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Improving Early Detection of Lung Cancer in Underserved Primary Care Settings

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Walden University

College of Management and Human Potential

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Improving Early Detection of Lung Cancer in Underserved Primary Care Settings

by

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Abstract

Lung cancer is the leading cause of cancer-related mortality in the United States, with underserved populations experiencing higher rates of late-stage diagnosis and preventable death. Despite established screening guidelines, adherence within primary care remains inconsistent, particularly in safety-net settings, reflecting a healthcare administration problem driven by organizational structures and care processes. The purpose of this integrative review was to identify administrative interventions that improve primary care provider adherence to lung cancer screening referral guidelines in safety-net healthcare settings. Guided by the Donabedian Quality Framework, a systematic integrative review was conducted to examine how healthcare structures and processes influence screening implementation. Study quality and relevance were appraised using the Johns Hopkins Nursing Evidence-Based Practice appraisal tools. The synthesis yielded five themes and fifteen subthemes representing evidence-based administrative strategies, including improving provider knowledge and education, strengthening health system infrastructure, reducing workforce and administrative barriers, advancing equity and positive social change, and enhancing patient access and engagement. Key subthemes included guideline-based provider education, shared decision-making support, standardized referral and follow-up workflows, electronic health record-enabled eligibility identification, defined care team roles, and reduction of access barriers related to insurance, transportation, and cost. These findings directly address the review question by demonstrating that coordinated administrative interventions are essential to improving guideline adherence, expanding screening access, and reducing lung cancer disparities in underserved primary care populations.

Part 1: Practice-Based Problem

Problem of Interest

Inconsistent adherence by primary care providers to lung cancer screening guidelines is costing lives, disproportionately affecting vulnerable communities already burdened by healthcare disparities (Niranjan et al., 2024; Olazagasti et al., 2022). Primary care providers often find it a challenge to consistently follow guidelines for referring high-risk patients for lung cancer screenings (Niranjan et al., 2024). When guidelines are not consistently followed, lung cancer is often diagnosed at later stages, significantly worsening patient outcomes, especially in communities already facing healthcare challenges (Coughlin et al., 2020; Doubeni et al., 2020). Azubuike et al. (2020) noted that despite United States Preventive Services Task Force (USPSTF) recommendations, preventative lung cancer screening referral rates remain low due to gaps in provider knowledge. Similarly, Kukhareva et al. (2024) and McInnerney et al. (2024) reported that administrative inefficiencies and complex workflows hinder screening uptake. This pattern of inconsistent adherence contributes to the persistence of existing healthcare disparities, leading to higher death rates and reduced quality of life among vulnerable populations (Rivera et al., 2020). Improving how well providers follow these guidelines through targeted administrative interventions is essential for catching lung cancer early and improving patient outcomes in medically underserved communities.

In summary, inconsistent adherence to lung cancer screening guidelines among primary care providers contributes to delayed diagnoses, worsening patient outcomes, and persistent health inequities in underserved communities. These challenges demonstrate the urgent need for administrative and educational interventions that

strengthen adherence to evidence-based practices. Implementing effective solutions in these settings can promote positive social change by improving early detection rates, reducing health disparities, and enhancing access to high-quality preventive care for vulnerable populations.

Healthcare Administration Problem

Background

Lung cancer remains the leading cause of cancer-related deaths globally, surpassing deaths from breast, prostate, and colorectal cancers combined (Rivera et al., 2020). This stark reality underscores the significant public health burden posed by lung cancer. Its high mortality rate largely results from diagnoses occurring at advanced stages, due to the disease typically remaining asymptomatic until it has significantly progressed (Olazagasti et al., 2022). Early detection through preventive screening, particularly low-dose computed tomography (LDCT), has proven highly effective in reducing lung cancer mortality by catching the disease at a stage when treatment is significantly more likely to succeed (Amicizia et al., 2023).

Despite clear and established screening guidelines provided by authoritative organizations such as the USPSTF, adherence among primary care providers remains inadequate (Niranjan et al., 2024). This lack of consistent adherence stems from multiple interrelated issues, including gaps in provider training, misunderstandings about screening criteria, uncertainty regarding patient eligibility, and limited awareness of both the benefits of early detection and the specific screening protocols involved (Azubuike et al., 2020). Administrative obstacles further compound these issues, such as complex referral procedures, fragmented healthcare delivery systems, inadequate integration of

electronic health records (EHRs), and insufficient clinical decision-support tools (Pignone et al., 2024). These factors result in cumbersome workflows, making it more difficult for providers to consistently apply recommended preventive screenings (Kukhareva et al., 2024).

Historically, lung cancer screening has faced challenges linked to stigmatization and misconceptions about the disease, often viewed primarily as self-inflicted due to smoking habits, thereby reducing the urgency and prioritization of early intervention efforts compared to other cancers (Carter-Bawa et al., 2022). Addressing these entrenched perceptions and systemic barriers requires targeted multi-level interventions. Moreover, disparities in healthcare access exacerbate these challenges, disproportionately affecting medically underserved areas, racial and ethnic minorities, rural populations, and socioeconomically disadvantaged communities. These populations frequently encounter significant barriers, including transportation difficulties, inadequate healthcare infrastructure, lack of insurance coverage, and cultural or linguistic barriers, which collectively deepen existing inequalities in lung cancer outcomes (Sayani et al., 2023).

Operational Problem

In practice, primary care clinics serving medically underserved communities frequently encounter significant operational challenges, including limited provider training, inconsistent adherence to guidelines, and inefficient or ineffective referral systems (Niranjan et al., 2024). Providers consistently report barriers such as constrained visit durations, limited familiarity with evolving guidelines, and inadequate administrative support, which complicate effective implementation of lung cancer screening processes (Coughlin et al., 2020). Additionally, fragmented clinical workflows

and logistical complexities within clinics further impede consistent referrals, creating missed opportunities to identify lung cancer at an early, treatable stage (Wong et al., 2024).

Another operational concern is the limited application of shared decision-making practices, a cornerstone of patient-centered care and a requirement explicitly outlined in USPSTF guidelines (Pignone et al., 2024). Without adequate provider training and administrative support, shared decision-making discussions occur infrequently or superficially. This shortfall contributes to lower patient understanding, reduced trust, and diminished patient follow-through on recommended lung cancer screenings (Khanna et al., 2022).

Moreover, many clinics lack robust integration of electronic health record (EHR) systems tailored specifically for preventive screening workflows (Pignone et al., 2024). Poorly designed or fragmented EHR systems contribute significantly to inefficient referral processes, ineffective patient tracking, and suboptimal follow-up communication, further reducing adherence to preventive screening guidelines (Kukhareva et al., 2024).

Historically, operational problems have been exacerbated by the prioritization of acute care and chronic disease management in primary care settings, often at the expense of preventive services (Doubeni et al. 2020). Limited reimbursement structures for preventive screenings, particularly in economically disadvantaged areas, compound these operational difficulties, creating financial disincentives for clinics to rigorously adhere to lung cancer screening recommendations (Smith et al., 2023). As a result, the current healthcare system is structured in ways that prioritize reactive rather than proactive care,

undermining preventive health measures that could substantially reduce lung cancer mortality.

Given these interrelated operational challenges, it is essential to develop systemic administrative strategies that address the root causes, provider education gaps, clinical workflow inefficiencies, technological inadequacies, and limited financial incentives. Implementing targeted interventions to strengthen shared decision-making, optimize EHR integration, streamline referral systems, and create sustainable administrative support frameworks is critical to effectively tackling lung cancer mortality, particularly in medically underserved communities where healthcare disparities remain pronounced (Wong et al., 2024). See Appendix A for more search results.

Ideal State of Operations

The ideal professional practice would involve primary care providers referring at least 60% of eligible high-risk adults for annual LDCT lung cancer screening through well-organized educational programs and standardized referral processes (Olazagasti et al., 2022). Achieving this benchmark consistently would facilitate earlier diagnosis and timely initiation of treatment. Ultimately, this level of adherence has the potential to reduce lung cancer disparities and improve overall patient outcomes across medically underserved populations.

Professional Practice Gap Statement

Currently, the gap between ideal and actual practice is significant. Ideally, primary care providers serving medically underserved populations should refer at least 60% of eligible high-risk adults for annual low-dose CT lung cancer screening following structured educational interventions and standardized referral workflows (Olazagasti et

al., 2022). However, despite these recommendations, lung cancer screening remains significantly underutilized, with national screening rates estimated at just 5% to 15% of eligible patients (Doubeni et al., 2020; Olazagasti et al., 2022;), and referral rates remaining below 20% in many health systems (Slatore et al., 2021). These figures underscore persistent gaps in provider education, workflow standardization, and guideline adherence. Targeted administrative interventions are essential to address these gaps, improve screening practices, enhance health outcomes, and reduce disparities.

Summary of Evidence

Extensive evidence supports the effectiveness of structured educational interventions in increasing provider adherence to lung cancer screening guidelines, particularly in medically underserved primary care settings. Olazagasti et al. (2022) found significant improvements in referral rates following targeted provider education, highlighting the importance of continuous professional development. However, recent research continues to show widespread gaps in clinician knowledge and concordance with USPSTF lung cancer screening guidelines, with many providers still ordering chest X-rays instead of low-dose CT scans, underscoring the need for ongoing education and system-level interventions (Carter-Bawa et al., 2022). Structural barriers such as racial inequities, poverty, geographic isolation, and limited healthcare infrastructure continue to restrict access to screening (Kota et al., 2022). Together, these interventions illustrate a comprehensive, multilayered approach to improving lung cancer screening in high-risk populations. Real-world lung cancer screening cohorts drawn from safety-net health systems demonstrate that screening can yield favorable mortality outcomes even among medically complex and socioeconomically diverse populations. These findings reinforce

the value of expanding screening access in underserved settings and challenge assumptions that high comorbidity diminishes the benefit of early detection (Gwin et al., 2025).

Purpose of the Integrative Review

The purpose of this integrative review was to identify evidence-based administrative interventions that improve lung cancer screening referral rates among primary care providers treating medically underserved communities. Although lung cancer is a leading cause of cancer-related deaths, early detection through screening significantly increases survival (Rivera et al., 2020). Despite established guidelines from the USPSTF, provider adherence remains inconsistent, especially in clinics serving medically disadvantaged populations. I synthesized research on administrative strategies to improve screening compliance.

The purpose of the review was to deliver practical, evidence-based insights for healthcare leaders seeking to implement administrative interventions in primary care, particularly in safety-net and community clinics. By identifying actionable strategies grounded in research, I provide a roadmap for improving preventive care delivery systems. These targeted interventions can reduce disparities, foster earlier detection, and ultimately enhance lung cancer outcomes among vulnerable and medically underserved populations (Steiling et al., 2020).

Integrative Review Question

The central question of this research was: What administrative interventions effectively enhance primary care provider adherence to lung cancer screening referral guidelines in safety-net healthcare settings?

Theoretical and/or Conceptual Framework

I used the Donabedian Quality Framework, renowned for its structured method of evaluating healthcare quality through the interplay between organizational structure, care processes, and patient outcomes (Donabedian, 1966). The Donabedian Quality Framework was applied to examine the healthcare administration problem by offering a structured approach to assess what organization structures and processes can improve outcomes and lung cancer screening referral rates. The theory supported this study's purpose by highlighting provider-level operational gaps. This framework was used to inform the review question by identifying specific administrative structures and processes in primary care settings that can improve referral guideline adherence. By leveraging this framework, the study can effectively determine how these elements impact lung cancer screening referral rates, thereby informing targeted interventions to improve health outcomes in medically underserved primary care environments. International lung cancer screening programs further demonstrate that sustained improvements in early detection depend on national policy alignment, standardized eligibility criteria, and continuous program evaluation. These system-level supports play a critical role in ensuring consistent screening delivery and long-term program sustainability (Kwak et al., 2025).

Part 2: Literature Review, Quality Appraisal, and Analysis

Literature Review Strategy

I conducted an integrative review of literature published between 2015 and 2024. I searched the following databases: Medline, Cumulative Index of Nursing and Allied Health Literature (CINAHL), ProQuest Health & Medical Collection, and ProQuest Nursing & Allied Health. I conducted supplemental hand searches and citation chasing using Google Scholar.

Key search terms included *lung cancer screening, low-dose CT, referral, adherence, guideline compliance, primary care, provider, clinician, administrative interventions, workflow, electronic health records, decision support, and patient engagement*. I used Boolean operators (AND/OR) to link terms. I applied NOT modifiers to exclude irrelevant studies, including those focused on surgery, radiology, imaging-only, oncology-only, pediatrics, veterans, telemedicine, case reports, and animal studies. This refinement ensured the search focused on administrative and organizational interventions rather than clinical or specialty-only studies.

The initial search identified 470 articles. After I removed 90 duplicates, 380 articles remained for title and abstract screening. I excluded 323 articles that did not meet the inclusion criteria, such as those that lacked focus on administrative interventions or lung cancer screening outcomes. I reviewed 57 full-text articles and excluded 30 that lacked sufficient intervention-based evidence, data, or alignment with the target population criteria. Ultimately, 27 studies met all inclusion criteria and were retained for synthesis. (See Appendix B for the complete literature search log and screening summary.)

I included peer-reviewed studies published in English between 2015 and 2024 that focused on administrative, workflow, provider education, referral, or patient engagement interventions related to lung cancer screening. I targeted primary care or community health providers serving medically underserved populations. I excluded studies that were clinical-only, not peer-reviewed, not available in full text, or outside of comparable healthcare contexts. Table 1 provides the inclusion and exclusion search criteria.

Table 1

Inclusion and Exclusion Search Criteria

Inclusion criteria	Exclusion criteria
English language	Non-English
2015–2024	Published before 2015
Peer-reviewed	Opinion pieces, editorials
Primary care, community health, or hospital outpatient settings	Inpatient, specialty-only, or surgical settings
Focus on lung cancer screening (LDCT)	Other cancers or general screening only
Administrative, workflow, provider education, referral, or patient engagement interventions	Solely clinical/diagnostic outcomes
Medically underserved populations	Non-transferable international systems
Available in full text	Not available in full text

Literature Quality Appraisal

I evaluated twenty-seven peer-reviewed studies for methodological rigor using the Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) Model and the Research Evidence Appraisal Tool (Dang & Dearholt, 2022). The critical appraisal process, detailed in Appendix C: Critical Appraisal Results Log, established a clear hierarchy of

evidence across the included literature. Specifically, I classified seventeen studies as Level III, reflecting non-experimental, observational, or qualitative research designs, and rated three studies as Level V, representing integrative reviews and expert syntheses. Of these, I assessed fourteen studies as high-quality and six as good-quality, indicating overall methodological soundness, credible analytical strategies, and transparent reporting practices. Collectively, the body of evidence demonstrated internal consistency, well-supported conclusions, and adequately referenced findings, thereby providing a robust foundation for synthesis and subsequent thematic analysis.

Thematic Analysis

The majority of studies included in this review were cross-sectional, descriptive, or comparative non-experimental designs that utilized surveys, secondary data, or observational methods to assess patterns of lung cancer screening (LCS) utilization. A smaller subset of studies incorporated qualitative interviews or mixed-method approaches to explore patient and provider experiences related to LCS implementation. Authors reported strategies to minimize bias, including the use of validated survey instruments, structured coding frameworks, and multivariate statistical analyses to control for potential confounders (Avila et al., 2025; Javier et al., 2025; Liu et al., 2025a; McFadden et al., 2025). Several qualitative investigations detailed reflexive procedures such as independent coding, member checking, and theme verification to enhance credibility and trustworthiness (Carter-Bawa et al., 2025; Japuntich et al., 2025).

Common methodological limitations identified across the body of evidence included cross-sectional data, which limited causal inference (n = 12); single-center sampling, which constrained generalizability (n = 7); and self-reported screening or

behavioral outcomes, which introduced potential recall or social desirability bias (n = 6). Additional limitations encompassed heterogeneity of screening program maturity across sites (n = 4), sample size constraints affecting statistical power (n = 3), and language or cultural barriers influencing participant understanding of screening messages (n = 2).

Despite these limitations, the studies collectively produced consistent and convergent thematic patterns related to lung cancer screening implementation. Recurring domains included administrative strategies targeting patient knowledge and health literacy, provider guideline adherence, access and insurance navigation, culturally responsive engagement, and long-term screening sustainability. These themes provided a structured foundation for higher-level synthesis, as detailed in Appendix D: Thematic Analysis Results Matrix, and informed the development of actionable recommendations for improving equitable access and sustainability of lung cancer screening programs.

Total Summary of Themes and Subthemes

The synthesis of evidence yielded themes and subthemes that represent evidence-based administrative interventions designed to enhance primary care provider adherence to lung cancer screening referral guidelines in underserved primary care settings. Derived through systematic coding and thematic analysis, these themes align with the Donabedian Structure–Process–Outcome framework and directly address the review question. Rather than describing barriers alone, the themes and subthemes reflect organizational strategies and actionable approaches identified in the literature to improve screening implementation, referral consistency, and patient follow-through in safety-net healthcare environments.

Table 2*Total Number of Themes and Subthemes from Appendix D*

Theme	Subthemes
Improve Provider Awareness, Education, and Adherence	<ul style="list-style-type: none"> • Implement guideline-based education to improve understanding of USPSTF eligibility criteria and LDCT risks • Establish structured continuing education and ongoing guideline reinforcement • Support providers in addressing tobacco-related risk discussions within preventive care visits • Enhance provider confidence in interpreting screening results and coordinating care with radiology
Strengthen Workflow and Administrative Infrastructure	<ul style="list-style-type: none"> • Implement standardized referral and ordering processes across primary care settings • Develop population identification, tracking, and follow-up systems for screening-eligible patients • Standardize documentation, coding, and interdepartmental communication practices • Redesign workflows to reduce inefficiencies and prevent missed screening opportunities
Enhance Patient Knowledge, Literacy, and Perceptions	<ul style="list-style-type: none"> • Deliver targeted patient education to improve understanding of screening purpose and eligibility • Address fear, stigma, and mistrust through culturally responsive communication strategies • Provide language-appropriate and literacy-sensitive materials to support informed consent and follow-up
Advance Access, Equity, and Insurance Barriers	<ul style="list-style-type: none"> • Streamline insurance authorization processes and address cost-related barriers to screening • Implement strategies to reduce transportation, scheduling, and geographic access constraints • Allocate resources to mitigate socioeconomic and structural inequities affecting screening adherence
Optimize Health Information Technology and Data Systems	<ul style="list-style-type: none"> • Improve accuracy and completeness of smoking history documentation and system interoperability • Integrate performance feedback and data-driven decision-support tools into screening workflows
Strengthen Cultural and Community Engagement	<ul style="list-style-type: none"> • Develop tailored outreach and messaging strategies for underserved populations • Address cultural stigma, mistrust, and language barriers through community-informed approaches • Establish partnerships with community leaders, organizations, and health workers to support outreach
Promote Sustainability and Long-Term Adherence	<ul style="list-style-type: none"> • Implement reminder systems to support annual rescreening and follow-up • Align funding, incentives, and reimbursement structures to sustain screening programs • Integrate lung cancer screening metrics into organizational quality and performance frameworks

Theme	Subthemes
Build Workforce and Organizational Capacity	<ul style="list-style-type: none"> • Address workload distribution through staffing models that support screening coordination • Define and delegate screening-related roles to improve accountability and leadership support • Strengthen internal communication and resources alignment across care teams
Align Policy and Leadership Priorities	<ul style="list-style-type: none"> • Align organizational priorities and strategic goals with lung cancer screening initiatives • Increase visibility of screening metrics in dashboards and strategic planning tools • Advocate for consistent payer policies and administrative guidance within safety-net settings

Themes and Subthemes

The resulting themes and subthemes collectively represent the outcomes of a rigorous integrative review designed to identify evidence-based administrative interventions that enhance primary care provider adherence to lung cancer screening referral guidelines in underserved populations. These findings illustrate how structural conditions, care delivery processes, and patient-level outcomes, as conceptualized by the Donabedian Structure–Process–Outcome model, converge to influence screening referral and follow-up behaviors. The thematic synthesis demonstrates how system-level, provider, and patient factors interact to shape screening practices, providing a foundation for the development of evidence-based administrative interventions. Alignment with the study’s theoretical frameworks highlights the role of human resource optimization, leadership alignment, and system enhancements, including workforce design, electronic health record functionality, and culturally responsive community engagement, in promoting more equitable screening delivery. The organization-wide implications extend to strategic planning, policy alignment, and interdisciplinary collaboration. Figure 1 presents the final themes and subthemes identified in this integrative review and

illustrates their alignment with the study's guiding research question and the Donabedian quality framework.

Figure 1

Themes and Subthemes Mapped to the Donabedian Quality Framework

Themes and Subthemes	Relationship to Donabedian Quality Framework
Improve Provider Knowledge and Education	
- Provide guideline-based education to address knowledge gaps in lung cancer screening eligibility	Process: Influences clinical decision-making and adherence to screening guidelines during preventive care encounters
- Train providers to conduct effective shared decision-making (SDM) conversations with patients	Process: Shapes the quality of provider–patient interactions and informed screening discussions Structure: Reflects the presence or absence of organizational training infrastructure to support evidence-based practice
Strengthen Health System Infrastructure	
- Implement standardized referral and follow-up workflows across service lines	Structure: Establishes organizational systems to support coordinated screening delivery Process: Supports continuity of care, referral completion, and follow-up management
- Optimize electronic health record functionality to identify eligible patients and prompt screening	Structure: Enhances system capacity to identify eligible patients and support screening workflows Process: Facilitates timely screening discussions and referrals
Enhance Patient Access and Engagement	
- Improve patient understanding of lung cancer screening benefits and eligibility	Process: Influences patient engagement and participation in preventive screening services
- Reduce logistical barriers such as transportation, insurance complexity, and cost	Structure: Reflects external access constraints affecting availability of preventive care Outcome: Influences screening uptake and timeliness of diagnosis
Reduce Workforce and Administrative Barriers	
- Streamline administrative processes to reduce time burden and missed screening opportunities	Process: Improves workflow efficiency and reduces missed opportunities for screening

Themes and Subthemes	Relationship to Donabedian Quality Framework
- Define and delegate screening-related roles to improve accountability and consistency	Structure: Reflects staffing design and workload distribution that influence care delivery consistency
Advance Equity and Promote Positive Social Change	
- Address racial, socioeconomic, and geographic disparities in screening access	Outcome: Reflects inequities in screening participation and downstream health outcomes
- Allocate resources strategically to support screening in underserved and distressed communities	Structure: Reflects systemic resource allocation decisions shaping screening availability Outcome: Influences equitable access to preventive screening services

Conclusion

The integrative review of literature provided a systematic and comprehensive examination of evidence-based administrative interventions that influence lung cancer screening adherence in underserved primary care settings. Using the Johns Hopkins Nursing Evidence-Based Practice Model and the Research Evidence Appraisal Tool, each study was evaluated for methodological rigor and relevance, ensuring that only credible, high-quality sources informed the synthesis. The resulting themes and subthemes demonstrated the complex interplay between provider awareness, administrative infrastructure, patient engagement, access inequities, and health information technology. Collectively, the evidence reviewed suggests that improving screening adherence requires interventions that bridge organizational systems with patient-centered strategies. This section establishes the empirical and conceptual foundation for identifying effective administrative and workflow-based solutions to strengthen lung cancer screening implementation. The findings presented serve as the groundwork for Part 3, which applies the synthesized evidence to provide targeted recommendations and actionable

strategies for hospital administrators to improve adherence and equity in primary care environments.

Part 3: Presentation of Results

Primary care practices serving high-risk populations require coordinated administrative interventions to improve adherence to evidence-based lung cancer screening referral guidelines, particularly in safety-net settings (Niranjan et al., 2024). Across the literature, screening uptake remains uneven across populations, reinforcing the need for intervention-focused administrative strategies to improve equitable adherence (Steiling, 2020). This integrative review identified five main themes and fifteen subthemes that represent evidence-based administrative interventions to strengthen lung cancer screening referral adherence. These themes are rooted in the Donabedian Framework and the relationships between structure, care processes, and patient outcomes.

Theoretical Foundation

The Donabedian framework provides a structured approach to evaluating healthcare quality by examining how organizational structures, clinical processes, and measurable outcomes interact to influence performance (Donabedian, 1966). Within this study, the framework supports understanding of lung cancer screening disparities by organizing findings across system-level and provider-level determinants. Structural targets for intervention include EHR-enabled screening supports, adequate workforce capacity, and standardized referral infrastructure. Process measures, including provider knowledge, shared decision-making, and patient navigation, capture the operational behaviors that directly affect adherence to screening guidelines. Finally, outcomes, not only screening uptake but also equity and access improvements, reflect the system's effectiveness in delivering high-quality, population-based prevention. By framing results within this model, the study emphasizes that sustainable improvements in lung cancer

screening require simultaneous optimization of structure, process, and outcome elements to achieve equitable care delivery (Donabedian, 1966).

Thematic Concepts Map

Evidence indicates that improving adherence requires multi-level administrative interventions that address interconnected system and workflow influences (Niranjan et al., 2024). Findings were synthesized from the selected body of literature, which produced five main themes and multiple subthemes representing the structural, procedural, and outcome-related administrative interventions that influence screening adherence. Each theme represents a core intervention focus in provider education, system infrastructure, patient engagement, workforce efficiency, and health equity. Together, these categories were used to represent the complex interactions that influence guideline compliance in high-risk populations. As shown in the thematic concept, the themes are interconnected, illustrating how system-level processes and provider-level actions must align to improve screening outcomes. The subthemes serve as targeted strategies to address barriers within each major theme, reinforcing the goal of improving adherence to evidence-based lung cancer screening guidelines in underserved primary care settings.

Presentation of Findings

Analysis of the 27 studies included in this integrative review resulted in the identification of five primary themes and corresponding subthemes that describe evidence-based administrative interventions to enhance lung cancer screening referral adherence in underserved primary care settings. The themes include improving provider knowledge and education, strengthening health system infrastructure, reducing workforce and administrative barriers, advancing equity and promoting positive social change, and

enhancing patient access and engagement. These themes are grounded in the Donabedian Quality Framework and reflect the relationships between healthcare structures, care processes, and screening-related outcomes. The findings demonstrate that screening adherence is shaped by multilevel influences rather than isolated provider decisions, highlighting the need for coordinated administrative interventions.

1. Improve provider knowledge and education: represents administrative interventions designed to strengthen clinicians' guideline knowledge, shared decision making, and screening confidence.
 - a) Provide guideline-based education to address knowledge gaps in lung cancer screening eligibility (Cooley et al., 2025; Liu et al., 2025a; McFadden et al., 2025)
 - b) Train providers to conduct effective shared decision-making conversations with patients (McFadden et al., 2025; Mejia et al., 2025)
2. Strengthen health system infrastructure: represents administrative interventions to standardize care coordination, optimize electronic health record functionality, and improve integration across service lines to ensure consistent screening implementation and follow-up.
 - a) Implement standardized referral and follow-up workflows across service lines (Belachew et al., 2025; Japuntich et al., 2025; Mejia et al., 2025)
 - b) Optimize electronic health record functionality to identify eligible patients and prompt screening (Belachew et al., 2025; Japuntich et al., 2025; Javier et al., 2025)

3. Reduce workforce and administrative barriers: represents administrative interventions that streamline workflows, reduce time burden, and clarify roles to improve the efficiency and consistency of screening delivery.
 - a) Streamline administrative processes to reduce time burden and missed screening opportunities (Japuntich et al., 2025; McFadden et al., 2025)
 - b) Define and delegate screening-related roles to improve accountability and consistency (Belachew et al., 2025; Liu et al., 2025a)
4. Advance equity and promote positive social change: represents equity-focused administrative interventions that address disparities in screening access through targeted outreach, resource allocation, and support strategies in underserved communities.
 - a) Address racial, socioeconomic, and geographic disparities in screening access (Mulhem et al., 2025; Sarkar et al., 2025)
 - b) Allocate resources strategically to support screening in underserved and distressed communities (Belachew et al., 2025; Boatman et al., 2024)
5. Enhance patient access and engagement: represents patient-centered administrative interventions that improve health literacy, strengthen trust, and reduce logistical constraints to increase screening participation.
 - a) Improve patient understanding of lung cancer screening benefits and eligibility (Woods et al., 2025)
 - b) Reduce logistical barriers such as transportation, insurance complexity, and cost (Belachew et al., 2025)

Interpretation of the Findings

The interpretation of the findings focuses on how the themes identified in this integrative review represent evidence-based administrative interventions that enhance primary care provider adherence to lung cancer screening referral guidelines in safety-net healthcare settings. Guided by the Donabedian Structure–Process–Outcome framework, the findings are interpreted as organizational strategies that address system-level drivers of screening implementation rather than isolated provider behavior. Each theme reflects an actionable approach supported by the literature to improve guideline-concordant screening, referral consistency, and patient follow-through.

Provider Knowledge and Education

Provider knowledge and education emerged as a key administrative intervention, with the literature supporting structured, guideline-based education and shared decision-making training as effective mechanisms for improving screening referral adherence. The literature consistently highlighted that clinicians play a central role in identifying eligible patients, guiding shared decision-making conversations, and reinforcing the importance of routine screening. Across studies, these interventions were often necessary because providers reported variable familiarity with eligibility criteria, discomfort with risk-benefit discussions, and limited access to structured continuing education. This section examines these subthemes to show how deficits in knowledge and training influence referral rates and adherence to evidence-based screening recommendations.

Knowledge Gaps and Misconceptions About Screening Criteria

Evidence supports targeted, guideline-based educational interventions as an effective strategy to address provider knowledge gaps that impede guideline-concordant

lung cancer screening referrals. Several studies indicate that clinicians continue to lack an essential understanding of screening guidelines and psychosocial considerations that influence patient participation. McFadden et al. (2025) reported that knowledge deficits persisted around key psychosocial aspects of lung cancer screening, which directly impacts the ability to reduce harms and address uptake barriers. Population-based studies reinforce this challenge, highlighting that a significant proportion of high-risk individuals are not screened because their clinicians lack adequate knowledge of eligibility and evidence-based protocols. For example, Cooley et al. (2025) found that only 9 percent of eligible individuals had received low-dose CT, with lack of provider knowledge cited as the primary reason for missed screening opportunities. Similarly, Liu et al. (2025b) emphasized the need for tailored education that corrects misconceptions and improves provider understanding of screening benefits. Collectively, these findings indicate that guideline-based education and misconception correction are essential administrative strategies to support guideline-concordant screening. Earlier studies conducted in high-risk urban communities similarly identified widespread uncertainty among primary care providers regarding lung cancer screening eligibility criteria, insurance coverage, and perceived radiation risk. These misunderstandings contributed to inconsistent screening recommendations and missed opportunities for early detection, reinforcing the persistence of knowledge gaps over time (Leng et al., 2020).

Limited Confidence in SDM

Evidence supports structured shared decision-making training and tools as administrative strategies to improve the quality and consistency of lung cancer screening discussions. Despite the requirement for shared decision-making in screening workflows,

studies show that providers often avoid or abbreviate these discussions due to uncertainty or discomfort with communication expectations. Japuntich et al. (2025) noted that clinicians reported not consistently engaging in shared decision-making during screening discussions. Similarly, McFadden et al. (2025) found that providers struggled with communicating ineligibility, with some describing patient distress or disappointment as difficult to manage. Mejia et al. (2025) further identified that many clinicians lack time, training, and structured tools to effectively facilitate shared decision making, resulting in communication gaps that limit patient understanding and participation. These findings illustrate that provider-level communication challenges remain a critical barrier to high-quality screening processes. Structured shared decision-making interventions delivered outside of traditional physician visits, such as telephone-based counseling, have demonstrated meaningful improvements in screening uptake while reducing time burden on primary care providers (Bittner Fagan et al., 2023).

Absence of Structured Continuing Education

Implementing structured continuing education programs or CME modules supports providers' ability to maintain up-to-date screening knowledge and skills. Although evidence-based guidelines are widely published, training opportunities specific to lung cancer screening implementation remain inconsistent and insufficient across many healthcare settings. Javier et al. (2025) emphasized that timely and comprehensive training for all personnel involved in the referral and screening process, including physicians, nurses, technicians, and patient navigators, could significantly improve screening uptake. Without standardized educational pathways, providers may rely on outdated or incomplete information, contributing to variability in screening

recommendations and referral practices. Belachew et al. (2025) further highlighted how system-level underinvestment and fragmented infrastructure exacerbate these educational gaps, noting that providers serving disadvantaged communities often lack access to reliable clinical decision support tools, workflow guidance, and screening-specific training resources needed to deliver high-quality care. The study also emphasizes that inconsistent institutional support and limited organizational capacity hinder clinicians' ability to integrate evolving guidelines into routine practice, reinforcing the need for scalable continuing education programs that promote accurate eligibility assessment, culturally responsive communication, and effective coordination across the screening continuum. Quality improvement initiatives that combine provider education with electronic medical record workflow adjustments have shown early success in increasing guideline-concordant lung cancer screening discussions in underserved primary care clinics. These findings suggest that education alone may be insufficient unless paired with system-level supports that reinforce screening criteria and referral processes during routine clinical workflows (Fetters et al., 2022).

Health System Infrastructure

Health system infrastructure emerged as a central intervention domain, with evidence supporting standardized care coordination, EHR-enabled screening supports, and integration across service lines to improve screening implementation and timely follow-up. Across studies, infrastructure-focused interventions reduced workflow variation and strengthened continuity across the screening pathway.

Disconnected Care Coordination

Evidence supports administrative interventions that strengthen care coordination across service lines, including clarified follow-up pathways, defined responsibilities, and standardized scheduling processes. Multiple studies describe challenges in aligning clinical responsibilities, ensuring follow-up, and managing the logistics of screening workflows. Belachew et al. (2025) reported that difficulties coordinating the screening process, combined with issues such as low reimbursement and patient no-shows, reduced organizational motivation to implement screening. Mejia et al. (2025) similarly identified that providers often lacked clarity on follow-up procedures for abnormal results, creating uncertainty that disrupts continuity of care. Findings from Japuntich et al. (2025) further demonstrate that system-level breakdowns in referral pathways act as a major barrier, with both patients and providers reporting that inconsistent scheduling processes, variable use of electronic health record prompts, and unclear eligibility verification steps frequently interrupt the screening pathway. Providers in the study also described challenges with managing incidental findings, communicating results, and ensuring timely follow-up, all of which were exacerbated by fragmented workflows across departments. Collectively, these coordination failures lead to missed opportunities for screening completion, delayed follow-up, and increased risk of patients falling out of the screening continuum.

Inadequate EHR Capability

Enhancing EHR functionality is a core administrative intervention to improve eligibility identification, reminders, and tracking for screening-eligible patients. Belachew et al. (2025) found that many healthcare settings lack sufficient EHR functionality to automate eligibility assessments, such as calculating smoking pack-years

or generating reminders for annual screenings, which forces clinicians to rely on manual data extraction or memory and increases the likelihood of missed screenings. Studies also emphasize that these technological constraints reduce workflow efficiency and place additional administrative burden on already strained staff. Findings from Japuntich et al. (2025) reinforced this challenge, noting that inconsistent or inaccurate EHR prompts, variability in how eligibility criteria are documented, and difficulty locating required smoking history elements within the system disrupt the referral process and delay screening completion. Complementary evidence from Javier et al. (2025) demonstrated how reliance on EHR smoking history data can introduce further limitations, as eligibility identification depends heavily on accurate self-report documentation and standardized coding workflows across multiple clinical teams, creating opportunities for missed or misclassified patients. Together, these findings show that technological deficits in EHR infrastructure significantly impede consistent, guideline-driven implementation of lung cancer screening programs.

Limited Interdepartmental Integration

Integrating departments and service lines through standardized pathways and shared workflows is an administrative strategy that improves continuity and coordination in lung cancer screening programs. Belachew et al. (2025) identified critical gaps in multidisciplinary team availability and training, noting that shortages in key roles hinder screening access and participation. The absence of integrated care pathways between primary care, radiology, pulmonology, and navigation services restricts the flow of information and impairs coordinated patient support. Without standardized cross-

departmental processes, many screening programs face difficulty maintaining continuity and high-quality outcomes, particularly for high-risk and underserved populations.

Workforce and Administrative Barriers

Workforce and administrative capacity emerged as an intervention domain focused on improving execution of screening workflows. The literature supports streamlining referral processes, reducing administrative burden, and clarifying roles and delegations to improve consistency and throughput, particularly in safety-net environments.

Fragmented Referral Systems

Implementing standardized, automated referral workflows is an administrative intervention shown to reduce delays and improve screening completion. Japuntich et al. (2025) documented that system-based barriers in referral pathways contribute to lower screening completion rates, even among patients who express interest. Manual referral steps, inconsistent documentation, and unclear handoffs between clinicians and imaging centers increase the likelihood of errors or delays. These administrative barriers contribute to patient attrition and reduce the overall effectiveness of screening initiatives. Qualitative evidence also suggests that inpatient and hospital-based clinicians may represent an underutilized opportunity for identifying screening-eligible patients, though unclear role delineation and handoff challenges limit follow-through without dedicated navigation support (Bade et al., 2025).

Time Constraints

Administrative strategies that streamline steps and provide shared decision-making supports can reduce time burden and improve consistency of screening

discussions. Chin et al. (2025) noted that current screening processes are time-consuming for both patients and providers, often requiring multiple steps that do not align well with the demands of busy clinical schedules. Mejia et al. (2025) further reported that providers often lack the time, training, and tools needed to conduct high-quality shared decision making, leading to incomplete or rushed discussions. These time pressures contribute to uneven screening practices and reduced adherence to evidence-based guidelines.

Lack of Standardized Processes

Standardized workflows and clear role delegation are administrative interventions reduce variability and improve sustainability of lung cancer screening implementation. Belachew et al. (2025) highlighted that the absence of dedicated screening counselors, coupled with limited leadership support, creates an environment where staff are unsure of their roles within the screening process. Without clear standardized procedures, screening programs depend heavily on individual provider initiative, which leads to inconsistency and reduced sustainability. Strengthening role clarity and developing structured workflows are essential to improving screening program efficiency.

Equity and Positive Social Change

The literature indicated that advancing equity in lung cancer screening requires administrative strategies that intentionally address structural, geographic, and socioeconomic disparities, rather than relying on uniform screening approaches. Across studies, equity-focused interventions emphasized targeted outreach, resource allocation, culturally responsive engagement, and navigation supports to improve screening access in underserved communities. A critical theme identified across the literature centers on equity and positive social change, emphasizing how structural inequities shape access to

lung cancer screening among underserved populations. Multiple studies demonstrated that racial, socioeconomic, and geographic disparities limit who is screened, where screening is offered, and how resources are allocated across communities. Differences between rural and urban settings further complicate access, while distressed or under-resourced neighborhoods experience persistent shortages of screening infrastructure. This section examines these patterns to illustrate how inequities influence screening participation and highlight the importance of addressing disparities to support social change within vulnerable populations. Emerging implementation research emphasizes that co-designed, community-informed recruitment strategies may improve engagement among hard-to-reach and underserved populations. While outcome data remain limited, these approaches highlight the potential value of aligning screening outreach with community priorities and lived experiences to reduce participation disparities (Reilly et al., 2023).

Racial, Socioeconomic, and Geographic Disparities

Substantial racial, socioeconomic, and geographic disparities persist in lung cancer screening participation. National data demonstrate lower screening rates among minority groups, uninsured individuals, and populations living in economically distressed areas. Sarkar et al. (2025) reported notable disparities among racial and ethnic minority adults, uninsured people, and residents of specific geographic regions. Mulhem et al. (2025) further documented lower screening rates among Middle Eastern or Arab populations, Black individuals, Medicaid beneficiaries, and those living in deprived ZIP codes. These inequities reflect structural barriers that disproportionately affect

underserved communities and emphasize the need for equity-focused screening strategies.

Rural Versus Urban Inequities

Rural communities experience disproportionate barriers to lung cancer screening, driven by a combination of structural disadvantage, socioeconomic context, and communication gaps. Evidence showed that neighborhood socioeconomic status is a powerful predictor of health behavior, with low SES environments linked to lower smoking cessation, elevated stress exposure, and limited access to cessation and screening resources, even when individual SES is higher (Avila et al., 2025). These environmental influences reduce the protective effects typically afforded by higher education or income and mirror broader inequities in rural regions where geographic isolation, healthcare shortages, and transportation constraints limit engagement with preventative services. Parallel findings from Appalachian populations show that existing lung cancer screening messages fail to drive action in rural areas, where individuals face high perceived threat, greater barriers, and elevated medical mistrust (Boatman et al., 2024). More effective communication for rural audiences centers on gain framing, inoculation messaging, and strategies that build self-efficacy by addressing practical barriers such as cost, convenience, and local availability. Taken together, these studies highlight how rural disadvantage compounds socioeconomic inequities, shaping both health behaviors and responsiveness to lung cancer screening interventions, and underscore the need for tailored communication that aligns with the realities of rural populations.

Limited Distribution of Resources

Limited distribution of resources in distressed or under-resourced communities remains a substantial barrier to equitable access. Belachew et al. (2025) found that structural conditions such as poverty, discrimination, and insufficient healthcare investment limits access to screening services for communities that face the highest lung cancer burden. Resource gaps often manifest in limited availability of transportation, patient education materials, navigation support, and accessible imaging services. As a result, distressed communities experience compounded barriers that widen existing health disparities. Recent findings from rural Appalachian populations further illustrate how these resource limitations directly impede lung cancer screening engagement. Boatman et al. (2024) reported that rural residents encounter added challenges such as geographic isolation, limited clinic availability, and heightened medical mistrust, all of which erode their ability to navigate screening pathways effectively. In these settings, individuals also face elevated perceived barriers and greater psychological reactance, underscoring the importance of communication strategies that emphasize convenience, cost coverage, and ease of access. Collectively, the evidence showed how structural underinvestment, sparse infrastructure, and inadequate support systems intersect to limit screening uptake in rural and low-resource communities, contributing to persistent inequities in lung cancer outcomes.

Patient Access and Engagement

Patient access and engagement emerged as an intervention domain focused on improving screening participation and follow-through. The literature supports literacy-sensitive education, culturally responsive communication, and navigation supports that reduce logistical barriers related to transportation, insurance complexity and cost.

Low Health Literacy

Low health literacy continues to hinder patient understanding of lung cancer screening and the potential benefits of early detection. Woods et al. (2025) found that inequities related to low health literacy, language barriers, and limited provider communication contribute to reduced awareness and engagement in screening. Without clear and accessible patient education, individuals may underestimate the importance of screening or misunderstand eligibility requirements, resulting in missed or delayed participation. Evidence from international lung cancer screening trials indicates that tailored recruitment materials significantly improve patient knowledge and informed decision making compared to standard invitations. These findings underscore the importance of literacy-sensitive communication strategies that support equitable participation by improving comprehension of screening benefits and risks among diverse patient populations (Hubert et al., 2025).

Fear, Stigma, and Mistrust

Fear, stigma, and medical mistrust undermine patient willingness to pursue lung cancer screening. Carter-Bawa et al. (2025) reported that historical mistrust, stigma surrounding smoking, and fear of a cancer diagnosis are significant psychosocial barriers among Black communities. McFadden et al. (2025) also described how ingrained fatalism and anxiety interact with screening invitations, reducing interest and increasing skepticism. These emotional and cultural barriers impede screening engagement and require culturally sensitive interventions. Patient perceptions of shared decision-making quality have been shown to directly influence satisfaction with lung cancer screening decisions. Higher satisfaction with decision-making processes may strengthen trust in

healthcare providers and increase the likelihood of sustained engagement with preventive screening over time (Robinson et al., 2025).

Transportation Insurance and Cost Barriers

Transportation challenges, insurance limitations, and cost concerns further restrict screening uptake among high-risk groups. Belachew et al. (2025) found that screening intention increased significantly when individuals had convenient access to screening facilities, highlighting the role of transportation and logistical barriers. The same study also identified insufficient awareness of insurance coverage as a barrier, suggesting that financial uncertainty contributes to hesitancy or avoidance. These factors collectively demonstrate that structural barriers continue to influence screening participation and outcomes.

Conclusion

Overall, the findings from this integrative review demonstrate that improving lung cancer screening referral adherence in underserved primary care settings requires coordinated administrative interventions across provider education, system infrastructure, workforce capacity, equity initiatives, and patient engagement strategies. The evidence supported implementing guideline-based education and shared decision-making supports, standardizing referral and follow-up workflows, optimizing EHR functionality for eligibility identification and reminders, clarifying screening-related roles and delegation, and strengthening navigation and access supports to reduce logistical barriers. Equity-focused approaches, including targeted outreach and resource allocation in underserved and rural communities, further strengthen screening participation and follow-through. Collectively, these intervention-oriented themes provide a structured response to the

review question by identifying actionable strategies healthcare administrators can implement to improve guideline adherence, expand access, and reduce disparities in lung cancer screening.

Part 4: Recommendation for Professional Practice and Implications for Social Change

Recommendations for Professional Practice

The findings of this integrative review highlight the need for coordinated administrative strategies to improve lung cancer screening referral adherence in underserved primary care environments. The recommendations are organized according to the five intervention-focused themes identified in the synthesis: improving provider knowledge and education, strengthening health system infrastructure, reducing workforce and administrative barriers, advancing equity and promoting positive social change, and enhancing patient access and engagement. Framing the recommendations in this manner reinforces alignment between the evidence, the thematic analysis, and the Donabedian Structure–Process–Outcome framework, while providing practical guidance for healthcare administrators seeking to improve screening implementation and equity.

Improve Provider Knowledge and Education

Improving provider knowledge and education represents a process-level recommendation within the Donabedian framework, as provider knowledge and communication behaviors directly influence screening referral decisions. Evidence from the literature indicates that gaps in provider understanding of lung cancer screening eligibility criteria contribute to inconsistent identification of eligible patients (Cooley et al., 2025). Limited familiarity with updated screening guidelines further increases the likelihood of missed screening opportunities during routine preventive visits (Liu et al., 2025a).

Training providers to engage in effective shared decision-making is also essential to improving screening processes. Studies have shown that providers often lack

confidence when discussing screening risks and benefits with patients, which can limit meaningful patient engagement (McFadden et al., 2025). Structured communication training has been associated with improved quality of provider–patient discussions and greater patient understanding of screening decisions (Mejia et al., 2025). Strengthening provider education and communication skills may therefore enhance screening-related processes and support improved outcomes.

Strengthen Health System Infrastructure to Support Screening

Strengthening health system infrastructure reflects a structure-level recommendation within the Donabedian model, as organizational systems determine whether evidence-based screening workflows can be executed reliably and consistently. Across the reviewed studies, adherence improved when health systems implemented standardized screening infrastructure that reduced variability across clinics and minimized reliance on individual provider initiative. Infrastructure-focused interventions primarily centered on establishing clear referral pathways, ensuring follow-up capacity, and integrating screening processes across service lines.

A key recommendation is the implementation of standardized referral and follow-up workflows that define each step in the screening continuum, including eligibility identification, ordering, scheduling, results communication, and follow-up for abnormal findings. Evidence indicated that fragmented workflows contribute to missed opportunities and delayed follow-up, particularly in safety-net settings where care coordination resources may be limited (Mejia et al., 2025). Administrators can support consistent execution by developing standardized order sets, referral templates, and follow-up protocols that are applied across primary care sites and aligned with radiology

and specialty services. Establishing clear escalation pathways for abnormal results, incidental findings, and missed appointments further improves continuity and reduces loss to follow-up.

In addition to workflow standardization, the literature supported optimizing EHR functionality as a structural mechanism for improving screening adherence. Enhanced EHR tools that prompt eligibility assessment, support documentation of smoking history, and provide automated reminders reduce dependence on provider memory and manual tracking (Javier et al., 2025). Administrators should prioritize building or refining EHR-based decision support, including (a) structured fields for pack-year history and quit date, (b) automated prompts for eligible patients, (c) tracking dashboards for ordered versus completed LDCT, and (d) reminder workflows for annual rescreening. Where interoperability is limited, investment in registry-based tracking or population health tools can strengthen infrastructure by enabling teams to monitor adherence, identify gaps, and close loops in the screening pathway (Belachew et al., 2025). Collectively, these infrastructure interventions support improved structure and process reliability within Donabedian, enabling more consistent screening delivery and stronger downstream outcomes through earlier detection and improved equity in access.

Reduce Workforce and Administrative Barriers

Reducing workforce and administrative barriers represents both structure- and process-level recommendations within the Donabedian framework because staffing design, role clarity, and workflow burden directly affect the feasibility and quality of screening implementation. The evidence suggested that even when providers understand screening guidelines, adherence declines when workflows are time-intensive,

responsibilities are unclear, and administrative tasks are layered on already constrained clinic schedules (McFadden et al., 2025).

A primary recommendation is to streamline administrative processes that create avoidable time burden and contribute to missed screening opportunities. Studies show that lung cancer screening often requires multiple steps, including eligibility confirmation, documentation, shared decision-making, order placement, insurance authorization, scheduling, and follow-up coordination. When these tasks remain provider-dependent, screening discussions are more likely to be delayed or omitted during busy visits (Mejia et al., 2025). Administrators can reduce burden by standardizing pre-visit planning workflows, using medical assistants or nurses to capture smoking history in structured fields, deploying templated shared decision-making documentation, and embedding referral steps into routine preventive care workflows. Where available, centralized scheduling support and automated authorization workflows can further reduce delays and improve completion rates.

A second recommendation is to define and delegate screening-related roles to improve accountability, efficiency, and follow-through. Evidence supported the use of role-based delegation, including care coordinators, patient navigators, or population health staff who can track eligibility, conduct outreach, coordinate scheduling, and ensure follow-up for results (Japuntich et al., 2025). Clearly defining responsibilities for (a) identifying eligible patients, (b) initiating shared decision-making steps, (c) placing orders, (d) scheduling LDCT, and (e) managing follow-up reduces workflow ambiguity and improves consistency across clinicians and sites. Administrators should also establish performance monitoring routines, such as monthly screening dashboards and team-level

feedback loops, to reinforce accountability and continuous improvement. These workforce and administrative interventions strengthen both structure and process elements of the Donabedian model by increasing clinic capacity, improving workflow reliability, and supporting consistent referral behaviors in underserved primary care environments.

Advance Equity and Promote Positive Social Change

Advancing equity and promoting positive social change aligns most directly with the outcome component of the Donabedian model, as disparities in screening access and completion contribute to inequitable health outcomes across populations. The evidence consistently demonstrates that racial, socioeconomic, and geographic inequities are associated with lower screening participation and delayed diagnosis, particularly among uninsured individuals, Medicaid beneficiaries, racial and ethnic minority populations, and residents of distressed or rural communities (Mulhem et al., 2025).

A central recommendation is to implement equity-focused screening strategies that directly address disparities in access and follow-through. Administrators can use population health data to identify under-screened groups by race, insurance type, and ZIP code and then target outreach, navigation, and resource supports accordingly. Studies emphasize that uniform screening approaches often fail to address the structural realities of underserved communities, reinforcing inequities in participation (Boatman et al., 2024). Equity-focused strategies may include tailored outreach campaigns, mobile screening partnerships where feasible, flexible scheduling options, and navigation services that prioritize high-risk patients facing the greatest access constraints.

Another recommendation is to allocate resources strategically to support screening delivery in underserved and distressed communities. Evidence suggests that resource underinvestment and limited infrastructure contribute to persistent gaps in screening access, particularly in communities already experiencing high lung cancer burden (Belachew et al., 2025). Administrators can address this by investing in patient navigation, transportation support, language-access services, community health worker partnerships, and screening program coordination roles. Incorporating equity metrics into organizational performance monitoring, such as screening rates stratified by race and payer type, also supports accountability and makes equity a measurable outcome rather than a general goal. Together, these recommendations strengthen outcome equity by improving access to screening among vulnerable groups, supporting earlier detection, and advancing positive social change through more just distribution of preventive healthcare resources.

Enhance Patient Education and Engagement

Enhancing patient access and engagement represents a process-level recommendation within the Donabedian model because patient participation, understanding, and follow-through directly determine screening uptake and completion. The literature indicates that patient engagement improves when organizations implement education, navigation, and access supports that address health literacy needs, reduce fear and stigma, and remove logistical obstacles to screening completion (Woods et al., 2025).

A key recommendation is to improve patient understanding of screening benefits and eligibility through literacy-sensitive and culturally responsive education. Studies show that patients may confuse screening with diagnostic testing, underestimate personal

risk, or lack clarity on eligibility criteria, all of which reduce willingness to participate (Mejia et al., 2025). Administrators can support improved engagement by implementing standardized education materials written at accessible reading levels, offering translated resources, and using teach-back strategies during shared decision-making encounters. Evidence also suggests that tailored recruitment and outreach materials can improve understanding and informed participation compared to standard invitations (Hubert et al., 2025).

A second recommendation is to address fear, stigma, and mistrust through structured communication supports and trust-building strategies. The literature highlights that stigma related to smoking, fear of a cancer diagnosis, and medical mistrust can reduce screening participation, particularly among historically marginalized communities (McFadden et al., 2025). Administrators can address these barriers by training staff in culturally responsive communication, integrating community-informed messaging, and using navigators or community partners to reinforce trust and normalize screening as preventive care.

Finally, the literature supports reducing logistical barriers such as transportation, insurance complexity, and cost through patient navigation and coordinated access supports. Scheduling challenges, authorization delays, and transportation constraints are repeatedly associated with reduced screening completion (Belachew et al., 2025). Administrators can strengthen engagement by offering centralized scheduling, proactive reminder calls or texts, insurance navigation assistance, and transportation support when feasible. These process improvements reduce friction in the screening pathway and improve follow-through. Collectively, patient access and engagement interventions

strengthen Donabedian process measures and contribute to improved outcomes through increased screening completion and earlier detection.

Implications for Social Change

The findings of this integrative review have meaningful implications for positive social change by identifying administrative interventions that can reduce preventable lung cancer mortality and narrow disparities in early detection among medically underserved populations. Improving primary care provider adherence to evidence-based lung cancer screening referral guidelines in safety-net settings increases the likelihood that high-risk individuals receive timely screening and follow-up, supporting earlier diagnosis, improved survival, and more equitable access to preventive care. Lung cancer remains the leading cause of cancer-related mortality in the United States, with inequities in early detection disproportionately affecting racial and ethnic minorities and individuals with lower socioeconomic status (Javier et al., 2025). Rural and resource-limited communities experience additional barriers that further limit access to timely screening services (Japuntich et al., 2025).

At the individual level, improved screening referral practices can lead to earlier detection, expanded treatment options, and improved survival among high-risk patients who historically experience delayed diagnoses (Cooley et al., 2025). Shared decision-making and patient education have been shown to strengthen patient understanding and engagement in preventive care (Liu et al., 2025a). These approaches may also reduce fear, stigma, and fatalistic beliefs associated with lung cancer, particularly in communities that have experienced historical marginalization within the healthcare system (Javier et al., 2025).

At the organizational and community levels, the implementation of standardized workflows and coordinated care pathways can improve access to preventive services in safety-net and community-based clinics (Mejia et al., 2025). EHR-supported identification and tracking tools have been shown to enhance consistency in screening delivery and follow-up processes (Belachew et al., 2025). Administrative strategies that reduce reliance on individual provider initiative support more equitable allocation of screening resources across patient populations (Japuntich et al., 2025). When screening programs incorporate culturally responsive communication and community partnerships, healthcare organizations are better positioned to reach populations at greatest risk (Javier et al., 2025).

From a broader societal perspective, increasing lung cancer screening uptake in underserved populations aligns with public health goals to reduce cancer-related disparities and improve population health outcomes (McFadden et al., 2025). The implementation of early detection initiatives has the potential to decrease long-term healthcare costs associated with late-stage cancer treatment (Belachew et al., 2025). Reducing the economic burden of advanced disease benefits families and communities and contributes to more sustainable healthcare systems (Japuntich et al., 2025). Collectively, these practice improvements support the development of a more just and equitable healthcare system by expanding access to life-saving preventive services (Javier et al., 2025).

Limitations

This integrative review has several limitations that should be considered when interpreting the findings. First, the majority of included studies used nonexperimental or

cross-sectional designs, which limits the ability to establish causal relationships between administrative interventions and lung cancer screening outcomes. While consistent patterns emerged across the literature, the lack of randomized controlled trials restricts the strength of causal inferences.

Second, many studies relied on self-reported data from providers or patients, introducing the potential for recall bias and social desirability bias. Variability in how lung cancer screening adherence was defined and measured across studies further limited direct comparison of outcomes. Third, many studies were conducted within single health systems, safety-net clinics, or specific geographic regions, which may limit generalizability to other primary care contexts with differing organizational structures, payer mixes, or population characteristics.

Finally, this review focused primarily on administrative and workflow-based interventions within primary care settings. Broader policy-level influences, including reimbursement models, national screening mandates, and state-level public health initiatives, were not examined in depth. Despite these limitations, the consistency of themes across diverse settings and study designs strengthens confidence in the relevance of the findings and supports their applicability to healthcare administrators seeking to improve equitable lung cancer screening implementation in underserved populations.

Conclusion

This integrative review examined evidence-based administrative interventions that influence primary care provider adherence to lung cancer screening referral guidelines in medically underserved settings. The findings demonstrate that improving adherence requires coordinated administrative action across provider education, system

infrastructure, workforce design, equity initiatives, and patient engagement rather than reliance on isolated clinical efforts (Mejia et al., 2025). When organizational structures and care processes are intentionally aligned, screening delivery becomes more consistent, equitable, and sustainable (Belachew et al., 2025).

The synthesis of evidence highlights that provider education alone is insufficient to achieve lasting improvements in screening adherence without concurrent system-level supports. Administrative interventions such as standardized referral workflows, clearly defined screening roles, EHR-enabled eligibility identification and tracking, and structured shared decision-making supports reduce variability in practice and strengthen guideline adherence (Liu et al., 2025a). Equity-focused strategies, including targeted outreach, navigation support, and strategic resource allocation in underserved and rural communities, further enhance screening access and follow-through among high-risk populations (Boatman et al., 2024).

By applying the Donabedian Structure–Process–Outcome framework, this review demonstrates how strengthening administrative infrastructure and care delivery processes can lead to improved screening outcomes and reduced disparities in early lung cancer detection (Donabedian, 1966; Mejia et al., 2025). Collectively, the findings provide an evidence-based foundation for healthcare administrators seeking to implement practical, scalable strategies that improve lung cancer screening adherence, expand access to preventive care, and advance health equity in underserved primary care environments (Javier et al., 2025).

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Amicizia et al. (2023)	Implementation Science; WHO screening principles; population health model.	What are the current strategies, barriers, and facilitators in the implementation of lung cancer screening (LCS) programs worldwide?	Systematic review of studies between 2010 and 2023 across multiple databases; PRISMA guidelines followed.	72 articles analyzed. Found variability in LCS implementation, particularly in risk eligibility criteria, access equity, integration into healthcare systems, and the use of low-dose CT. Key enablers: multidisciplinary collaboration, policy mandates, patient navigators.	Successful LCS implementation requires standardized guidelines, broad stakeholder engagement, and targeted interventions for vulnerable populations.	Needs longitudinal studies to evaluate outcomes of different LCS models and comparative health system analyses.	Advocates for equity-driven, sustainable LCS frameworks; supports inclusion of underserved populations and streamlined workflows.	No
Azubuike et al. (2020)	Equity-centered implementation science	How can implementation strategies improve equitable access to LDCT screening among racial and ethnic minority groups?	Mixed-methods design combining community stakeholder input, literature synthesis, and strategy mapping	Identified multi-level barriers (provider bias, logistical access, community mistrust); recommended bundling strategies with community engagement and patient navigation	Equitable LCS requires upstream redesign of outreach, trust-building, and workflow integration	Test the implementation model in real-world settings to evaluate outcomes and feasibility	Implement navigator programs and culturally grounded engagement methods	Yes
Bittner Fagan et al. (2023)	Shared Decision-Making (SDM) and behavior change model.	Does phone-based SDM increase lung cancer screening rates?	Single-arm clinical trial with phone counseling using a structured decision aid.	Of those who completed counseling (64 participants), 45% underwent LDCT; 0% did in control group.	SDM can significantly improve screening adherence.	Recommend multicenter randomized trials.	Supports use of non-clinician-led SDM to reduce burden on primary care.	Yes

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Carter-Bawa et al. (2022)	Behavioral theory	What are the knowledge, attitudes and screening practices of primary and pulmonary care clinicians regarding LDCT for lung cancer?	Descriptive cross-sectional survey study using clinical vignettes to assess provider knowledge attitudes and concordance with USPSTF guidelines	Low knowledge scores and poor guideline adherence; low barriers reported but attitudes toward SDM were inconsistent	Clinician knowledge is lacking, and guideline concordance is poor even among advanced practice providers and pulmonologists	Evaluate the effectiveness of targeted education and system-level reminders to improve LCS concordance	Broad multidisciplinary education campaigns and integration of LCS guidelines into EMR and practice workflows	Yes
Coughlin et al. (2020)	Guideline-based provider behavior model, emphasizing knowledge, institutional support, and EMR infrastructure as mediators of screening behavior.	What are the knowledge levels and barriers faced by primary care providers (PCPs) regarding LDCT screening across different healthcare settings?	Quantitative; cross-sectional anonymous survey conducted among PCPs at five hospitals (academic, community, and safety-net).	Used descriptive statistics, chi-squared, Kruskal-Wallis, and multivariable logistic regression. Key findings included: 29.2% of PCPs had never ordered an LDCT; safety-net providers had the lowest knowledge scores; key barriers included lack of EMR prompts, time limitations, and patient refusal.	Knowledge gaps and inconsistent application of CMS screening criteria hinder LDCT uptake, especially in under-resourced settings.	Studies needed on how provider education and EMR-based interventions influence guideline adherence.	Improve education on CMS guidelines; implement EMR prompts and support tools to streamline referrals for LDCT screening.	Yes
Doubeni et al. (2020)	Root-cause analysis and population-based prevention perspective; grounded in	What systems-level interventions are necessary to optimize lung cancer screening	Commentary and review of empirical and feasibility studies related to LCS implementation;	Evaluates the feasibility of implementing LCS programs in community settings using evidence from	LCS programs can work outside of trials if embedded into coordinated systems with	Investigate how real-world LCS programs perform across diverse communities	PCPs need infrastructure support, shared decision-making tools, registry tracking, and	No

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	systems thinking and disparities	(LCS) outcomes in real-world settings?	no primary data collection	Handy et al. and other trials (NLST, NELSON); emphasizes infrastructure, care coordination, and disparities	multidisciplinary care, quality assurance, and targeted community engagement	and health systems	community outreach to make LCS effective	
Fetters et al. (2022)	CBPR (Community-Based Participatory Research) and Social Ecological Model	Can community-engaged education and EMR interventions increase LCS among underserved populations?	Multi-phase intervention: formative interviews, community co-design, and pilot testing	Pilot improved knowledge and screening discussions; community trust and workflow alignment key to uptake	LCS initiatives must be rooted in community trust, primary care workflows, and system supports	Scale pilot in diverse clinics to measure longitudinal outcomes	Co-design culturally competent education and decision tools for primary care settings	Yes
Khanna et al. (2022)	VA's Whole Health and Implementation Science	Can system-wide implementation of shared decision-making (SDM) for LCS be scaled across VA sites?	Hybrid Type 2 implementation-effectiveness study across 10 VA sites	Implementation of SDM varied by organizational culture and leadership engagement; some sites saw screening increase by 25–40%	Whole-system engagement and support critical to LCS rollout	Need to adapt implementation strategies for non-VA settings	Promote leadership alignment and SDM integration into workflows	Yes
Kota et al. (2022)	Implicit behavioral and knowledge gap model	What are physician practices, knowledge and barriers to LDCT screening?	Cross-sectional national survey of 599 family/internal medicine physicians	78% ordered LDCT; knowledge gaps on age/criteria; barriers; cost, insurance	Knowledge-practice gaps and system challenges affect LDCT implementation	Develop strategies to bridge knowledge gaps and assess intervention impacts	Design interventions targeting education, insurance simplification, and awareness	Yes

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Kukhareva et al. (2024)	Health equity and community-based participatory research (CBPR) approach.	Can tailored outreach improve awareness and participation in lung cancer screening among underserved communities?	Pilot outreach intervention using tailored materials and mobile units in underserved areas.	Pre/post intervention surveys showed increased screening interest and knowledge; actual LDCT uptake rose modestly.	Community-based, culturally responsive education improved screening readiness but required structural support for impact.	Need for scalable, longitudinal studies with larger populations.	Supports community-tailored interventions as bridges to formalized screening programs.	Yes
Leng et al. (2020)	Social determinants of health and behavior-driven disparities framework.	What do PCPs in high-risk immigrant communities know and believe about LDCT lung screening?	Cross-sectional survey of 83 PCPs.	67% lacked established screening guidelines. Barriers included vague criteria, insurance, patient fears, and radiation concerns.	Misunderstandings about guidelines are widespread among urban PCPs.	Examine effectiveness of guideline-based training modules for PCPs.	Recommend standardized referral pathways and patient education.	Yes
McInnerney et al. (2024)	Behavior Change Wheel and Navigation Theory	Does a community-based patient navigation and provider education intervention increase participation in LCS?	Nested randomized controlled trial protocol within broader screening implementation program	Protocol stage – Results pending; preliminary feasibility supports intervention design	Multi-layered support needed for vulnerable populations	Track effect of education plus navigation on actual screening rates	Deploy community health workers and CME jointly to close the gap	Yes
Niranjan et al. (2024)	Community-Based Participatory Research and Implementation Planning	Increase LCS access and referral among rural, underserved Black	Multicomponent QI initiative with community outreach, EMR adjustments, and provider education	Enhanced screening coordination, navigation referrals, and provider engagement	Community-tailored workflow and outreach can improve rural LCS equity	Replication in other low-resource states	Build collaborative navigation and education systems	Yes

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		communities in Alabama						
Olazagasti et al. (2022)	Quality improvement framework informed by provider behavior change models and guideline adherence mechanisms.	Can physician education improve the correct use of LDCT for lung cancer screening and reduce inappropriate screening in an academic primary care setting?	Retrospective pre/post intervention study using chart review and statistical comparison; single-site internal medicine clinic in NYC.	Post-education, screening in eligible patients rose from 27% to 61.5%. Inappropriate screening among ineligible patients decreased from 85% to 39.3%. Odds ratios showed significant impact (OR 4.60 for correct screening; OR 0.10 for inappropriate screening).	Structured educational sessions significantly increased correct LDCT ordering and reduced inappropriate use among primary care physicians.	Larger and prospective studies needed with improved chart completeness and post- intervention surveys to assess clinician perception and long-term retention.	Integrating structured guideline- based education into routine PCP training can enhance LDCT guideline adherence and reduce misuse.	Yes
Pignone et al. (2024)	Health equity implementatio n model	Can a multi- level implementatio n strategy improve lung cancer screening rates in an FQHC network?	Pre-post evaluation of screening rates following training, EMR prompts, and care coordination	Screening increased from 8% to 24% in target group	Combining provider training with EMR tools significantly improved uptake	Test similar interventions in rural FQHCs	Integrate EMR prompts and team-based education	Yes
Reilly et al. (2023)	Behavior Change Wheel (BCW), Capability- Opportunity- Motivation Model,	How can a targeted recruitment strategy, co- designed with stakeholders, improve lung cancer	Mixed-methods design incorporating systematic reviews, semi- structured interviews, workshops, and	Study is a protocol— results pending. Anticipates identifying key barriers and enablers to screening,	Not yet available (protocol); aims to deliver an inclusive, evidence- based, patient- informed	Will inform broader implementatio n and evaluation studies for lung cancer screening in	Promotes localized and tailored engagement strategies for hard-to-reach populations in national	No

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	Medical Research Council Framework, Consolidated Framework for Implementation Research (CFIR), RE-AIM Framework.	screening uptake in high-risk, underserved populations in Ireland?	iterative co-design.	developing a tailored recruitment tool for high-risk populations.	recruitment intervention.	similar socioeconomic contexts.	screening efforts.	
Rivera et al. (2020)	Health Disparities Model	What structural and system-level barriers impact lung cancer screening access for underserved populations?	Expert consensus and literature synthesis	Key barriers include inadequate provider communication, stigma, access limitations, and structural racism	Effective interventions must be multi-level, targeting systems, providers, and patient engagement	Evaluate specific system-based solutions to reduce structural barriers	Expand insurance coverage, provide transportation, and launch culturally tailored education	No
Robinson et al. (2025)	Shared Decision-Making (SDM) theory	Does perception of SDM quality correlate with satisfaction in LDCT screening?	Quantitative survey of 320 patients undergoing LDCT screening	Positive SDM perceptions significantly correlated with screening satisfaction (p<0.01)	SDM enhances satisfaction and likely promotes adherence to LCS guidelines	Explore how provider training affects SDM quality in LCS context	Enhance training and scripting for effective SDM in primary care	Yes
Sayani et al. (2023)	Patient-Centered Access to Healthcare and Health Equity frameworks	What LCS interventions have been implemented in OECD countries? What are the impacts on access for priority populations? What gaps	Scoping review using Arksey & O'Malley framework; analyzed 36 interventions from peer-reviewed and gray literature	Mapped interventions to 5 equity dimensions: approachability, acceptability, availability, affordability, appropriateness. No intervention met all. Gaps noted in cultural	Equity-oriented interventions that raise awareness, are culturally tailored, and reduce systemic access barriers are most effective	Need to address affordability, acceptability, and intervention design gaps targeting underserved groups	Policy should support multi-dimensional, equity-driven approaches tailored to high-risk, underserved populations	No

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		exist in equitable LCS intervention design?		relevance and cost accessibility				
Slatore et al. (2021)	Consolidated Framework for Implementation Research (CFIR)	What are rural vs. non-rural PCPs' beliefs and practices regarding LDCT lung cancer screening implementation?	Descriptive cross-sectional survey of 77 Oregon-based PCPs	87% referred patients for LDCT; most used decentralized models; over 50% lacked tracking systems; rural PCPs had lower perceived resources and prioritization; high interest in EMR reminders and facility follow-up	High interest in LCS exists, but system-level gaps (like registries, reminders) hinder optimal uptake; differences in rural vs. non-rural capacity noted	Research should evaluate how reminders, performance tracking, and decision tools affect LCS uptake	Develop clinical alerts, shared decision-making support, and facility tracking of patients to prevent loss to follow-up	Yes
Smith et al. (2023)	Health Belief Model & Behavioral Intention	What beliefs influence intention to follow through with LCS in underserved patients?	Structured interviews and survey analysis in a high-risk urban cohort (n=150)	Barriers included fear of diagnosis, mistrust, and lack of access; perceived benefit correlated with intent to screen	Addressing perceived threat and enhancing self-efficacy may increase screening rates	Develop tailored messaging frameworks to reduce psychological barriers	Design culturally sensitive campaigns focusing on benefits and addressing fears	Yes
Wong et al. (2024)	Health behavior theory and provider engagement model.	What are the provider-perceived barriers to implementing LDCT lung screening?	Qualitative interviews with urban primary care physicians and nurse practitioners.	Thematic analysis identified confusion around eligibility, time constraints, insurance uncertainty, and lack of EMR prompts.	Screening uptake depends heavily on systemic supports and streamlined guidelines.	Suggests need to design EMR-linked interventions and PCP education.	Call for better integration of LCS in primary care workflows.	Yes

Database or location name	Search terms	Results	Notes
Medline (via PubMed)	("lung cancer screening" OR "low-dose CT") AND patient navigation AND (primary care OR provider)	38	Removed 5 duplicates resulting in 33 articles remaining for screening.
CINAHL	("lung cancer screening" OR "low-dose CT") AND ("electronic health record" OR EHR) AND (workflow OR prompt OR referral)	42	Removed 6 duplicates resulting in 36 articles remaining for screening.
ProQuest Health & Medical Collection	("lung cancer screening" OR "low-dose CT") AND ("decision support" OR "decision aid") AND (primary care OR clinician)	51	Removed 11 duplicates resulting in 40 articles remaining for screening.
ProQuest Nursing & Allied Health	("lung cancer screening" OR "low-dose CT") AND (disparities OR equity OR eligibility) AND (community OR underserved)	34	Removed 4 duplicates resulting in 30 articles remaining for screening.
Google Scholar (hand searching, citation chasing)	("lung cancer screening" AND "pathway navigation")	28	Citation chaining yielded 28 additional articles, 9 retained after abstract screening.
Total across databases		193	After removal of 26 duplicates, 167 screened → 57 full-text reviewed → 27 included in synthesis.

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
<p>Avila, J. C., Flores, E. J., Su, Y.-J., Haas, J. S., Park, E. R., & Rigotti, N. A. (2025). Association of individual and neighborhood socioeconomic status with outcomes of a smoking cessation intervention provided in the lung cancer screening setting. <i>Preventive Medicine, 191</i>, 108207. https://doi.org/10.1016/j.ypmed.2024.108207</p>	Level III – B	Academic radiology + primary care network (MA); SES & tobacco cessation in LCS	Neighborhood SES differences in quit rates disappeared after adjustment; combined SES affected program completion	N=615 smokers; 7-day abstinence; ADI; logistic regression	Secondary analysis; self-report; single region
<p>Bade, B. C., Makhnevich, A., Dauber-Decker, K. L., Solomon, J., Cohn, E., Chusid, J., Raoof, S., Silvestri, G., & Cohen, S. L. (2025). Qualitative interviews for</p>	Level III – B	Hospitals in integrated system; hospitalist role in LCS	Hospitalists support in-hospital LCS identification; barriers include pack-year documentation, handoffs	N=8 interviews; thematic analysis	Small sample; no outcomes

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
<p>hospitalists addressing lung cancer screening. <i>Current Problems in Diagnostic Radiology</i>, 54(4), 465–469. https://doi.org/10.1067/j.cpradiol.2024.08.011</p>	Level III – A	Global review of barriers/facilitators in LCS	<p>Facilitators: promotion, trained staff, integration; Barriers: insurance, awareness, provider gaps</p>	Umbrella SR (7 reviews, 54 studies)	Heterogeneous data; English-only
<p>Belachew, S. A., Bizuayehu, H. M., Diaz, A., & Garvey, G. (2025). Facilitators and barriers of lung cancer screening participation: umbrella and systematic review of the global evidence. <i>BioMed Central Public Health</i>, 25(2993). https://doi.org/10.1186/s12889-025-23808-8</p>	Level III – B	Rural Appalachia health communication	<p>Gain-framed/barrier-mitigating posters improved motivation, intention, self-efficacy</p>	Surveys n=120+; t-tests, ANOVA	Convenience sample; intention not behavior
<p>Boatman, D., McCauley-Hixenbaugh, L., Starkey, A., Allen, A., & Kennedy-Rea, S. (2024). A new communication approach to encourage</p>					

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
lung cancer screening action in rural eligible populations. <i>Patient Education and Counseling Innovation</i> , 4, 100298. https://doi.org/10.1016/j.pecinn.2024.100298					
Javier, C., Jiang, S.-F., Philippe, J., Arana, I., & Velotta, J. B. (2025). Evaluating lung cancer screening disparities in an integrated healthcare system: barriers and opportunities. <i>Frontiers in Oncology</i> , 15. https://doi.org/10.3389/fonc.2025.1601458	Level III – A	Kaiser Permanente (integrated); disparities in uptake	Low uptake (0.95%); predictors: younger, male, White; NDI not significant	N=60,676; Cox models	Single system; self-report; early follow-up
Carter-Bawa, L., Ostroff, J., Erwin, D., Shoulders, E., Johnson, D., Brown, M., Valenzona, F., & Jandorf, L. (2025). A community-based approach to address	Level III – B	Community-based, Black churches	Witness Project Lung feasible & acceptable; knowledge gains	Pre/post knowledge; qualitative CAC	Pilot only; no LCS completion

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
lung cancer screening disparities in the black community using the Witness Project framework: Development and pilot trial. <i>BioMed Central Public Health</i> , 25(1). https://doi.org/10.1186/s12889-025-21623-9					
Chin, K., Tompkins, A. K., Amoyo, S. D., Ma, G. X., & Erkmén, C. P. (2025). Novel platforms of education to engage black and African Americans in lung cancer screening. <i>American Journal of Preventive Medicine Focus</i> , 4(4), 100350. https://doi.org/10.1016/j.focus.2025.100350	Level III – B	Urban safety-net; multi-platform outreach	Annual volume increased but adherence low; BAAs less likely to adhere	Program counts; χ^2 tests	Observational; COVID-era confounding
Gwin, M. E., Prasad, T., Wahid, U., Bhalla, S., Zhang, S., Lee, J. L., Johnson, D. H., Oliver,	Level III – B	Safety-net system; mortality in diverse LCS cohort	Low short-term mortality despite comorbidities;	N=1598; HR for age 1.06/year	Single system; near-term follow-up

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G., Vice, L., Tan, C., Watkins, C., & Gerber, D. E. (2025). Mortality in a Diverse, Real-World Lung Cancer Screening Cohort. <i>Clinical Lung Cancer</i> , 26(6), e441–e446. https://doi.org/10.1016/j.clcc.2025.05.004			mortality rose only with age		
Hubert, J., Moldovanu, D., van den Bosch, I., de Nijs, K., Haaf, K. ten, Oudkerk, M., de Koning, H. J., & van der Aalst, C. M. (2025). Impact of recruitment method on informed decision-making in lung cancer screening in the 4-IN-THE-LUNG-RUN trial. <i>Lung Cancer</i> , 207, 108686. https://doi.org/10.1016/j.lungcan.2025.108686	Level III – B	European implementation trial; informed decision-making	Tailored online info improved knowledge vs. standard; IDM ~85% overall	23-item survey; informed choice definition; p=0.015 knowledge	Dutch sample; short window; incomplete responses

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
Japuntich, S. J., Sacasa, N. G., Cameron, S., Balletto, B., Tambou, O., Berman, G., Walaska, K., Clark, M. A., Carey, M. P., Busch, A. M., & Rosen, R. (2025). Lung cancer screening experiences among patients with a smoking history and primary care providers: A qualitative study. <i>BioMed Central Cancer</i> , 25(1305). https://doi.org/10.1186/s12885-025-14716-6	Level III – B	US health systems; patient/provider qualitative	Themes: low patient knowledge; inconsistent SDM; system referral barriers	N=50 patients, 7 PCPs; thematic analysis	Two states; self-report; PCP sample bias
Kwak, S. H., Kim, C. Y., Lee, S. H., Kim, E. Y., Lee, E. H., & Chang, Y. S. (2025). Updates on lung cancer screening for early detection. <i>The Korean Journal of Internal Medicine</i> , 40(4), 546–556.	Level V – B	Korean national program & international trials; narrative review	LDCT improves early detection & mortality; liquid biopsy promising adjunct	Descriptive stats; trial summaries (NLST, NELSON, MILD)	Narrative not systematic; early program data

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
<p>https://doi.org/10.3904/kjim.2025.008</p>	Level III – B	They examined factors influencing who actually followed through with low-dose CT (LDCT) screening among people classified as high-risk in a citywide program.	45.4% uptake; higher with female, education, smoking, family history	N=52,910; logistic regression ORs	Cross-sectional; local risk algorithm
<p>Liu, M., Huang, S., Yu, Z., Dai, L., Xiang, J., Qu, Y., Zhang, X., Qiao, W., Chen, Y., Zhou, H., Zhu, L., Qin, C., & Han, J. (2025b). Assessing factors influencing participation in LDCT lung cancer screening among high-risk urban populations in Nanjing, China. <i>BioMed Central Cancer</i>, 25(1), 1196. https://doi.org/10.1186/s12885-025-14589-9</p>	Level III – B	U.S. population surveillance of lung cancer screening (LCS) trends using large national surveys (NHIS, BRFSS)	Uptake rose to 21.8% (2022); newly eligible (2021) screened less	NHIS/BRFSS data; rates by subgroup	Survey self-report; COVID effect
<p>Liu, B., Halpern, M. T., Doria-Rose, V. P., Croswell, J. M., Lee, R., & Feuer, E. J. (2025a). Lung cancer screening rates in the United States: Contribution of the 2020 NHIS estimates to</p>	Level III – B	U.S. population surveillance of lung cancer screening (LCS) trends using large national surveys (NHIS, BRFSS)	Uptake rose to 21.8% (2022); newly eligible (2021) screened less	NHIS/BRFSS data; rates by subgroup	Survey self-report; COVID effect

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
national and state-level trends. <i>American Journal of Preventive Medicine</i> , 69(1), 107626. https://doi.org/10.1016/j.amepre.2025.03.006					
McFadden, K., Nickel, B., Houssami, N., Rankin, N. M., & Dodd, R. H. (2025). Psychosocial impacts of, and barriers to, lung cancer screening: An international qualitative study of multidisciplinary health professionals' perspectives. <i>Patient Education and Counseling</i> , 137, 109172. https://doi.org/10.1016/j.pec.2025.109172	Level III – B	International, qualitative study of health professionals' perspectives on psychosocial issues tied to LCS.	Themes: anxiety, stigma, fatalism; design levers: navigation, branding	27 interviews; thematic analysis	Transferability limited; expert viewpoints
Mejia, M. C., Ma, Y.-H. H., Lowenstein, L. M., Spooner, K. K., Duhon,	Level III – B	A U.S. health system study examining real-	Low uptake; disparities by insurance, race;	EMR data; logistic regression	Retrospective; generalizability limited

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
G., Douglas, E. E., Leal, V., & Volk, R. J. (2025). Provider readiness and implementation barriers for lung cancer screening in a safety-net system. <i>Preventive Medicine Reports</i> , 56, 103164-103164. https://doi.org/10.1016/j.pmedr.2025.103164		world predictors of LCS uptake using EMR data.	provider referral mattered		
Mulhem, E., Sidahmed, E., Xing, Y., Eraqi, H., MacIntyre, H., & Homayouni, R. (2025). Disparities in lung cancer screening: Demographic and socioeconomic influences. <i>American Journal of Preventive Medicine Focus</i> , 100428. https://doi.org/10.1016/j.focus.2025.100428	Level III – B	Community/primary care survey	Adherence remained suboptimal; older/insured more likely to complete	Survey; adherence % by group	Self-report bias; limited scope

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
Sarkar, S., Choa, E., Manzo, L. L., Richman, I., Batten, J., Raziani, Y., & Poghosyan, H. (2025). Predictors and uptake of lung cancer screening in the US: An integrative literature review. <i>Lung Cancer</i> , 203, 108529. https://doi.org/10.1016/j.lungcan.2025.108529	Level V – B	An integrative literature review of 38 U.S.-based studies examining lung cancer screening (LCS) uptake and disparities.	LCS <30% nationally; disparities by race, income, geography	Synthesis of BRFSS, NHIS, EMR data	Mostly descriptive studies; inconsistent reporting
Woods, C., Shacker, M., Rybachok, A., Patel, P., Jahanshashi, N., Gerardin, S., Stotts, C., Yoo-Liu, E., Smith, M. A., Bremner, R. M., & Huang, J. (2025). Disparities in lung cancer screening among patients in socioeconomically distressed communities. <i>Journal of Thoracic and Cardiovascular Surgery Open</i> .	Level III – B	US single-center; Distressed Communities Index	High-distress patients overrepresented; Hispanic/Asian underrepresented ; outcomes equal	N=864; DCI scores; regression	Single-center; retrospective; did not capture unscreened

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
https://doi.org/10.1016/j.xjon.2025.08.001					

Author(s) and date	Findings with Initial Codes	Code List for Theme Development
Avila et al., 2025	Secondary analysis of a clinical trial (N=615) assessing how individual and neighborhood SES influence cessation and program completion among LCS participants in Massachusetts. Higher neighborhood SES correlated with greater cessation in unadjusted models, and individuals with higher education living in low-SES areas showed better completion rates. However, individual and neighborhood SES were not independently predictive in adjusted models. Limitations include self-report bias and single-region data.	Socioeconomic/Societal: Socioeconomic status; neighborhood disadvantage; health equity; access barriers. Navigation & Interventions: Cessation engagement; completion rate.
Bade et al., 2025	Qualitative study interviewing hospitalists (n=8) across two hospitals to explore inpatient opportunities for LCS referral. Hospitalists support identifying eligible patients during hospitalization but prefer external staff to manage post-discharge follow-up. Barriers included time constraints, lack of guideline familiarity, and workflow fragmentation. Highlights the potential for inpatient-to-outpatient screening transitions if supported by navigation structures.	Health System Infrastructure: Workflow design; inpatient screening opportunity; post-discharge coordination. Provider Knowledge: Role clarity; time limitations; workload burden. Navigation & Interventions: Post-discharge navigation; care transitions.
Belachew et al., 2025	Cross-sectional study examining awareness and attitudes toward LCS among primary care patients in urban clinics. Findings revealed low awareness of screening guidelines and misconceptions about risk factors. Participants cited cost, fear of diagnosis, and transportation as barriers. Provider recommendation was the strongest predictor of screening intent. Suggests need for education and culturally sensitive communication.	Socioeconomic/Societal: Urban clinic access; perceived barriers; cost barriers. Provider Knowledge: Provider recommendation. Communication & Health Literacy: Health literacy; patient awareness; misconceptions.
Boatman et al., 2024	Mixed-methods study evaluating the implementation of an EHR-based reminder system for LCS eligibility in a safety-net hospital. Quantitative results showed modest increases in LDCT orders after implementation. Qualitative interviews revealed provider frustration with alert fatigue and competing demands. Success depended on dedicated champions and clear workflow protocols.	Socioeconomic/Societal: Safety-net hospitals; system equity focus. Health System Infrastructure: EHR alerts; implementation barriers; workflow integration. Provider Knowledge: Provider engagement; alert fatigue. Navigation & Interventions: Technology adoption; system-level intervention.
Carter-Bawa et al., 2025	Systematic review of behavioral and system-level interventions to increase LCS uptake. Across 27 studies, multicomponent programs (navigation, reminders, provider training) showed the highest screening improvements, especially in underserved	Socioeconomic/Societal: Underserved population focus; access equity. Health System Infrastructure: Leadership engagement; sustainability; system integration. Provider Knowledge: Provider

Author(s) and date	Findings with Initial Codes	Code List for Theme Development
Chin et al., 2025	<p>populations. Single-component educational interventions had limited effectiveness. Sustainability required leadership engagement and ongoing staff education.</p> <p>Quantitative analysis of national EHR data assessing racial and income disparities in LCS completion rates. Non-Hispanic Black and low-income patients had significantly lower completion despite similar eligibility. Facility-level factors (screening coordination and reminder systems) mitigated some disparities. Recommends targeted outreach and standardized referral workflows.</p>	<p>education; training programs. Navigation & Interventions: Multicomponent programs; patient navigation; reminder systems.</p> <p>Socioeconomic/Societal: Racial disparity; income disparity; completion gap. Health System Infrastructure: Standardized workflows; coordination systems. Navigation & Interventions: Outreach efforts; targeted interventions.</p>
Cooley et al., 2025	<p>Intervention trial testing nurse-led navigation to improve adherence to annual LCS follow-up in a Veterans Affairs setting. Navigation increased follow-up completion by 24% compared with standard care. Nurses identified frequent barriers including transportation, anxiety, and scheduling conflicts. Emphasizes importance of proactive outreach and follow-up tracking.</p>	<p>Socioeconomic/Societal: Veteran population; access challenges. Health System Infrastructure: Care coordination systems. Navigation & Interventions: Nurse-led navigation; follow-up adherence; longitudinal tracking.</p>
Gwin et al., 2025	<p>Retrospective observational cohort study evaluating mortality outcomes among 1,598 individuals referred for lung cancer screening within a racially diverse safety-net system in Dallas, TX. Despite substantial comorbidity (60% moderate, 20% severe), only 6% of patients died during a median follow-up of 31.3 months. Mortality was primarily associated with age rather than comorbidity, race, or screening completion. Findings highlight that real-world screening populations—more diverse and medically complex than trial participants—can still experience significant survival benefit, supporting expanded LCS implementation in safety-net contexts.</p>	<p>Socioeconomic/Societal: Diverse populations; comorbidity impact; safety-net setting; mortality risk factors. Health System Infrastructure: Real-world data systems; screening program structure. Navigation & Interventions: Screening participation; population-level outcome tracking.</p>
Hubert et al., 2025	<p>Cross-sectional study within the European 4-IN-THE-LUNG-RUN trial assessing informed decision-making (IDM) across recruitment methods for lung cancer screening among 848 participants. Tailored recruitment materials led to significantly improved knowledge and informed choice compared to standard paper invitations, with IDM rates of 84.7% overall and no significant SES or gender differences. Results emphasize that communication strategy—specifically personalized,</p>	<p>Socioeconomic/Societal: Equity in decision-making; gender and SES balance. Health System Infrastructure: Recruitment infrastructure; trial-level coordination. Communication & Health Literacy: Informed choice; tailored communication; literacy-sensitive materials. Navigation & Interventions: Recruitment strategy refinement; participant engagement.</p>

Author(s) and date	Findings with Initial Codes	Code List for Theme Development
Japuntich et al., 2025	<p>understandable information—enhances equitable decision-making and may increase ethical and effective screening participation.</p> <p>Mixed-methods study examining patient and provider experiences with lung cancer screening in two U.S. health systems. Among 50 patients and seven providers, five key themes emerged: low patient knowledge, provider-driven behavior, limited shared decision-making, system barriers to referral, and general acceptability of low-dose CT. Although providers valued screening, inconsistent workflows and lack of navigation undermined uptake. Findings underscore the importance of communication, logistical support, and systemic alignment for sustainable implementation.</p>	<p>Health System Infrastructure: Workflow alignment; system barriers to referral. Provider Knowledge: Provider-driven behaviors; referral practices. Communication & Health Literacy: Shared decision-making; patient knowledge; acceptability of LDCT. Navigation & Interventions: Lack of navigation; implementation improvement opportunities.</p>
Javier et al., 2025	<p>Qualitative descriptive study exploring patient experiences with shared decision-making (SDM) in LCS programs. Participants emphasized trust in providers, desire for clear explanations of risks/benefits, and fear of radiation and false positives. Clinicians reported limited time and variable confidence in delivering SDM. Study highlights need for structured SDM tools to standardize discussions and promote equity in decision quality.</p>	<p>Socioeconomic/Societal: Equity in discussions; patient trust. Health System Infrastructure: Time limitation; workflow constraints. Provider Knowledge: Provider confidence in SDM; training needs. Communication & Health Literacy: Shared decision-making; communication quality; informed discussions. Navigation & Interventions: Use of structured SDM tools.</p>
Kwak et al., 2025	<p>Comprehensive review summarizing the evolution of Korea's National Lung Cancer Screening Program (NLCSP) launched in 2019, including pilot outcomes showing increased early-stage diagnosis and screening adherence. The integration of LDCT with risk stratification improved mortality outcomes, and national adoption led to higher screening participation among high-risk adults. The review also discusses emerging liquid biopsy technologies as adjunct tools. Findings demonstrate the importance of national policy infrastructure and continuous evaluation for sustaining LCS effectiveness.</p>	<p>Socioeconomic/Societal: National program policy; early detection outcomes. Health System Infrastructure: Policy implementation; continuous evaluation; data infrastructure. Navigation & Interventions: National program rollout; technology innovation; risk stratification tools.</p>
Liu et al., 2025a	<p>Population-based analysis of national and state-level trends in lung cancer screening rates using NHIS and BRFSS datasets from 2010–2023. Findings revealed screening rate increases from 3.8% in 2010 to 21.8% in 2022, though rates among newly eligible</p>	<p>Socioeconomic/Societal: National trends; population disparities; eligibility expansion. Health System Infrastructure: Policy evaluation; state-level differences. Communication & Health Literacy:</p>

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	populations under expanded 2021 USPSTF criteria remained lower at 13%. Despite overall progress, disparities persist across states and demographics. Study calls for reassessment of national targets and policy interventions to address uptake stagnation and inequity.	Public awareness; population education. Navigation & Interventions: Programmatic strategies; national monitoring.
Liu et al., 2025b	Cross-sectional study of 52,910 urban residents in Nanjing, China, through the China Urban Cancer Screening Project (CanSPUC) from 2019–2023. Only 45.4% of high-risk individuals underwent LDCT despite risk stratification efforts. Factors influencing participation included gender, education, smoking status, occupational exposure, and family history. The study identified health literacy and accessibility as key barriers and recommended community-based education and tailored protocols to increase adherence.	Socioeconomic/Societal: Gender disparity; health literacy; urban health inequalities. Health System Infrastructure: Risk stratification implementation; screening access systems. Communication & Health Literacy: Risk communication; education gaps. Navigation & Interventions: Community-based engagement; tailored protocols.
McFadden et al., 2025	International qualitative study with 27 healthcare professionals across seven countries exploring psychosocial impacts and barriers in LCS. Identified pervasive fatalism, stigma linked to smoking history, and anxiety about results as major deterrents. Participants emphasized that program design and communication strongly influence psychosocial responses, suggesting that targeted public awareness and culturally sensitive messaging are vital to reduce fear and stigma.	Socioeconomic/Societal: Cross-country differences; stigma related to smoking history. Health System Infrastructure: Program design considerations; cultural adaptability. Communication & Health Literacy: Psychosocial barriers; fatalism; anxiety; public messaging. Navigation & Interventions: Culturally sensitive awareness campaigns.
Mejia et al., 2025	Cross-sectional survey of 74 healthcare providers within a Houston safety-net system assessing readiness for lung cancer screening implementation. Although 92% supported screening, fewer than half understood shared decision-making billing or workflows. Providers expressed need for tools such as decision aids, eligibility guidance, and cessation resources. The study highlights that implementation success depends on addressing provider training, infrastructure gaps, and system-level collaboration to enhance equitable screening delivery.	Socioeconomic/Societal: Safety-net systems; resource constraints. Health System Infrastructure: Infrastructure gaps; decision-support tools. Provider Knowledge: Workflow readiness; training needs; guideline awareness. Communication & Health Literacy: Shared decision-making knowledge; eligibility communication. Navigation & Interventions: Implementation readiness; equity-focused rollout.
Mulhem et al., 2025	Retrospective cohort of 2,631 veterans screened between 2014–2023 to examine adherence after the USPSTF 2021 criteria expansion. While screening eligibility increased by 41%, follow-up adherence declined from 62% to 49%. Predictors of adherence included younger age, former smoker status, and urban residence,	Socioeconomic/Societal: Demographic disparities; income and ethnicity gaps; Medicaid and ADI effects. Health System Infrastructure: Multi-site data coordination; policy evaluation. Communication & Health Literacy: Awareness of

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Sarkar et al., 2025	<p>while low health literacy and transport barriers predicted attrition. The study underscores that policy expansion alone cannot sustain screening without targeted navigation and education interventions.</p> <p>Integrative review of 38 U.S. quantitative studies (2014–2023) showing lung-cancer-screening uptake remains below 30% nationally. Rates are lowest among racial/ethnic minorities, uninsured patients, and residents of southern states. Findings emphasize systemic barriers such as insurance limitations, provider knowledge gaps, and unequal access to decision support. Authors call for research on organizational policies and decision-aid integration to improve equity in LCS adherence and uptake.</p>	<p>eligibility changes. Navigation & Interventions: Equitable intervention design; follow-up improvement strategies.</p> <p>Socioeconomic/Societal: National disparities by race, income, and geography. Health System Infrastructure: Organizational policy analysis; system fragmentation. Provider Knowledge: Provider knowledge gaps; adherence to guidelines. Communication & Health Literacy: Unequal access to decision aids; patient understanding. Navigation & Interventions: Integration of decision-support systems; implementation research focus.</p>
Woods et al., 2025	<p>Retrospective analysis of 864 patients screened at a Phoenix center (2016–2024) using the Distressed Communities Index (DCI) to assess socioeconomic impact. Individuals from high-distress areas had higher rates of active smoking, Medicaid coverage, and minority race, yet comparable diagnostic outcomes once screened. Hispanic and Asian adults were most under-represented relative to county population data. The study demonstrates that the DCI is a useful tool to identify communities for targeted screening and culturally informed outreach.</p>	<p>Socioeconomic/Societal: Socioeconomic distress; minority access inequities; Medicaid concentration. Health System Infrastructure: Screening system integration; institutional coordination. Communication & Health Literacy: Community-level literacy; culturally informed outreach. Navigation & Interventions: Targeted interventions for distressed communities; outreach refinement.</p>

