

Development and Testing of “Is Lung Cancer Screening for You?”: A Computer-Based Decision Aid

Otis L Owens (✉ owenso@mailbox.sc.edu)

University of South Carolina <https://orcid.org/0000-0002-1023-1449>

Karen Kane McDonnell

University of South Carolina

Brandi R Newsome

University of South Carolina School of Medicine

Mark E Humphrey

University of South Carolina School of Medicine

Short Report

Keywords: Lung Neoplasms, Early Detection of Cancer, Decision-Making, Computer-Assisted Decision-Making, Decision Support Techniques

Posted Date: October 20th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-891417/v1>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Purpose

To reduce lung cancer mortality, individuals at high risk should receive a low-dose computed tomography screening annually. To increase the likelihood of screening, interventions that promote shared decision-making are needed. The goal of this study was to investigate the feasibility, acceptability, usability, and preliminary effectiveness of a computer-based decision aid.

Methods

Thirty-three participants were recruited through primary-care clinics in a small southeastern-US city. Participants used a computer-based decision aid (“Is Lung Cancer Screening for You?”) during a clinic appointment. Paper surveys collected self-reported feasibility, acceptability, and usability data. A research coordinator was present to observe each patient’s and health-care provider’s interactions, and to assess the fidelity of shared decision-making.

Results

The decision aid was feasible, acceptable for use in a clinic setting, and easy for participants to use. Patients had low decisional conflict following use of the decision aid and had high screening intention and actual screening rates. Shared decision-making discussions using the decision aid were nearly 6 minutes on average.

Conclusion

Computer-based decision aids are feasible for promoting shared lung cancer–screening decisions. A more robust study is warranted to measure the added value of a computer-based version of this aid versus a paper-based aid.

Introduction

Lung cancer is the second most-commonly-diagnosed and deadliest cancer in the world.¹ An estimated 2.2 million new lung cancers were diagnosed in 2020, and 1.8 million people died from the disease globally.¹ In the United States, lung cancer accounted for an estimated 228,820 new cancers and 135,720 deaths in 2020,² translating to an incidence rate of 59.3 per 100,000 persons and a mortality rate of 40.2 per 100,000.² Several states (primarily in the southeastern and midwestern United States) have higher-than-average lung cancer incidence and mortality rates. South Carolina is among these, with an age-adjusted incidence of 65.5 per 100,000 persons and a mortality rate of 44.8 per 100,000 persons.

Although there are many determinants of lung cancer (e.g., genetics), the disease can largely be attributed to cigarette smoking (past or current),³ which is linked to 80–90% of lung cancer deaths.⁴ To lower lung cancer risk, individuals are advised to avoid/stop smoking.⁵ For years, national-level smoking cessation programs, such as the US Department of Health and Human Services' National Network of Tobacco Cessation Quitlines (1-800-QUIT-NOW), have addressed the smoking problem. The most effective interventions include behavioral and Quitline counseling, medication, interactive or tailored text messaging, and interactive web-based strategies.⁵

Individuals 50–80 years old with a 20-pack-year smoking history and who currently smoke or quit within the past 15 years are at the highest risk for lung cancer.⁶ These recommendations, updated in 2021, expand screening eligibility guidelines to a wider age range (previously, it was 55–75) and those with a shorter smoking history (previously, it was 30 pack-years). For this population, the United States Preventive Services Task Force recommends a low-dose computed tomography (LDCT) scan after a “counseling and shared decision-making (SDM) conversation with their provider.”⁶ A counseling and SDM discussion between provider and patient helps the patient evaluate complex medical information in a short time frame.⁷ Absent such discussion, some patients experience anxiety, which can negatively affect health-care decisions.

The Centers for Medicare and Medicaid Services (CMS) has included lung cancer screening counseling, an SDM visit, and LDCT screening—once yearly—as a Medicare preventive service benefit since 2015.⁷ CMS guidelines require that screening counseling and SDM visits include (1) a determination of LDCT eligibility based on lung cancer risk, (2) SDM that can include a decision aid (DA), (3) counseling on the importance of LDCT and smoking abstinence, and (4) a written order for LDCT if appropriate.⁷ Despite clear guidelines, provider and patient barriers impede the SDM process. For example, providers may be unaware of recent changes in screening guidelines/eligibility or have reservations about its efficacy.^{8,9} Providers may also lack time to engage in SDM,⁸ have limited training on implementing SDM,¹⁰ and receive poor reimbursement from insurance.¹¹ Patient barriers to SDM discussions about LDCT include competing health-care needs, fear, reservations due to stigma associated with smoking, mistrust of the provider or medical system, cost, lack of professional navigation by providers, and/or logistical concerns.¹⁰

Shared DAs, as the CMS recommends, can promote patient engagement in SDM discussions by improving lung cancer and screening knowledge and reducing personal decisional conflict.¹¹ However, these aids have had mixed success, partly because of the above-mentioned barriers. In a systematic review of existing research on the implementation of decision support interventions into routine clinical practice, Ewlyn et al¹² discovered that reliance solely on patients to independently use a DA (e.g., mailing it before a clinic visit), or dependence solely on clinicians to preassign or newly introduce a DA into their consultation, was ineffective. The most effective, yet challenging, method for promoting use of DAs in clinical practice is to employ a systems approach to pre-identify appropriate patients prior to their visit

and facilitate use of the DA in-clinic.¹² Buy-in from clinical leadership and training of individual providers also increase the probability of routine DA use.¹²

Based on known barriers to DA use in clinical practice, McDonnell et al¹³ developed and tested a brief LDCT DA titled “Is Lung Cancer Screening for You?”, designed for use by the patient immediately prior to a consultation to learn more about lung cancer and LDCT and to indicate their values/concerns about LDCT. The aid is also meant to guide and tailor the SDM discussion to quickly address patient questions and concerns. In a pilot study testing the general feasibility of a printed version of the DA, patients and providers deemed the DA easy to read and brief.¹³ To improve its access and interactivity, the research team developed a mobile version of the DA. Similar to the print version, the mobile version was meant for in-clinic use, to educate patients about lung cancer and facilitate an SDM discussion between a high-risk patient and a health-care provider about LDCT screening. The current study aimed to investigate the feasibility, acceptability, usability, and preliminary effectiveness of this computer-based version of the DA in clinical practice.

Methods

Intervention Description

“Is Lung Cancer Screening for You?”—developed and pilot tested by McDonnell et al¹³—is a brief DA that covers risks factors for lung cancer (principally smoking), a formula for calculating cigarette smoking history (in pack-years), LDCT screening facts, questions to spur patient reflection on screening (plus a question about receiving LDCT screening in the next 30 days), and lung cancer resources (e.g., phone numbers to quit-smoking hotlines). The original DA was a 12-page booklet containing plain-language text and racially/ethnically diverse images.

The “Is Lung Cancer Screening for You?” DA was adapted prior to this study for use on any mobile or other computer-based device via the Redcap survey platform. The Redcap platform is widely available within academic settings and enables low-cost, robust development that will be scalable across the state of South Carolina and eventually anywhere with Internet service. The platform is HIPPA compliant, enabling straightforward IRB review for multiple sites. Visually, the computer-based DA looked identical to the paper-based version, but it also contained interactive elements, such as an ability to increase text size, a read-aloud feature (aimed at low-literacy users), a pack-year calculator, and a patient response area for the reflective statements. The DA was designed to compile patients’ responses in a single-page, on-screen report, which health-care providers can use during the SDM process. For this study, the DA was disseminated on a 12-inch touch-screen tablet computer.

Provider Training

Prior to the study, all providers were given an overview of the study protocol and a short (10-minute) video-based training on how to use the DA. The video included an overview of SDM for LDCT, an SDM

exemplar involving a provider/partner and lung cancer survivor, instructions on billing for LDCT screening, and a template for documenting SDM. Providers received this training either in-person during grand rounds or via email (which directed providers to our website: <https://lungcancersc.com/resources/for-clinicians/decision-aids>).

Recruitment

To be eligible, individuals had to meet the CMS guidelines for being high risk for lung cancer as well as be Medicare- or Medicaid-eligible. Three recruitment approaches were used. In the first, a research team member examined upcoming appointment schedules at two sites (a family practice clinic and a pulmonology clinic), identified eligible patients, and called them to assess participation interest. The second strategy consisted of mailing invitations to patients at the same two clinic sites who met study eligibility criteria (based on information in their electronic medical records) but did not have a scheduled appointment; these invitations were followed up with a call from a research team member. Thirdly, flyers were placed in the clinic waiting room to inform potential participants about the study and let them know how to contact the research coordinator. Eligible participants who made appointments solely for this study were seen via an SDM or wellness appointment, both of which Medicare covers with minimal out-of-pocket fees.

Measures

Feasibility.¹⁴ Instrument: Feasibility of Intervention Measure. Items: 4. Measures: The extent to which an intervention can be implemented successfully in a given setting. Scoring: 5 response options, from 1 (Completely Disagree) to 5 (Completely Agree); total score (sum of all items) ranges 1–20 (20 = fully feasible, 1 = not feasible). Cronbach α : 0.89.

Acceptability.¹⁴ Instrument: Acceptability of Intervention Measure. Items: 4. Measures: Whether an intervention is agreeable, palatable, or satisfactory. Scoring: 5 response options, from 1 (Completely Disagree) to 5 (Completely Agree); total score (sum of all items) ranges 1–20 (20 = fully acceptable, 1 = unacceptable). Cronbach α : 0.85.

Usability.¹⁵ Instrument: System Usability Scale. Items: 10. Measures: Ease of use (user-friendliness) of a technology. Scoring: 5 response options, from 1 (Strongly Disagree) to 5 (Strongly Agree); total score (sum of responses for each statement, with positive items reverse-scored) ranges 1–100 (100 = very easy to use, 1 = very difficult to use). Cronbach α : 0.79–0.97.

Decisional Conflict.¹⁶ Instrument: Decisional Conflict Scale. Measures: personal perceptions of: uncertainty in choosing options. Scoring: 3 possible response options (Yes = 0, Not Sure = 2, No = 4); total score (sum of responses, divided by 10, and multiplied by 25) ranges 0–100 (0 = no decisional conflict, 100 = very high decisional conflict). Cronbach α : 0.81.

Screening Intent. Assessed (using an original instrument/item) whether the person intended to be screened within the next 30 days.

Actual Screening. Examined participants' electronic medical records post-SDM visit to determine if the person followed through with receiving LDCT.

Fidelity. Instrument: Original instrument developed by McDonnell et al.¹³ Items: 15. Measures: The extent to which providers thoroughly implement study procedures, with a focus on both overall study implementation (e.g., showing the participant the DA, asking the participant about the DA) and SDM implementation (e.g., discussing pros and cons of screening). Scoring: 2 response options (Yes/No).

Data Collection and Analysis

After consenting to participate, each participant completed demographic and computer-proficiency questionnaires. The research coordinator then directed the participant to complete the DA on the tablet. Next, the participant answered questions (via the above-described measures) related to feasibility, acceptability, usability, decisional conflict, and screening intent. Immediately prior to the SDM conversation, the research coordinator gave the provider the tablet containing a summary of the participant's responses. The research coordinator was present during the entire SDM discussion to observe and record fidelity and appointment time lapse. Lastly, the research coordinator used electronic medical records to determine whether participants received screening post-appointment. Each participant received a \$25 incentive for participation.

All data were analyzed using univariate methods, including frequency and calculations of means. The data reported are based on the scoring range for each measurement scale.

Results

Demographics

The 33 participants in our study were all current smokers or former smokers who quit less than 15 years ago. A majority were female, and a little more than half reported race as African American. Participants' mean age was 66.5 years (SD, 9.5). A little more than a third of participants were married, most held a high school diploma/GED or higher, and most lived in a household earning less than \$20,000 annually. A majority indicated being either "unable to work" or retired. A little less than half reported fair to poor health, although few (11%, $n = 4$) reported having chronic obstructive pulmonary disease (COPD)—a common comorbidity of lung cancer. See Table 1 for details.

Feasibility, Acceptability, Usability, Decisional Conflict, and Screening

Participants deemed implementing the "Is Lung Cancer Screening for You?" DA in a clinic setting as highly feasible ($m = 17.96$; SD, 2.71) and exceedingly acceptable ($m = 18.45$; SD, 1.87). The mean

usability score was 72.41 (SD, 16.06); scores higher than 80.3 are excellent, and scores between 68 and 80.2 are considered good.

Participants had an average decisional conflict score of 19 (out of 70; zero represents no conflict) after DA use. Prior to conversations with providers, 100% of participants intended to be screened, and all respondents maintained that intention after the conversations. All participants who desired screening were scheduled for it by their provider. Follow-up review of participants' electronic medical records revealed that 25 of 33 participants (76%) were screened following the SDM conversation. Seven of the remaining eight were not screened within 30 days because the provider did not recommend it during the SDM visit (although 2 of 7 were later referred via letters, but these patients were lost to follow-up). Notably, one of the seven was eventually diagnosed with lung cancer. One participant was ineligible for screening because of receiving it within the past year.

Fidelity

The 11 participating providers covered a majority ($m = 23.5$; SD, 6.4) of the 33 fidelity checklist items during discussions. Providers often kept good eye contact with participants, strongly encouraged current smokers to quit, discussed lung cancer risk factors, and placed an LDCT screening order the same day as the visit (if screening was agreed upon). More than half (67%, $n = 22$) of participants were scheduled for LDCT screening within 72 hours of the SDM discussion. All participants referred for screening were notified of their screening appointment.

In most cases (64%, $n = 21$), providers introduced the observing research coordinator and described the reason for observation. Providers usually used the digital DA during conversations (67%, $n = 22$) and/or asked patients if they had read the DA (61%, $n = 20$). Most providers reviewed patients' value statements from the DA (64%, $n = 21$), and a majority offered smoking cessation information to patients who currently smoked (58%, $n = 19$). Among the 15 fidelity instrument items, providers *least often* assessed patients for lung cancer symptoms (39%, $n = 13$), asked if patients had questions about LDCT (45%, $n = 15$), and/or finalized the discussion by reviewing patients' "intent to be screened" rating scale within the DA (48%, $n = 16$). See Table 2 for details. The average time to complete an SDM discussion with support of the DA was 5.95 minutes (SD, 2.05).

Discussion

Findings demonstrate that the computer-based version of "Is Lung Cancer Screening for You?" is acceptable and feasible for use in clinic settings. The DA reduced decisional conflict by educating participants about the rationale and pros/cons of screening. The DA successfully facilitated a brief but effective SDM conversation. Fidelity scores showed that health-care providers can effectively engage patients in an SDM discussion about lung cancer screening when trained how to use a DA in clinical practice, and when that DA is designed to collect patient concerns and values related to LDCT screening.

These findings are consistent with prior hypotheses by Elwyn et al¹² that if barriers related to clinical implementation of DAs are removed, then their use is more likely.

In addition to the success of “Is Lung Cancer Screening for You?” with promoting SDM, the high LDCT screening rates can be attributed to the timely scheduling of patients for screening following the SDM discussion followed by patient notification of their screening appointments. While most previous literature has largely focused on systems-level barriers to screening (e.g., difficulty identifying eligible patients),^{8,17} few studies have focused on the lack of timely patient scheduling and appointment notifications/reminders as a deterrent. However, Carter-Harris and Gould¹⁰ noted that the use of information technology for facilitating systems-level exchanges and management of scheduling, testing, results tracking, etc., can be a critical asset for promoting LDCT screening.

Despite the success of our DA in promoting screening, some notable improvements would strengthen the LDCT SDM process. First, providers should always assess for lung cancer symptoms. Doing so could help prioritize what is discussed during the SDM conversation, particularly if symptoms are present. Secondly, providers should always ask if the patient has any questions about the radiologic procedure of LDCT to ensure the person understands the risks and benefits of the CMS-recommended screening.⁷ Additionally, providers should always take into consideration the patient’s values in a shared decision;¹⁸ this values assessment should not only include a patient’s intention to be screened but also discussion about the extent to which LDCT screening aligns with the patient’s overall well-being (e.g., affordability, safety, perception of others).¹⁸ Using a DA containing a values assessment tool could enable providers to streamline the SDM process. Fourth, providers should ensure that they are not only making a clear assessment on a patient’s intent to be screened, but also placing orders for screening in a timely manner. Not scheduling the appointment immediately could mean a patient is lost to follow-up. More concerning is that untimely LDCT could lead to a later discovery of lung cancer, as occurred with one participant in our study. Lastly, consistent with CMS guidelines, providers should always offer smoking cessation information to patients who smoke since smoking is the leading cause of lung cancer.

Conclusions And Implications

DAs can be excellent resources for patients and providers, making both parties aware of the latest LDCT screening recommendations as well as providing a systematic way of informing the provider about the patient’s values and concerns as they relate to screening. DAs are most effective when championed by providers within clinical practice and when these aids do not distract significantly from the limited time allocated for appointments. Future research should seek to recruit a more robust sample to determine the statistical significance of the impact of “Is Lung Cancer Screening for You?” on SDM and LDCT screening behaviors. Further research should also assess the performance of a computer-based versus paper-based version of our DA. Qualitative research would be valuable for ascertaining provider and patient experiences with the DA. Moreover, implementation and dissemination of science research could be

useful for determining the best methods for supporting the routine use of “Is Lung Cancer Screening for You?” in diverse clinical settings (e.g., hospitals, primary care clinics, federally qualified health centers).

Limitations

This study had some notable limitations. It consisted of 33 participants residing in one region of one state; therefore, findings may not be applicable to individuals residing in other areas. Recruitment was greatly affected (even paused) by the COVID-19 pandemic. Furthermore, more robust analysis (e.g., regression) could not be performed to ascertain in what specific contexts our DA reduces decisional conflict and increases screening intent among high-risk individuals. Decisional conflict was only measured post-test; therefore, we cannot report with certainty that the low decisional conflict scores were a direct result of DA use. Despite these limitations, our study provided valuable information about the feasibility of using a computer-based, brief LDCT decision aid in a clinical setting to promote SDM.

Declarations

Funding: This study was funded by the Bristol Myers Squibb Foundation.

Conflicts of interest/competing interests: We certify that no author (Otis L. Owens, Karen Kane K. McDonnell, Brandi R. Newsome, Mark Humphrey) has any conflicts of interest to report.

Availability of data and material: The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Authors' contributions: Each of the authors contributed thought leadership to the conceptualization and implementation of the project as well as to the drafting of this publication.

Ethics approval: This research included human subjects. We certify that it was reviewed and received approval from the Institutional Review Board at the University of South Carolina.

Consent to participate: Informed consent was obtained from all individual participants included in the study.

Consent for publication: All patients signed informed consent that detailed our intentions to publish their data.

References

1. Sung H, Ferlay J, Siegel R et al (2021) Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin* 71(3):209–249. doi:10.3322/caac.21660
2. Siegel RL, Miller KD, Jemal A (2020) Cancer statistics, 2020. *CA Cancer J Clin* 70(1):7–30. doi:10.3322/caac.21590

3. Barta JA, Powell CA, Wisnivesky JP (2019) Global epidemiology of lung cancer. *Ann Glob Health* 85(1):8. doi:10.5334/aogh.2419
4. Jha P, Ramasundarahettige C, Landsman V et al (2013) 21st-century hazards of smoking and benefits of cessation in the United States. *N Engl J Med* 368(4):341–350. doi:10.1056/NEJMsa1211128
5. US Department of Health and Human Services (2020) Smoking cessation: A report of the Surgeon General—key findings. Office of the Surgeon General, Public Health Service. <https://www.hhs.gov/sites/default/files/2020-cessation-sgr-full-report.pdf>. Accessed 20 August 2021
6. US Preventive Services Task Force, Krist AH, Davidson KW et al (2021) Screening for lung cancer: US Preventive Services Task Force recommendation statement. *JAMA* 325(10):962–970. doi:10.1001/jama.2021.1117
7. Centers for Medicare and Medicaid Services (2015) Decision memo for screening for lung cancer with low dose computed tomography (LDCT) (CAG-00439N). <https://www.cms.gov/medicare-coverage-database/details/nca-decision-memo.aspx?NCAId=274>. Accessed 20 August 2021
8. Wang GX, Baggett TP, Pandharipande PV et al (2019) Barriers to lung cancer screening engagement from the patient and provider perspective. *Radiology* 290(2):278–287. doi:10.1148/radiol.2018180212
9. Eberth JM, McDonnell KK, Sercy E et al (2018) A national survey of primary care physicians: Perceptions and practices of low-dose CT lung cancer screening. *Prev Med Rep* 11:93–99. doi:10.1016/j.pmedr.2018.05.013
10. Carter-Harris L, Gould MK (2017) Multilevel barriers to the successful implementation of lung cancer screening: Why does it have to be so hard? *Ann Am Thorac Soc* 14(8):1261–1265. doi:10.1513/AnnalsATS.201703-204PS
11. Piana R (2017, May 25) The ongoing challenges of lung cancer screening. *The ASCO Post*. <https://ascopost.com/issues/may-25-2017/the-ongoing-challenges-of-lung-cancer-screening>. Accessed 20 August 2021
12. Elwyn G, Scholl I, Tietbohl C et al (2013) “Many miles to go.. .”: A systematic review of the implementation of patient decision support interventions into routine clinical practice. *BMC Med Inform Decis Mak* 13(Suppl 2):S14. doi:10.1186/1472-6947-13-S2-S14
13. McDonnell KK, Strayer SM, Sercy E et al (2018) Developing and testing a brief clinic-based lung cancer screening decision aid for primary care settings. *Health Expect* 21(4):796–804. doi:10.1111/hex.12675
14. Weiner BJ, Lewis CC, Stanick C et al (2017) Psychometric assessment of three newly developed implementation outcome measures. *Implement Sci* 12(1):108. doi:10.1186/s13012-017-0635-3
15. Brooke J (1996) SUS: A “quick and dirty” usability scale. In: Jordan PW, McClelland IL, Weerdmeester B (eds) *Usability evaluation in industry*. CRC Press, London, p 189

16. O'Connor AM (1995) Validation of a decisional conflict scale. *Med Decis Making* 15(1):25–30. <https://doi.org/10.1177/0272989X9501500105>
17. Erkmen CP, Moore RF, Belden C et al (2017) Overcoming barriers to lung cancer screening by implementing a single-visit patient experience. *Int J Cancer Oncol* 4(2). doi:10.15436/2377-0902.17.1469
18. Elwyn G, Frosch D, Thomson R et al (2012) Shared decision making: A model for clinical practice. *J Gen Intern Med* 27(10):1361–1367. doi:10.1007/s11606-012-2077-6

Tables

Table 1. Description Statistics of Participants

Variable (N = 33)	Frequency	Mean (SD) or %^a
Age	33	66.5 yr (9.5)
Gender		
Female	21	64%
Male	12	36%
Race		
African American	18	55%
White	14	42%
Other	1	3%
Education		
Elementary	2	6%
Some high school	8	24%
High school/GED	11	33%
Some college or technical school	9	27%
College	3	9%
Marital status		
Single/never married	3	9%
Married	12	36%
Separated/divorced	8	24%
Widowed	10	30%
Annual household income		
< \$4,999	10	30%
\$5,000–\$9,999	3	9%
\$10,000–\$19,999	8	24%
\$20,000–\$49,999	10	30%
\$50,000–\$99,999	1	3%

Table 1. Description Statistics of Participants

Variable (N = 33)	Frequency	Mean (SD) or %^a
> \$100,000	1	3%
Employment status		
Employed	2	6%
Unemployed	1	3%
Homemaker	1	3%
Retired	13	39%
Unable to work	16	48%
Health status		
Excellent	1	3%
Very good	6	18%
Good	11	33%
Fair	11	33%
Poor	4	12%
Technology use		
Excellent	1	3%
Very good	6	18%
Good	11	33%
Fair	11	33%
Poor	4	12%

^a Some categories may not sum exactly to 100% due to rounding.

Table 2. Study Fidelity

Checklist statement	Yes (%)	No (%)
DA is present in the room at the time of the visit.	33 (100%)	0
Provider introduces the observer and describes the reason for the observation.	21 (64%)	12 (36%)
Provider maintains eye contact with patient (may sit down next to patient) most of the time.	33 (100%)	0
Provider uses tablet DA.	22 (67%)	11 (33%)
Provider asks the patient if he/she has read the DA.	20 (61%)	13 (39%)
Provider asks if the patient has any questions about the actual radiologic procedure—LDCT.	15 (45%)	18 (55%)
Provider discusses the risk factors (age, smoking status) for lung cancer with the patient.	29 (88%)	4 (12%)
Provider assesses for symptoms of lung cancer (hemoptysis, unexplained weight loss, change in a chronic cough or “smoker’s cough,” a new cough that doesn’t go away, shortness of breath, chest pain, wheezing, or hoarseness).	13 (39%)	20 (61%)
Provider discusses the benefits and harms of lung cancer screening.	26 (79%)	7 (21%)
Provider reviews patient’s value statements with the patient.	21 (64%)	12 (36%)
Provider finalizes discussion by reviewing the patient’s “intent to be screened” rating scale with the patient.	16 (48%)	17 (52%)
Provider strongly encourages any current smokers to stop smoking.	31 (94%)	2 (6%)
Provider gives smoking cessation program information to patients who currently smoke.	19 (58%)	14 (42%)
If agreed upon, provider places order for a LDCT screening on the day of the visit.	31 (94%)	2 (6%)
Screening appointment is scheduled within 72 hours.	22 (67%)	11 (33%)
Patient is notified of appointment.	25 (76%)	8 (24%)

Abbreviations: DA, decision aid; LDCT, low-dose computed tomography