Preventive Services Task Force, the Centers for Medicare and Medicaid Services established national coverage for lung cancer screening (LCS) for high-risk adults that meet specific age, smoking, and health-status criteria.
- Despite national policies, low uptake and variation in the implementation of LCS has been observed, but little is known about how these differences impact LCS outcomes.
- The aim of this study is to compare multilevel factors associated with LCS in two regional centers affiliated with a single healthcare organization:
  - **Urban Center:** Hospital of the University of Pennsylvania, Pennsylvania Area Hospital, Penn Presbyterian Medical Center, Chester Country Hospital, and Penn Medicine Community Care Associates
  - **Semi-rural Center:** Lancaster General Health (LGH)

Methods

- Using electronic medical record data and contextual inquiry from stakeholders, we evaluated differences by medical center in baseline and subsequent annual LCS using low-dose computed tomography in patients undergoing baseline screening in 2014-2018. The two centers are located about 90 miles apart in urban and semi-rural locations in Southeastern Pennsylvania.
- Bivariate and multivariate analyses were conducted to compare differences by center in patient characteristics, (age, sex, race/ethnicity, and smoking status), clinician specialty, baseline LungRADS, and subsequent annual screening.
- Key informant interviews with clinical leadership were used to describe LCS implementation at each center.





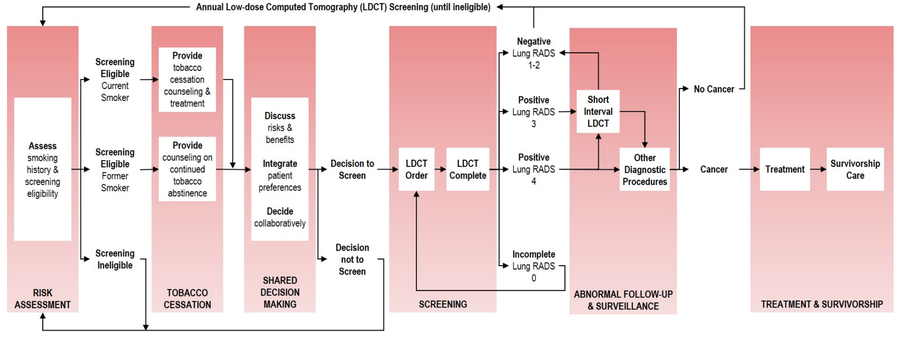


Figure 1. PROSPR Lung Cancer Screening Process Model

Results

- To implement LCS, the semi-rural center used a centralized approach, coordinated through a nurse-led program for shared decision-making and coordination; whereas, the urban center used a de-centralized approach, without direct outreach or centralized coordination.
- In comparison to patients screened at the urban center (n=2,611), patients receiving a baseline LDCT screened at the semi-rural center (n=3,186) were significantly more likely to be Non-Hispanic White (90.5% vs 64.5%), younger than age 65 (52.7% vs 48.6%), and male (54.7% vs 50.9%), and less likely to be current smokers (48.3% vs 54.4%).
- Of those receiving a baseline LDCT in 2014-2018 (n=3,769), nearly-half (47.3%) of semi-rural center patients received a timely annual screen (<15 months) following baseline in contrast to 17.5% of urban center patients.
- Semi-rural center patients were 3-times more likely to receive any subsequent LCS in comparison to urban center patients, controlling for patient characteristics (AOR=3.34; 95%CI: 2.62-4.00).

Conclusions & Policy Implications

- Intra-system variation in LCS policy implementation was associated with differences in optimal adherence, not attributable to observed patient-level factors.
- As U.S. healthcare systems continue to consolidate, it is important to understand how contextual factors between and within systems impact outcomes and impact of healthcare policies.
- Further research is needed to identify effective strategies to improving screening to ensure that existing disparities are not exacerbated by LCS implementation differences.

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