

Harnessing Opportunity: Pilot Intervention to Improve Lung Cancer Screening for Women Undergoing Breast Screening Mammography



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ABSTRACT

Introduction: The screening mammogram could be a “teachable moment” to improve lung cancer screening (LCS) uptake. The aim of our project was to combine patient self-referral with eligibility identification by providers as a two-pronged approach to increase rates of LCS among eligible women.

Methods: LCS education materials were created to stimulate patient education and encourage self-referral. Chart review of patients scheduled for screening mammography was performed to identify patients who met LCS criteria. The primary outcome was rate of acceptance of targeted interventions as measured by qualitative survey material and rate of LCS uptake.

Results: Between August 2022 and August 2023, 116 patients were identified by providers for potential eligibility for LCS and 34 patients (29.3%) deemed eligible based on the U.S. Preventative Services Task Force 2021 guidelines. There were 19 patients (56%) who completed LCS with three patients (16%) with screen-detected nodules that led to further workup. Post-implementation qualitative survey results reveal that 100% of the participants rated their shared decision-making visit experience as “very helpful” and 67% responded “very likely” to seek simultaneous breast and LCS in the future. Informational materials were rated as 80% favorable among all respondents; however, the rate of self-referral alone was 0%. The combined rates of eligible patients lost to follow-up or refusal was 24%.

Conclusion: The self-referral aspect of the intervention revealed that patients are unlikely to self-refer for LCS. Nevertheless, patients undergoing screening mammograms individually identified for LCS were very responsive to learning more about dual screening.

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Keywords: Lung cancer screening; Dual cancer screening; Mammography; Low dose CT scan

Introduction

Lung cancer remains the deadliest cancer in the United States, with 90% of cases being secondary to tobacco exposure.¹ Landmark studies revealed marked mortality benefit with low-dose computed tomography (LDCT) for lung cancer screening (LCS); however, women were underrepresented in those trials.² Importantly, more recent trials have revealed that women have a stronger mortality reduction from LCS compared with men.³ In stark contrast

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Figure 1. Educational brochures with QR code placed in mammography imaging suites.

to low rates of LCS nationwide, screening efforts for breast cancer are more mature, with greater than 75% of women between the ages of 50 to 74 years reporting that they have received a screening mammogram within the last 2 years.^{4,5} Overall, women who complete mammography screening are more likely to receive other recommended cancer screening tests, suggesting that the occasion of mammography screening could be a “teachable moment” or unique opportunity to increase awareness about LCS and improve enrollment among eligible women. In a retrospective review of women at our institution who were identified as eligible for LCS and were engaged in screening mammography, only 35% of those eligible for LCS received LDCT scan.⁶ The aim of our project was to implement a set of targeted LCS interventions among eligible women currently undergoing mammography screening to assess the feasibility of piloting a dual breast and lung screening cancer program.

Materials and Methods

A multidisciplinary team was assembled to create a workflow that combines breast and lung cancer screening, including staff and faculty from the radiology and thoracic surgery departments. The study duration was from August 2021 to July 2022. We piloted the

following two interventions: (1) self-referrals and (2) electronic health record–screened referrals to LCS.

To assess the willingness of patients to self-refer for LCS, educational brochures about the eligibility criteria, process, risks, and benefits of LCS were created, with a QR code embedded to allow patients to self-refer for LCS if they deem themselves eligible. The brochures were placed in four mammography suite waiting rooms in the Stanford Healthcare network in accessible locations (Fig. 1). The second intervention for increasing LCS uptake relied on chart review by providers using the electronic health record to identify eligible patients for LCS among women scheduled for mammograms.

The two primary outcomes of the study were screening rates and survey data. Study participants were referred to the thoracic surgery cancer screening clinic, where a shared decision-making visit was scheduled before completing LDCT. Pre- and post-screening surveys measuring knowledge, attitudes, and perceptions were administered to all participants.

Results

Process of Patient Identification and Enrollment Into the Study

The process workflow is as summarized in Figure 2. Regarding self-identification, no patient self-enrolled using the QR code. Regarding retrospective chart review, 116 patients were invited to confirm eligibility status, of which 34 were deemed LCS eligible (Fig. 3). Of the 19 patients who completed LDCT, 14 patients (74%) had benign findings, two patients (11%) had incomplete findings due to infectious or inflammatory processes and recommended for repeat LDCT in 1 to 3 months, and three patients (16%) had findings of LUNG-RADS 3 to 4 requiring further workup. Abnormal findings included “subsolid 2.5 cm nodule,” “multiple nodules < 5 mm,” and “11 mm ground-glass nodule concerning for adenocarcinoma.”

Survey Administration and Completion

In the prescreening survey, 92% of the participants indicated that they felt they were at risk for lung cancer and 81% indicated that early cancer detection was a key motivator for getting screened. Concerns patients had about screening included cost of screening (46%), incidental findings (19%), and test accuracy (12%). A total of 80% respondents rated informational materials favorably. Results from the post-screening survey revealed that 100% of the patients rated the shared decision-making visit as “very helpful” and 67% indicated that they were “very likely” to seek same-day breast and lung screening in the future. Of patients who withdrew or refused screening, one patient indicated concern about financial costs as a reason for

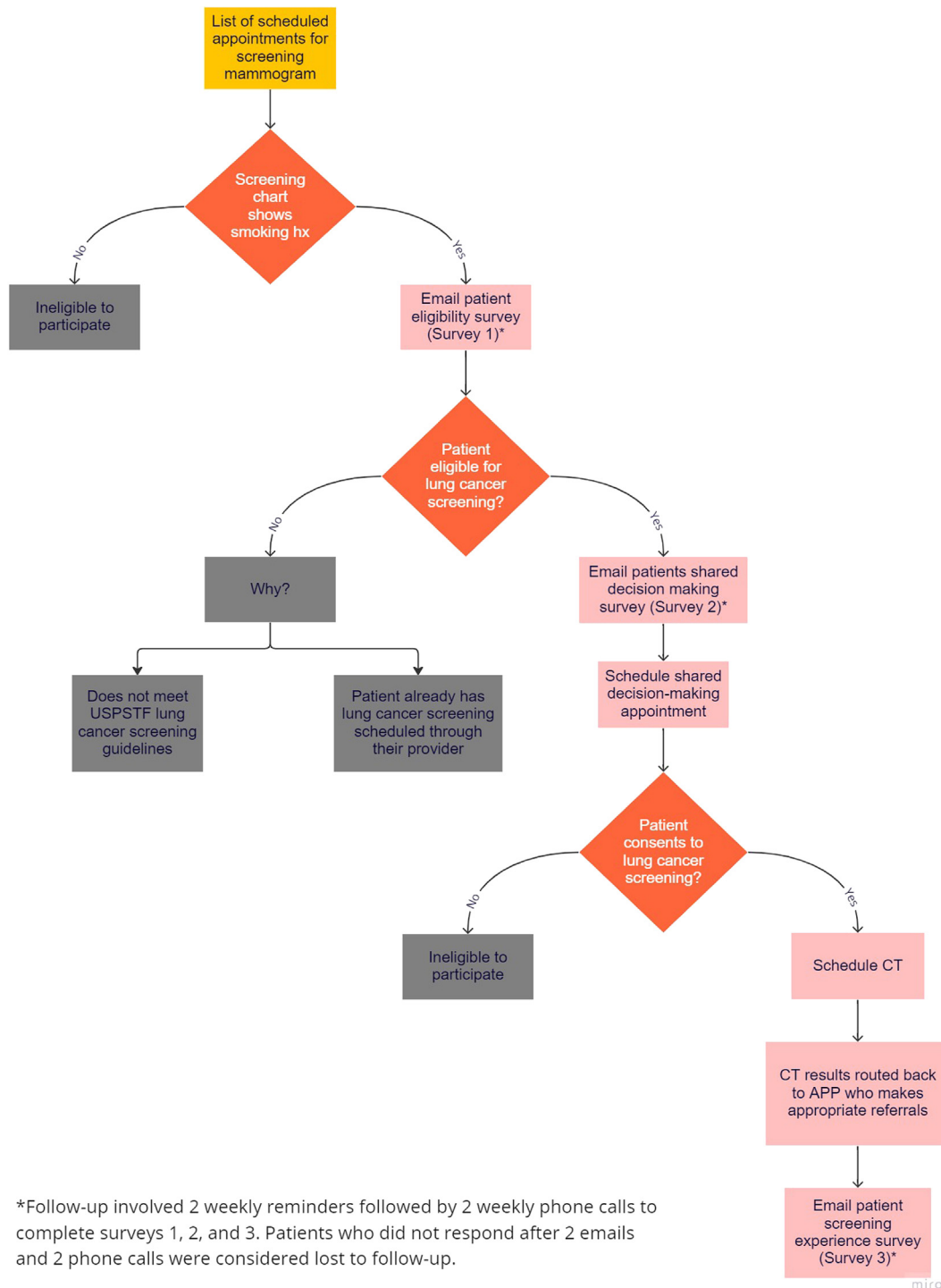


Figure 2. Process workflow. APP, advanced practice provider; CT, computed tomography; hx, history; USPSTF, U.S. Preventive Services Task Force.

withdrawal and one patient indicated already undergoing LDCT as a reason for withdrawal.

Discussion

The goal of our project was to increase rates of LCS among eligible women by leveraging a very robust breast cancer screening program as an opportunity to

improve the LCS program in an academic, tertiary care center. Our dual cancer screening strategy is one of the first of its kind. Although self-referral was not a successful method to increase screening rates, our overall results indicate that individuals who were identified as eligible for LCS were responsive to learn more about dual screening and may have had unmeasured benefit

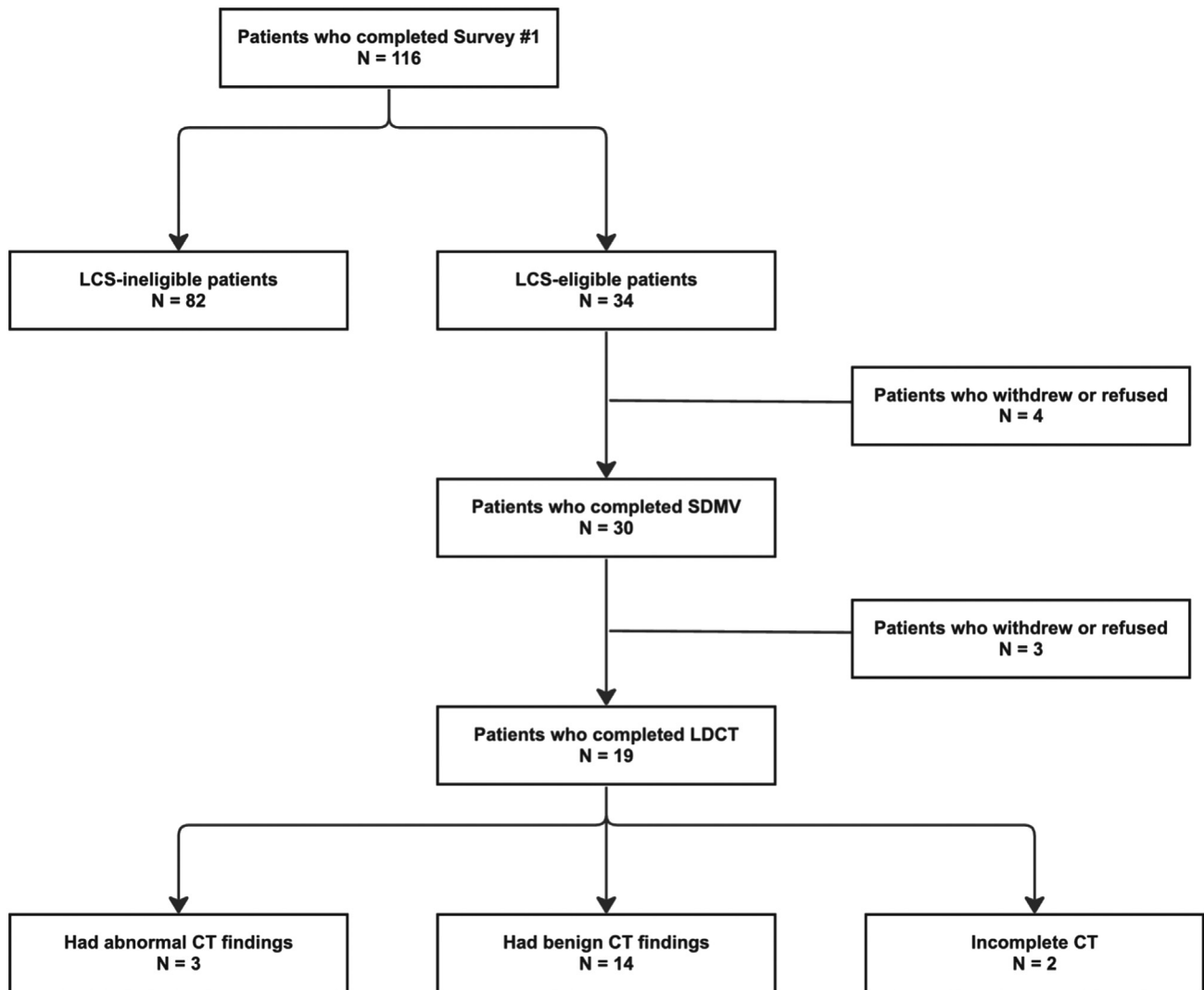


Figure 3. Process workflow for all LCS-eligible patients. CT, computed tomography; LCS, lung cancer screening.

from exposure to educational materials. By leveraging the “teachable moment” of mammography screenings, providers can proactively identify eligible patients and engage them in discussions about the risks and benefits of LCS. This approach not only facilitates informed decision-making but also increases the likelihood of follow-through with LCS. This intervention has the potential to increase overall screening rates, address the existing disparities in LCS among women, and improve outcomes in the early detection and management of lung cancer. Further research and implementation efforts are warranted to maximize the impact of this approach and ensure equitable access to LCS for high-risk individuals.

CRediT Authorship Contribution Statement

Lye-Yeng Wong: Data curation; Investigation; Methodology; Validation; Visualization; Roles/Writing—original draft; Writing—review and editing.

Tiffany Yue: Data curation; Formal analysis; Writing—review and editing.

Ghazal Aghagoli: Data curation; Formal analysis; Funding acquisition; Investigation; Methodology.

Ioana Baiu: Writing—review and editing.

Laura Shula: Data curation; Formal analysis; Funding acquisition; Investigation; Methodology.

Angela Lee: Writing—review and editing.

Natalie S. Lui: Resources; Software; Supervision; Validation.

Leah M. Backhus: Conceptualization; Data curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Visualization; Writing—review and editing.

Disclosure

The authors declare no conflict of interest.

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