



Quality Measures for Lung Cancer Screening: Current Challenges and Future Opportunities

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Background and Disclosures

- No disclosures – no relevant financial interests or other forms of potential conflict
- Relevant background
 - Co-Chair, National Quality Forum Scientific Methods Panel
 - Commissioner, Medicare Payment Advisory Commission (MedPAC)
 - Several expert panels and advisory committees for National Committee for Quality Assurance (NCQA)



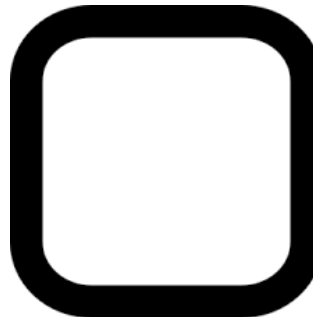
Where do Quality Measures Come From?

- High-Quality Clinical Evidence
 - Something about care process leads to better outcomes
 - Some important outcome can be influenced by care process
 - “Hierarchy of Evidence” – Multiple RCTs, Single RCT, Observational Studies, Expert Opinion
- ↓
- Evidence-Based Guidelines
 - Organizations like USPSTF, AHRQ, specialty societies....
 - This SHOULD be done, or this SHOULD NOT be done
- ↓
- Quality of Care Measures



How Does This Fit For Lung Cancer Screening?

- High-Quality Clinical Evidence
- Evidence-Based Guidelines
- Well-Defined Quality Measure



Types of Quality Measures

FIGURE C: The Donabedian Model, adapted from The Quality of Care (Donabedian, 1988)⁷



Possible Measures for Lung Cancer Screening?

- **Structure?**

- ???? (Equipment? Staffing? Existing protocol(s)?

- **Process**

- Number of screening tests done per X number of eligible plan members or patients

- (Possibly inflated by “over-screening”)

- *Percent of eligible plan members or patients screened in “performance year” (0-100%)*

- Or, maybe referrals for screening or orders for screening

- **Outcome?**

- Proportion of late-stage cancers diagnosed in screening-eligible population?

- Survival/mortality in screening-eligible population?

Do One or More Measures Already Exist?

[Thoracic Oncology Special Features]



Proposed Quality Metrics for Lung Cancer Screening Programs

A National Lung Cancer Roundtable Project

Peter J. Mazzone, MD, MPH; Charles S. White, MD; Ella A. Kazerooni, MD; Robert A. Smith, PhD; and Carey C. Thomson, MD, MPH

CHEST 2021; 160(1):368-378

TABLE 1] Topics of the Initial 30 Drafted Quality Indicators, the 15 Prioritized for Further Exploration, and the 8 With Data Available From the ACR LCSR

Topic	Drafted	Prioritized	Data
Who is screened	6	2	1
Shared decision-making	4	2	2
LDCT scan performance	3	1	1
LDCT scan findings	3	3	1
Evaluation of LDCT scan findings	8	5	2
Diagnosis and treatment	6	2	1
Total	30	15	8

Quality Indicators That Achieved Consensus

Six quality indicators achieved consensus through the survey process. One of the indicators is related to who is screened, one is related to the provision of smoking cessation guidance, three are related to compliance with follow-up recommendations, and one is related to the evaluation of concerning findings.

Screening Appropriateness (ie, Who Is Being Screened): The percentage of individuals who complete LDCT screening for lung cancer who are screening eligible based on the USPSTF criteria.

Veterans Health Administration (VHA) Initiative

N.M. Maurice and N.T. Tanner/Seminars in Oncology 49 (2022) 206–212

209

Table 1

Components of a high-quality lung cancer screening program.

Nine essential components that LCS programs should adopt.*	
1.	Careful patient selection in keeping with the USPSTF eligibility recommendation
2.	Structured frequency and duration of screening that is in line with the USPSTF recommendation
3.	Technical specifications of an LDCT is in keeping with the American College of Radiology (ACR) Society of Thoracic Radiology technical specifications and credentialing criteria
4.	Policy on the size and characteristics of a nodule that would label the test as positive and data collection system for nodules
5.	Structured LDCT reporting system such as the ACR-developed system, LungRADS
6.	Designated multidisciplinary group of clinicians with expertise in lung nodule management, the necessary infrastructure to evaluate screen-detected nodules, a standardized lung nodule management strategy, and a tracking system for nodule management
7.	Integrated smoking cessation services
8.	Educational strategies for ordering providers and standardized patient and provider educational materials to facilitate SDM
9.	A data collection methodology to track each component of an LCS program and regular quality audits

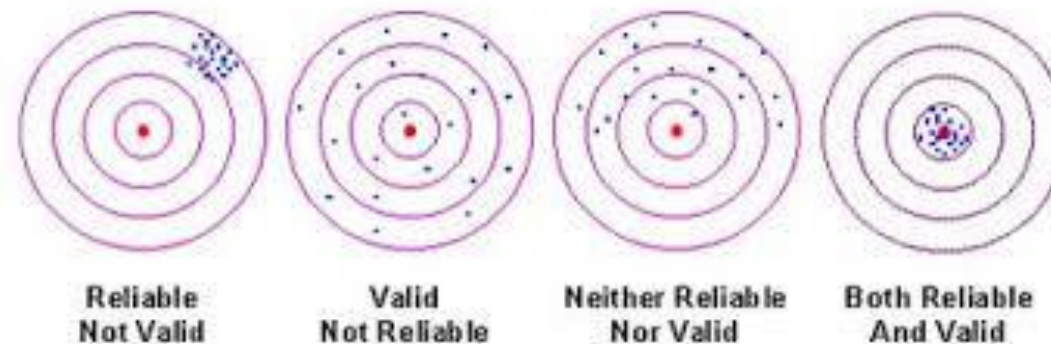
* [35].

Access to LCS in the US VHA

Retrospective analyses of LCS examinations within the VHA have identified that only around 2.5%–3% of the eligible veteran population have undergone LDCT screening. This screening was conducted in 60%–70% of the VA medical centers, most of which were of the highest complexity level [32,33]. However, the uptake

Why is Good Measurement Hard?

- Key measurement evaluation criteria
 - Reliability
 - Validity
- Levels of analysis for reliability and validity
 - Data element(s) / patient-level (are the billing codes reliable and valid?)
 - Entity-level scores (Are the plan-level scores reliable and valid?)
- Variety of statistical tests available to assess reliability and validity
 - Typically seek reliability of .7 on 0-1 scale
 - No clear thresholds or cutoffs for validity (yet)



Reliability and Validity of Key Data Elements

- Numerator?
 - Billing code(s) for tests performed
- Denominator
 - NCQA definition: For current smokers, and those who **stopped smoking within the past 15 years**, USPSTF now recommends an annual low-dose computed tomography (CT) screening:
 - Beginning at age 50, through age 80.
 - At a **20 pack-year smoking history threshold** (the equivalent of one pack per day for 20 years, two packs per day for 10 years and so on).
 - Where do data on current smoking status and pack-year history come from? Are those data elements reliable and valid?

Example of Denominator Problems

Journal of the American Medical Informatics Association, 29(5), 2022, 779–788
<https://doi.org/10.1093/jamia/ocac020>
Advance Access Publication Date: 15 February 2022
Research and Applications

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Research and Applications

Inaccuracies in electronic health records smoking data and a potential approach to address resulting underestimation in determining lung cancer screening eligibility

Polina V. Kukhareva ¹, Tanner J. Caverly ^{2,3,4}, Haojia Li⁵, Hormuzd A. Katki⁶, Li C. Cheung⁶, Thomas J. Reese ⁷, Guilherme Del Fiol¹, Rachel Hess^{5,8}, David W. Wetter¹¹, Yue Zhang⁵, Teresa Y. Taft¹, Michael C. Flynn^{9,10,12}, and Kensaku Kawamoto ¹

METHODS

This was a cross-sectional study of University of Utah (UU) Health patients 50–80 years old with a history of smoking. This study was approved by the UU Institutional Review Board.



Results: Over 80% of evaluated records had inaccuracies, including missing packs-per-day or years-smoked (42.7%), outdated data (25.1%), missing years-quit (17.4%), and a recent change in packs-per-day resulting in inaccurate lifetime pack-years estimation (16.9%). Addressing these issues by using longitudinal data enabled the identification of 49.4% more patients potentially eligible for lung cancer screening ($P < .001$).

What About Exclusions and Risk Adjustment?

- Exclusions in the USPTF guideline?
- Exclusions in measure specification beyond guideline? (e.g., no Health Risk Appraisal completed – smoking status unknown)
- Risk adjustment generally not a crucial issue for process measures
 - Confounding factors generally dealt with in numerator/denominator definitions
 - Still, **any factors outside of measured entity's control that would affect the measure?** (e.g., large number of plan members with cultural or religious objection to screening)

Potential Risk-Adjustment Issue - Race

Lake et al. *BMC Cancer* (2020) 20:561
<https://doi.org/10.1186/s12885-020-06923-0>


BMC Cancer

RESEARCH ARTICLE

Open Access

Black patients referred to a lung cancer screening program experience lower rates of screening and longer time to follow-up



Michael Lake^{1†}, Christine S. Shusted^{2†}, Hee-Soon Juon³, Russell K. McIntire⁴, Charnita Zeigler-Johnson³, Nathaniel R. Evans⁵, Gregory C. Kane² and Julie A. Barta^{1*} 

We carried out a historical cohort study of patients referred to our LCSP. Following approval by the Institutional Review Board of Thomas Jefferson University (17D.150), participants were identified using the clinical databases of the Jane and Leonard Korman Respiratory Institute Lung Cancer Screening Program. All referrals to the Jefferson LCSP between May 2015 and July 2017 were included for analysis. We carried out retrospective

One Active Step Forward – Target “End of 2024”



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New Measure Coming for Lung Cancer Screening

November 15, 2022 · Andy Reynolds

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Other Possible Development Pathways

- Large Insurer Data Bases
 - Kaiser
 - Health Care Systems Research Network (HCSRN)
 - Optum
- Health Care Consulting Firms (e.g., Milliman)
- National Association of ACOs (NAACOS)
- Key Requirements:
 - Multiple organizations or “units” with large, stable member populations (measure denominator)
 - Analytic capability
 - Interest and time available



Next Steps After Initial Measure Development

- Endorsement by “Multi-Stakeholder Entity”
 - Up to this year, was National Quality Forum (NQF)
 - Now, managed by Battelle under the “Partnership for Quality Measurement” (PQM)
 - Formal evaluation of scientific criteria (reliability/validity...)
 - Evaluation by groups of clinical experts (importance, feasibility....)
- Inclusion in CMS P4P or public reporting programs through the rule-making and public comment process (e.g., Medicare Advantage “Star Ratings” or ACO quality scores)
- Inclusion in NCQA ratings or accreditation of health plans
- Ongoing support by measure developer and/or measure steward



Remaining Challenges

- What about people who aren't insured or who are not in health plan data sets?
 - People in states that have not expanded Medicaid or have a health plan enrollment structure?
- What about people in fee-for-service Medicare? What is the accountable entity?
 - ACOs could be the accountable entities for many in FFS Medicare
- Measurement is just a first step!
 - Quality improvement takes time and effort and resources – doesn't just happen
 - Financial incentives through P4P programs, or public reporting initiatives like “star ratings” might help
 - What really matters is a clinical and administrative consensus that the care being measured really matters to patients or plan members, and improvement is a moral imperative.
 - Screening isn't the final meaningful step – there has to be effective follow-up on positive screening results

Summary

- Key elements for successful measure development are in place
- At least one major, significant measure development effort is underway (NCQA)
 - Focus on rate of screening among eligible health plan members
- Other parallel or possibly competing efforts could take place if there is interest and financial support
- After initial measure development, the essential steps are PQM endorsement and then use of the measure by major payors or plan accreditation agencies like CMS or NCQA