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Attitudes about Lung Cancer Screening: Primary Care Providers versus Specialists

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Abstract

Background—Based on the results of the National Lung Screening Trial (NLST), the United States Preventive Services Task Force (USPSTF) now recommends yearly low-dose computed tomography (LDCT) for lung cancer screening among high-risk individuals. There is limited information regarding physician attitudes towards LDCT screening and whether these vary according to provider specialty.

Methods—Primary care providers (PCPs) and specialists were surveyed about their knowledge and attitudes toward lung cancer screening and likelihood to order a screening LDCT. Descriptive and univariate analyses were used to assess differences between PCPs versus specialists.

Results—Of the 103 respondents: 69% were PCPs, 45% were attending-level physicians, 42% were male, and most (51%) worked in mixed outpatient/inpatient practice settings. Compared to specialists, PCPs were less likely to feel confident in their ability to identify appropriate patients

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All other authors are without any conflicts of interest.

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Analysis and interpretation of the data: SR, DD, JJL

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for lung cancer screening (63.8% vs. 93.5%, p<0.01) or to decide the workup of patients with positive LDCT findings (52.9% vs. 93.5%, p<0.01). PCPs were also less likely to believe that the recommended yearly screening interval is feasible (27.5% vs. 86.7%, p<0.01), to feel comfortable counseling patients on LDCT (51.4% vs. 82.8%, p=0.01) or have sufficient time for counseling (14.3% vs. 50%, p<0.01). Despite these differences, PCPs were equally as likely as specialists to recommend LDCT for their high-risk smokers.

Conclusions—Despite feeling less confident and knowledgeable about lung cancer screening, PCPs are as likely as specialists to recommend LDCT. However, PCPs need further education to ensure the success of lung cancer screening programs.

Keywords

physician view points; knowledge; screening for lung cancer; LDCT; primary care

Introduction¹

Lung cancer is the leading cause of cancer death in the United States. Lung cancer deaths each year are greater than colon, breast and prostate cancer combined. As of 2011, lung cancer made up 14% of all cancer diagnoses and 27% of all cancer deaths in the US. The incidence of lung cancer in the US for 2016 is estimated to be 224,000 cases with males having a greater incidence than females and approximately two out of three people diagnosed being over the age of 65. Reduction in the lung cancer death rate is a component of the Healthy People 2020 objectives whose goal is to reduce the lung cancer death rate by 10% from a 2007 baseline of 50.6 lung cancer deaths per 100,000 (after age-adjustment) to 45.5 deaths per 100,000.

Reduction in lung cancer mortality rates can be achieved through screening with low dose computed tomography (LDCT) and detection of early-stage lung cancer. The National Lung Screening Trial (NSLT) demonstrated a 20% decrease in lung cancer specific mortality and 7% reduction in overall mortality among high-risk smokers who received LDCT versus standard chest x-rays. This reduction in lung cancer-specific and overall mortality is the basis for current guidelines by professional societies such as the American Cancer Society (ACS), the National Cancer Comprehensive Care Network and the American College of Chest Physicians (ACCP) recommending annual LDCT for patients 55 to 74 years of age with at least a 30 pack-year smoking history who are current smokers (or former smokers who quit within the last 15 years). 5–7

The United States Preventive Services Task Force (USPSTF) issued a grade B recommendation for annual LDCT screening for lung cancer for adults aged 55 to 80 years

CI: confidence internal

CMS: Centers for Medicare and Medicaid Services

LDCT: low-dose computed tomography

NLST: National Lung Screening Trial

OR: odds ratio

PCPs: primary care providers

USPSTF: United States Preventive Services Task Force

¹Abbreviation List

who have a 30 pack-year smoking history and currently smoke or have quit within the past 15 years. This recommendation applies to approximately 8.7 million people in the US, and its implementation could lead to the avoidance of as many as 12,000 lung cancer-associated deaths. The Both the Centers for Medicare and Medicaid Services (CMS) and the Affordable Care Act provide coverage for lung cancer screening, that patients receive counseling regarding lung cancer screening in a shared decision-making visit and must include the use of patient decision aids as well as a written referral order from a qualified provider. These requirements for shared decision-making place primary care providers (PCPs) at the forefront of the implementation and success of lung cancer screening programs. There is however limited information regarding PCPs views on lung cancer screening with LDCT. We undertook this study to assess the knowledge and attitudes of PCPs versus specialists (oncologists, pulmonologists, radiologists) towards lung cancer screening with LDCT as well as their likelihood to recommend LDCT screening.

Materials and Methods

Questionnaire Development

A multidisciplinary focus group comprised of 12 physicians (5 housestaff or fellows and 7 attendings) from oncology (2), primary care (8), pulmonology (1) and radiology (1) was conducted to inform design of the questionnaire survey. Findings from the focus group were used to develop an anonymous self-administered questionnaire to assess the knowledge of and attitudes and behavior towards lung cancer screening by PCPs (internal medicine and geriatrics) and specialists (oncologists, pulmonologists, radiologists) practicing at a large academic medical center in New York City.

Questionnaire Domains

The questionnaire focused on three domains: knowledge and familiarity with lung cancer screening recommendations, attitudes about LDCT screening and anticipated behavior regarding recommending and ordering LDCT screening for high risk smokers. Questions focusing on knowledge and attitudes were multiple-choice and scored on a four point Likert scale. Familiarity with the USPSTF lung cancer screening guidelines was used to measure knowledge. Attitudes towards LDCT screening were captured through questions focusing on comfort with counseling about LDCT screening and management of positive results and concerns about costs, access to screening and consequences of screening. Behavior was evaluated by questions assessing a provider's likelihood to order LDCT for high-risk patients in the next year. The questionnaire was piloted with three providers in the fields of primary care and pulmonology and revised based on their recommendations prior to its administration.

Participants

The survey was distributed to physicians in internal medicine and geriatrics at Mount Sinai Medical Center in New York City via a secure web-based survey capture platform (REDCap) and on paper during conferences, individual and large group meetings as well as general internal medicine, oncology, pulmonary and radiology grand rounds. Demographic information collected included age, gender, practice specialty, level of training, and practice

setting. Surveys were distributed between October and December 2014. The study was exempt by the Institutional Review Board at Icahn School of Medicine at Mount Sinai with waiver of signed consent.

Statistical Methods

Chi-square analysis was used to assess differences in attitudes and behaviors about lung cancer screening between PCPs and specialists. Multivariate logistic regression analysis was performed to assess factors associated with likelihood to order a screening LDCT scan in the next year for high-risk smokers, controlling for gender, level of training and specialty. All statistical analyses were performed with SPSS v.20 with a significance level of 0.05.

Results

Participants

A total of 103 physicians participated in the study (Table 1). Most were between the ages of 25 to 34 (57.4%) and female (57.8%). Over two-thirds (69.3%) were PCPs, 19.8% were pulmonologists and 9.9% were oncologists. Approximately half (55.4%) were interns, residents or fellows and 45.6% were attending-level providers. Most practiced in a mixed practice setting that included both inpatient and outpatient care.

Attitudes Regarding Lung Cancer Screening

Compared to specialists, PCPs felt less comfortable in their ability to identify appropriate patients for lung cancer screening (63.8% vs. 93.5%, p<0.01) and were more confused about how to apply lung cancer screening guidelines for patients who have multiple comorbidities (63.8% vs. 35.5%, p=0.01, Table 2). PCPs also felt less at ease counseling patients about LDCT screening (51.4% vs. 82.8%, p=0.01) and were not as confident in their abilities to decide on an appropriate work up of patients with positive CT findings (52.9% vs. 93.5%, p<0.01). PCPs were also less likely to feel that the recommended yearly screening interval was feasible (27.5% vs. 86.7%, p<0.01), cost effective (8.6% vs. 29%, p=0.01) or that they would have sufficient time to counsel patients about CT scan screening (40.3% vs. 50%, p<0.01). However, both specialists and PCPs shared similar views about false positive results causing distress to patients (96.8% vs 100%, p=0.31), worrying about incidental findings with LDCT screening (83.9% vs 90%, p=0.51) and worrying about follow up procedures associated with false positive results (83.9% vs 90%, p=0.51).

Attitudes about lung cancer screening were not associated with gender except for physician worry about incidental findings with chest CT screenings (p=0.05) and physician concern over not being able to order chest CT screening for lung cancer due to insurance (p=0.024). In both instances, females were more likely to be worried than males (94.9% vs. 79.1% and 89.8% vs. 66.7% respectively). The attitudes about lung cancer screening were also not associated with level of training except for the ability to identify appropriate patients for lung cancer screening (p=0.01) and feeling comfortable counseling patients about CT scan screening (p=0.03). Housestaff felt less confident and less comfortable than attendings (38% vs. 35% and 31% vs. 28% respectively).

Characteristics Associated with Screening Behavior

Both specialists and PCPs were equally likely to order a LDCT for eligible patients in the next year (84% vs. 81%, p=0.51). Familiarity with the USPSTF lung cancer screening guidelines and ability to identify appropriate patients for screening were both associated with a physician's likelihood to order a screening LDCT for eligible patients in the next year (67.1% and 80.7%). In addition, being comfortable counseling about screening for lung cancer and having sufficient time to counsel about LDCT screening were associated with likelihood to order LDCT (67.5% vs. 23.5%, p=0.01 and 28.9% vs. 5.6%, p=0.04, respectively). In multivariate regression controlling for gender, level of training and specialty, being able to identify appropriate patients (Odds Ratio (OR) =14.91, 95% CI: 3.10–71.77) and having sufficient time to counsel about screening (OR=11.45, 95% CI: 1.09–119.85) were independently associated with likelihood to order LDCT. Conversely, physicians who did not think it was cost effective to screen were less likely to order LDCT screening (OR=0.09, 95% Confidence interval (CI): 0.02–0.53).

Discussion

We found that compared with specialists, PCPs were less likely to feel confident identifying appropriate patients for LDCT screening or working up positive findings, less comfortable counseling patients about screening, and less likely to feel they have sufficient time for counseling. Despite these differences, PCPs and specialists in our sample were equally likely to recommend LDCT scans for lung cancer screening. This discordance could be because most physicians try to follow USPSTF guidelines which recommend LDCT screening. The most significant barriers for PCPs to recommend lung cancer screening include counseling time and the yearly screening interval, both of which play a role in the implementation and success of screening programs.

Similar to Hoffman et al.'s study of primary care providers in New Mexico, ¹² we found that cost and feasibility of LDCT screening to be of primary concern to PCPs. Providers in both studies felt that time limitations and the complexity of counseling required to explain LDCT screening as well as following up results would be barriers to the success of a screening program. Cost of screening with LDCT was also of concern among specialists in our study. Similarly, Iaccirino et al. found that pulmonologists were concerned about cost in addition to insufficient infrastructure and staffing. ¹³ Cost may now be less of a barrier for both PCPs and specialists since both the Affordable Care Act and CMS provide coverage for LDCT screening for high-risk patients.

We found that specialists and PCPs shared similar views regarding false positive results and patient distress, the follow-up procedures associated with false positive results and incidental findings with LDCT in lung cancer screening. Similar concerns such as the management of false positive results associated with mammography have been noted in breast cancer screening literature. Smith et al found that the reasons why physicians did not offer screening mammography specifically in women aged 40–49 included concerns that patient harms such as increased anxiety, a high false positive rate and overtreatment of benign findings outweighed the benefits. ¹⁴

The importance of physician recommendation practices for cancer screening and its subsequent uptake has been well documented in the literature. O'Malley et al. found that the factor most strongly associated with mammography utilization for breast cancer screening was a physician's recommendation while Wee et al. suggested that a physician's recommendation also played a significant role in the completion of colorectal cancer screening. ^{15,16} Patients' behavior towards screening is thus strongly influenced by physician recommendations. ¹⁷ Among smokers, a physician recommendation for LDCT to screen for lung cancer was an important factor for patients deciding whether they would undergo LDCT. ¹⁸ We found that PCPs were less comfortable in their ability to identify appropriate patients and to counsel about the use of LDCT, thus provider's recognition and confidence in these matters are required for lung cancer screening programs to be successful.

Our study suggests a need for education about lung cancer screening guidelines, particularly for PCPs. Other studies have shown that that some PCPs felt that lung cancer screening is not as efficacious as other cancer screening programs such as those for breast or colorectal cancer. 19,20 However based on NLST data, one lung cancer death is prevented with every 320 people screened. This is about equivalent to other cancer screening tests, thus indicating a need for more education among PCPs about the efficacy of lung cancer screening. By increasing physicians' knowledge, both familiarity with and confidence in counseling about lung cancer screening could subsequently increase. Based on our findings, we recommend that education about lung cancer screening should address the ability to identify appropriate patients or eligibility criteria for LDCT, insurance coverage and management of positive results. Providing decision-making aids such as those recently developed by the Agency for Healthcare Research and Quality (AHRQ) may assist PCPs in counseling about LDCT screening and may increase provider comfort and knowledge. Further development of clinical tools for providers regarding the work-up of positive findings on LDCT may also help improve provider comfort and knowledge.

This study, to our knowledge, is among the first to compare PCP and specialists' attitudes and behaviors towards lung cancer screening with LDCT. There are several limitations to this study. First, our surveys were administered prior to CMS's approval of coverage for LDCT for lung cancer screening. Our results may be different now that cost may no longer be as significant a factor determining providers' behaviors and recommendations regarding LDCT screening. Furthermore, our sample size was modest and we conducted our study at a single urban, academic medical center, which may limit the generalizability of our results to other providers and practices, particularly those in community settings. Lung cancer screening programs often include tobacco cessation counseling for those who still smoke, but our study did not include questions regarding whether patients were counseled on tobacco cessation methods and how confident providers felt in providing this counseling. This information may have elucidated additional needs for provider education. Lastly, addressing smoking and lung cancer risks with patients may be affected by a clinician's personal bias and/or prior patient experiences, but we did not ask about respondents' personal or family history with smoking or lung cancer in this study. Thus, we are unable to determine if personal experiences may have influenced respondents' attitudes about lung cancer screening.

Conclusions

Our study adds to the literature by demonstrating similarities and differences between PCPs and specialists regarding their attitudes towards lung cancer screening with LDCT. Despite several differences in comfort with counseling and attitudes towards screening, both PCPs and specialists were equally likely to order LDCT for lung cancer screening for high-risk patients. As implementation of lung cancer screening programs becomes more commonplace, further studies assessing provider attitudes and barriers to screening would shed light on the limitations of the NLST trial for which lung cancer screening recommendations are largely based. Additional work to increase provider knowledge about lung cancer screening, particularly for PCPs, and to identify the benefits or challenges of using shared decision-making tools when counseling about LDCT screening need to be undertaken to assess the impact of these interventions on provider behavior and ordering patterns for lung cancer screening.

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References

- 1. Basic information about lung cancer. http://www.cdc.gov/cancer/lung/basic_info/index.htm
- Society, AC. [Accessed September 17, 2016] Key statistics for lung cancer. http://www.cancer.org/cancer/lungcancer-non-smallcell/detailedguide/non-small-cell-lung-cancer-key-statistics
- [April 24, 2016] Cancer objectives. https://www.healthypeople.gov/2020/topics-objectives/topic/ cancer/objectives
- Team TNLSTR. Reduced Lung-Cancer Mortality with Low-Dose Computed Tomographic Screening. New England Journal of Medicine. 2011; 365(5):395–409. [PubMed: 21714641]
- 5. Smith RA, Manassaram-Baptiste D, Brooks D, et al. Cancer screening in the United States, 2015: a review of current American cancer society guidelines and current issues in cancer screening. CA Cancer J Clin. 2015; 65(1):30–54. [PubMed: 25581023]
- 6. Network NCC. Lung Cancer Screening. Aug 10.2016
- 7. Detterbeck FC, Mazzone PJ, Naidich DP, Bach PB. Screening for lung cancer: Diagnosis and management of lung cancer, 3rd ed: American College of Chest Physicians evidence-based clinical practice guidelines. Chest. 2013; 143(5 Suppl):e78S–92S. [PubMed: 23649455]
- Force USPST. [Accessed April 24, 2016] Lung cancer: screening. 2013. http:// www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/lungcancerscreening
- Doria-Rose VP, White MC, Klabunde CN, et al. Use of lung cancer screening tests in the United States: results from the 2010 National Health Interview Survey. Cancer Epidemiol Biomarkers Prev. 2012; 21:1049–1059. [PubMed: 22573798]
- Ma J, Ward EM, Smith R, Jemal A. Annual number of lung cancer deaths potentially avertable by screening in the United States. Cancer. 2013; 119(7):1381–1385. [PubMed: 23440730]
- 11. Decision Memo for Screening for Lung Cancer with Low Dose Computed Tomography (LDCT) [press release]. 2015

 Hoffman RM, Sussman AL, Getrich CM, et al. Attitudes and Beliefs of Primary Care Providers in New Mexico About Lung Cancer Screening Using Low-Dose Computed Tomography. Prev Chronic Dis. 2015; 12:E108. [PubMed: 26160294]

- Iaccarino JM, Clark J, Bolton R, et al. A National Survey of Pulmonologists' Views on Low-Dose Computed Tomography Screening for Lung Cancer. Ann Am Thorac Soc. 2015; 12(11):1667– 1675. [PubMed: 26368003]
- 14. Smith P, Hum S, Kakzanov V, Del Giudice ME, Heisey R. Physicians' attitudes and behaviour toward screening mammography in women 40 to 49 years of age. Canadian Family Physician. 2012; 58(9):e508–e513. [PubMed: 22972742]
- 15. O'Malley MS, Earp JA, Hawley ST, Schell MJ, Mathews HF, Mitchell J. The association of race/ethnicity, socioeconomic status, and physician recommendation for mammography: who gets the message about breast cancer screening? American Journal of Public Health. 2001; 91(1):49–54. [PubMed: 11189825]
- Wee CC, McCarthy EP, Phillips RS. Factors associated with colon cancer screening: the role of patient factors and physician counseling. Preventive Medicine. 2005; 41(1):23–29. [PubMed: 15916989]
- 17. Zapka JG, Lemon SC. Interventions for patients, providers, and health care organizations. Cancer. 2004; 101(S5):1165–1187. [PubMed: 15329892]
- 18. Jonnalagadda S, Bergamo C, Lin JJ, et al. Beliefs and attitudes about lung cancer screening among smokers. Lung Cancer. 2012; 77(3):526–531. [PubMed: 22681870]
- Lewis JA, Petty WJ, Tooze JA, et al. Low-Dose CT Lung Cancer Screening Practices and Attitudes among Primary Care Providers at an Academic Medical Center. Cancer Epidemiol Biomarkers Prev. 2015; 24(4):664–670. [PubMed: 25613118]
- Raz DJ. Perceptions and Utilization of Lung Cancer Screening Among Primary Care Physicians. Journal of thoracic oncology. 2016
- 21. Barton MK. Integration of lung cancer screening into practice is lacking. CA Cancer J Clin. 2015; 65(4):255–256. [PubMed: 25944110]

Clinical Practice Points

There is limited information regarding primary care providers (PCPs) views on lung cancer screening with low-dose computed tomography (LDCT).

- Despite feeling less confident and knowledgeable about lung cancer screening, PCPs are as likely as specialists to recommend LDCT.
- PCPs are at the forefront of the implementation and success of lung cancer screening programs, and need further education to ensure their success.

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Table 1

Physician Characteristics (n=103)

Age	n (%)
25-34	58 (57.4)
35–44	24 (23.8)
45–54	6 (5.9)
55-64	7 (6.9)
65+	6 (5.9)
Gender	
Male	43 (42.2)
Female	59 (57.8)
Specialty	
PCP	70 (69.3)
Non-PCP	31 (30.7)
Training Level	
Attending	45 (44.6)
Non-Attending	56 (55.4)
Practice Setting	
Outpatient	33 (32.4)
Inpatient	17 (16.7)
Mixed	52 (51.0)

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 Table 2

 Physician Attitudes Regarding Lung Cancer Screening

Statement	PCP	Specialist	p-value
	n=70 (%)	n=31 (%)	
Annual lung cancer screening with low dose chest CT for high-risk smokers reduces cancer mortality	63 (90.0)	27 (90.0)	0.99
Confused about how to apply lung cancer screening guidelines for patients who have multiple comorbidities	44 (63.8)	11 (35.5)	0.01
Recommended yearly screening interval is feasible	19 (27.5)	26 (86.7)	<0.01
Able to identify appropriate patients for lung cancer screening	44 (63.8)	29 (93.5)	<0.01
Have sufficient time to counsel patients about CT scan screening	10 (14.3)	15 (50.0)	<0.01
Feel comfortable counseling patients about CT scan screening	36 (51.4)	24 (82.8)	0.01
False positive results can cause distress to patients	69 (100)	30 (96.8)	0.31
Worry about incidental findings with chest CT screenings	63 (90.0)	26 (83.9)	0.51
Worry about follow-up procedures associated with false positive results	63 (90.0)	26 (83.9)	0.51
Confident in abilities to decide on work up of patients with positive CT findings	37 (52.9)	29 (93.5)	<0.01
Concerned will not be able to order chest CT screening for lung cancer due to insurance	55 (79.7)	26 (83.9)	0.62
Not cost effective to screen for lung cancer	6 (8.6)	9 (29.0)	0.01

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Table 3

Characteristics Associated with Likelihood to Screen

Statement	Likely to Screen	Not Likely to Screen	p-value
Familiar with USPSTF lung cancers creening guidelines	55 (67.1)	5 (27.8)	< 0.01
Not cost effective to screen for lung cancer	8 (9.5)	7 (38.9)	0.01
Able to identify appropriate patients for screening	67 (80.7)	7 (38.9)	< 0.01
Sufficient time to counsel patients about CT scan screening	24 (28.9)	1 (5.6)	0.04
Comfortable counseling about screening for lung cancer	56 (67.5)	4 (23.5)	< 0.01

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Table 4
Factors Independently Associated with Likelihood to Screen*

Variable	OR	95% CI	p-value
Able to identify appropriate patients	14.91	3.10-71.77	< 0.01
Sufficient time for counseling	11.45	1.09-119.85	0.04
Not cost effective to screen	0.09	0.02-0.53	< 0.01

^{*} Adjusted for gender, level of training, and specialty