

Using Telehealth to Increase Lung Cancer Screening Referrals for At-Risk Veterans in Rural Communities

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Background: At-risk rural veterans have low rates of lung cancer screening (LCS). This proof-of-principle quality improvement project aimed to determine whether a telehealth intervention would increase referrals for at-risk veterans living in the rural upper Midwest and attending a smoking cessation program to LCS with low-dose computed tomography (LDCT) of the chest. **Methods:** Sixty-eight of 74 LCS-eligible rural veterans who self-enrolled in a smoking cessation program were contacted by telephone. Those who agreed to enroll in LCS were referred to LDCT and followed for 4 months. At the conclusion of the intervention, the number of referrals and screenings performed were tabulated. LDCT reports were reviewed and scored according to Lung CT Screening Reporting and Data System (Lung-RADS) version 1.1.

Results: Only 3 of 74 LCS-eligible veterans (4%) underwent LDCT before initiation of this telehealth intervention. By the conclusion of this 4-month project, 19 of 74 veterans (26%) underwent LDCT. Forty-one veterans were successfully contacted and 29 agreed to participate in LCS. Of those who agreed to participate, 19 underwent LDCT within 4 months. Of the veterans who received LDCT, 10 were diagnosed with Lung-RADS 1, 7 with Lung-RADS 2, 1 with Lung-RADS 3, and 1 with Lung-RADS 4B. Annual follow-up LDCT or referral for further evaluation were pursued in each case. **Conclusions:** Collectively, these data suggest that telehealth intervention could increase referrals of at-risk rural veterans to a centralized LCS program at a regional US Department of Veterans Affairs medical facility.

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Annual lung cancer screening (LCS) with low-dose computed tomography (LDCT) of the chest has been shown to reduce mortality rates for individuals at risk for lung cancer.¹ Despite the benefits, < 5% of those who were eligible for LCS in the United States were screened in 2022.² Implementation of a LCS program in rural communities is especially challenging because they are sparsely populated, medically underserved, and located far from urban centers.²⁻⁷ It is estimated that 1 in 5 people live in rural areas. Rates of tobacco smoking and cancer are higher in rural communities when compared with urban communities.^{8,9} The scarcity of physicians in rural areas who are familiar with LCS may further impede individuals who are at risk from accessing this life saving service.^{5,6} As a result, these individuals may not regularly undergo LCS as recommended.⁹

Telehealth, or the remote delivery of health care services via telecommunications, is an emerging approach for addressing unmet medical needs in rural communities and is being utilized widely by the US Department of Veterans Affairs (VA).^{4,10-15} The Veterans Integrated Service Network 12 (Great Lakes Network) has established the Clinical Resource Hub (CRH), a telehealth network comprising of licensed independent physicians, nurse

practitioners, registered nurses, and ancillary staff. The CRH offers regular, remote health care services to several community-based outpatient clinics (CBOC) primary care clinics located in rural northern Wisconsin and the Upper Peninsula of Michigan.^{10,14}

The utility of telehealth in promoting LCS among at-risk veterans living in rural communities has not been firmly established.⁴⁻⁶ To address this issue, we conducted a proof-of-principle quality improvement project to determine whether a telehealth intervention would increase referrals among at-risk veterans who reside in rural northern Wisconsin and the Upper Peninsula of Michigan who are self-enrolled in a CBOC smoking cessation program in Green Bay, Wisconsin. The CBOC provides primary health care to veterans residing in rural northern Wisconsin and the Upper Peninsula of Michigan as defined by US Department of Agriculture rural-urban commuting area codes.¹⁶ The intervention aimed to refer these individuals to the closest available and centralized LCS program, which is located at the Clement J. Zablocki VA Medical Center (CJZVAMC) in Milwaukee, Wisconsin.

METHODS

We reviewed electronic health records (EHR) of LCS-eligible veterans treated by 2 authors

(SH and TB) who were self-enrolled in the smoking cessation program at the Green Bay CBOC between October 1, 2020, and September 30, 2021. The program provides comprehensive evidence-based tobacco use treatment, online self-help resources, behavioral counseling, and medicines for smoking cessation.¹⁷ Veterans aged 50 to 80 years with a smoking history of ≥ 20 pack-years, who currently smoke cigarettes or quit within the past 15 years, were considered at risk for lung cancer and eligible for LCS. After confirming eligibility, pertinent demographic data were abstracted from each EHR.

Telehealth Intervention

The CJZVAMC centralized LCS program manages all delivery processes and has been previously shown to increase uptake of LCS and improve patient outcomes among veterans as compared to a decentralized approach.^{18,19} In the centralized approach, eligible veterans were referred by a CBOC primary care practitioner (PCP) to a designated centralized LCS program. The centralized LCS program provides further evaluation and disposition, which includes structured and shared decision making, ordering LDCT of the chest, reporting LDCT results to the patient and PCP, devising a goal-directed care plan, and managing follow-up LDCTs as indicated (Figure 1).^{18,19}

This intervention was initiated before other measures aimed to increase the LCS enrollment for at-risk rural veterans at the CBOC, (eg, mailing LCS education fact sheet to veterans).²⁰ After reviewing prospective veterans' EHRs, 1 author (TB) contacted LCS-eligible veterans by telephone and left a voicemail if contact could not be established. A second telephone call was placed within 2 months of the initial call if no call back was documented in the EHR. When verbal contact was established, the goals of the centralized LCS program were described and the veteran was invited to participate.²¹

Veterans were seen at CBOCs affiliated with CJZVAMC. The CJZVAMC LCS coordinator was notified whenever a veteran agreed to enroll into LCS and then ordered LDCT, which was performed and read at CJZVAMC. Once LDCT has been ordered, 1 author (TB) reviewed the veteran's EHR for LDCT completion over the next 4 months.

Upon conclusion of the intervention period,

the number of veterans referred for LDCT and the number of LDCTs performed were recorded. Each LDCT was reviewed and coded by medical imaging clinicians according to Lung CT Screening Reporting and Data System (Lung-RADS) version 1.1 and coded as 0, 1, 2, 3, or 4 based on the nodule with the highest degree of suspicion.²² The LDCT and reports were also reviewed by pulmonary physicians at the CJZVAMC Lung Nodule Clinic with recommendations issued and reported to the PCP treating the veteran, such as annual follow-up with LDCT or referral to specialty care for further evaluation as indicated.

RESULTS

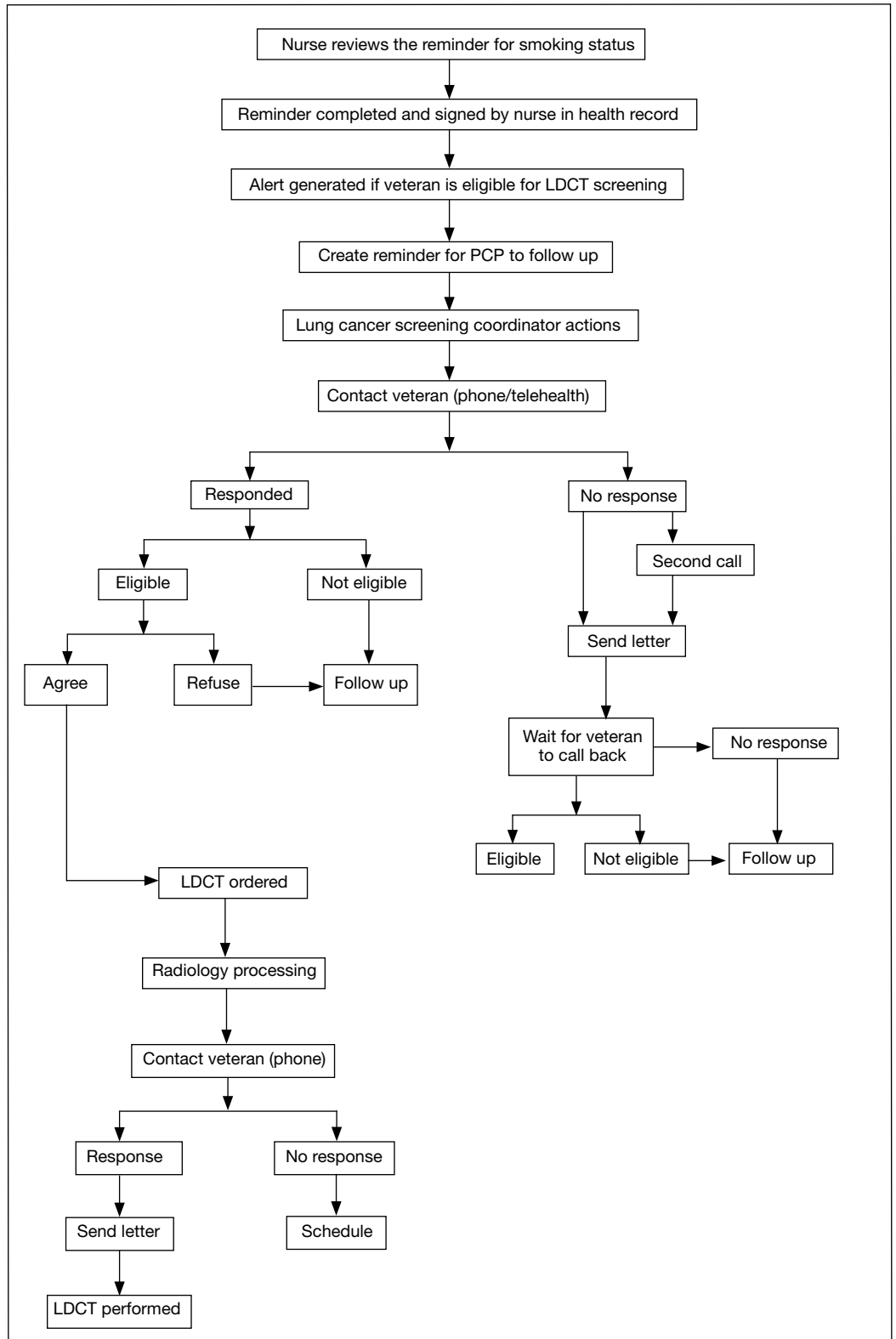
Of 117 veterans enrolled in the smoking cessation program at the CBOC during the intervention period, 74 (63%) were eligible to undergo LCS, and 68 (58%) were contacted by telephone (Figure 2). Eligible patients were primarily White male veterans; their mean (SD) age was 65.0 years (7.6). Participation in LCS was discussed with 41 (60%) veterans either during the initial or second telephone call of which 29 (71%) agreed to enroll and 12 (29%) declined. Veterans did not provide reasons for declining participation at the time of the telephone call.

Among the 74 eligible veterans who attended the smoking cessation program, only 3 had LDCT performed before initiation of this project (4%). At the conclusion of the telehealth intervention period, 19 veterans had LDCT performed (26%). Ten LDCTs were coded Lung-RADS 1, 7 Lung-RADS 2, 1 Lung-RADS 3, and 1 Lung-RADS 4B. In each case, annual follow-up LDCT or referral to a LCS clinician was pursued as indicated.²²

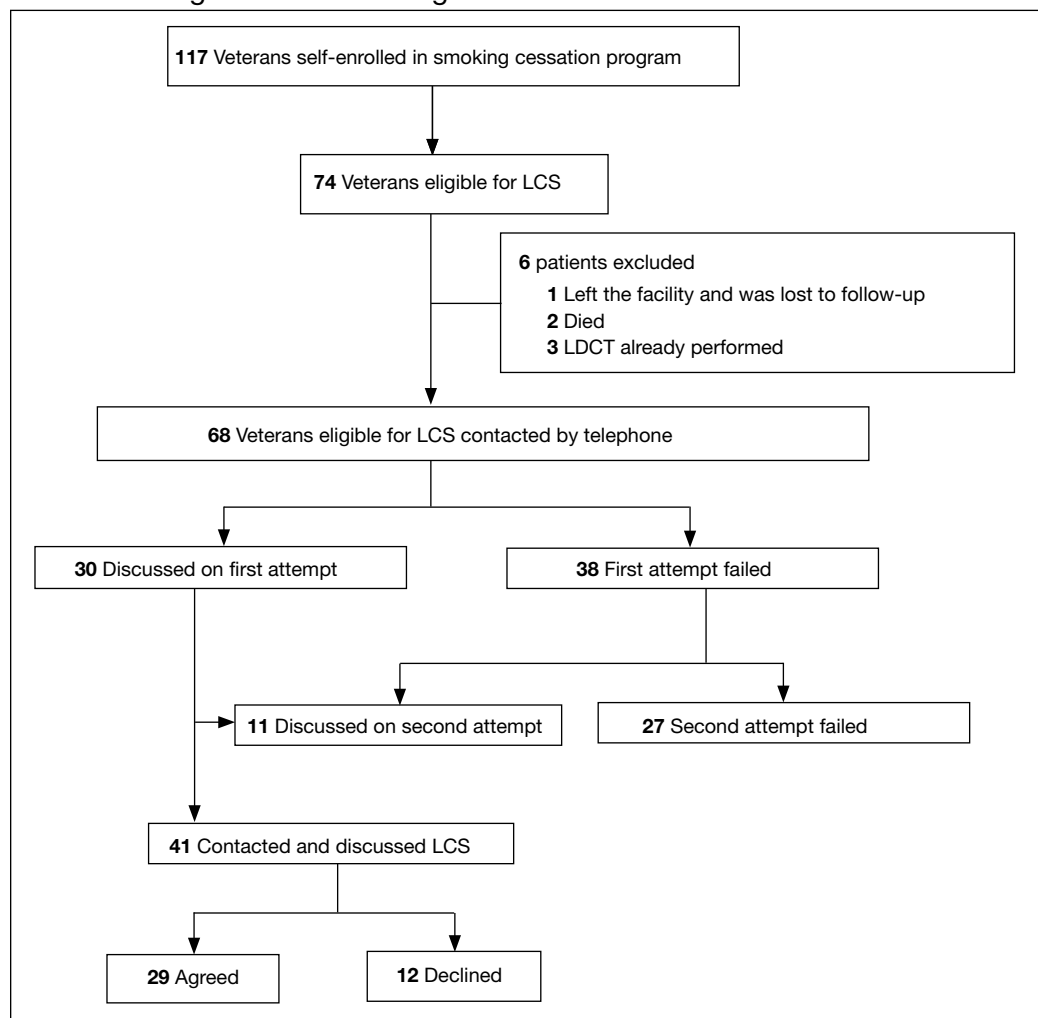
DISCUSSION

This proof-of-principle quality improvement project found that a high percentage (66%) of individuals in rural communities who were contacted via telehealth agreed to participate in a regional LCS program. The program reviewed LDCT results, ordered follow-up LDCTs, and recommended further evaluations.^{18,19} Whether this centralized LCS process could also promote adherence with subsequent annual LDCT and/or scheduled clinic appointments with designated clinicians, if abnormal imaging findings are detected, remains unclear.

FIGURE 1 Process Map of Centralized Telehealth Lung Cancer Screening



Abbreviations: LDCT, low-dose computed tomography; PCP, primary care physician.

FIGURE 2 Lung Cancer Screening Enrollment

Abbreviations: LCS, lung cancer screening; LDCT, low-dose computed tomography.

It has been well established LDCT LCS reduces lung cancer-specific and overall mortality rates among eligible current and former smokers.^{1,9,23} The 5-year relative survival rate of veterans diagnosed with localized non-small cell lung cancer is 63%; that number drops to 7% in those with advanced disease attesting to the utility of LCS in detecting early stage lung cancer.² Despite these favorable observations, however, screening rates with free LDCT remains low in rural communities.³⁻⁷

This proof-of-principle quality improvement project found that telehealth intervention may increase referrals of at-risk veterans who reside in rural communities to the closest centralized LCS program located at a

regional VAMC. This program is responsible for reviewing the results of the initial LDCT, ordering follow-up LDCT, and recommending further evaluation as indicated.^{18,19} Whether this centralized LCS process would promote adherence with subsequent annual LDCT and/or scheduled clinic appointments with designated clinicians if abnormal imaging findings are detected is yet to be determined.

We found that among 74 LCS-eligible rural veterans attending a CBOC-based smoking cessation program, only 3 (4%) underwent LDCT screening before this telehealth intervention was launched. This low LCS rate among veterans attempting to quit smoking may have been related, in part, to a lack of awareness of this intervention and/or barriers

to LCS access.^{7,10,21,24} Deploying a telehealth intervention targeting LCS could address this life threatening and unmet medical need in rural communities.²⁵ The results of this proof-of-principle quality improvement project support this contention with the reported increased referrals to and completion of initial LDCT within 4 months of the telehealth encounter.

Limitations

This was a small, single site project composed of predominantly White male rural veterans participating in a smoking cessation program associated with a VA facility.^{26,27} It is not clear whether similar outcomes would be observed in at-risk veterans who do not participate in a smoking cessation program or in more diverse communities. We were unable to contact 40% of LCS-eligible rural veterans by telephone. Twelve veterans reached by telephone declined to participate in LCS without providing a reason, and only 19 of 68 eligible veterans (28%) underwent LDCT screening during the 4-month telehealth intervention. The reasons underlying this overall low accrual rate and whether rural veterans prefer other means of personal communication regarding LCS were not determined. Lastly, generalizability of our initial observations to other veterans living in rural communities is limited because the project was conducted only in rural northern Wisconsin and the Upper Peninsula of Michigan.

CONCLUSIONS

At-risk rural veterans may be willing to participate in a centralized LCS program at a regional VA medical facility when contacted and coordinated using telehealth modalities. These findings offer support for future prospective, multisite, VA telehealth-based studies to be conducted in rural areas. The results of this project also suggest that telehealth intervention could increase referrals of at-risk rural veterans to the closest centralized LCS program located at a regional VA medical facility.

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Disclaimer

The opinions expressed herein are those of the authors and do not necessarily reflect those of *Federal Practitioner*, Frontline Medical Communications Inc., the US Government, or any of its agencies.

Ethics and consent

Authors adhered to the ethical principles for medical research involving human and animal subjects outlined in the World Medical Association's Declaration of Helsinki. This project was reviewed and determined to be exempt by the Jesse Brown Veterans Affairs Medical Center Institutional Review Board. This work was supported, in part, by grant L0004 (IR) from the US Department of Veterans Affairs and by grant ILHUU0049-19 from the US Department of Housing and Urban Development (IR).

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