ORIGINAL ARTICLE

Lung Cancer Screening Knowledge and Perceived Barriers Among Physicians in the United States

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ABSTRACT

Introduction: Lung cancer remains the leading cause of cancer death in the United States and has historically been detected late in its course. Low-dose computed tomography scan (LDCT) reduces lung cancer mortality by 20% and is currently recommended by clinical practice guidelines. However, compared with other cancer screening modalities, LDCT utilization remains low. This study surveyed office-based primary care physicians across the United States to better understand LDCT utilization.

Methods: A total of 1500 family and internal medicine physicians selected from the American Medical Association's physician master file were surveyed between April and July 2019 regarding LDCT practices, eligibility, clinical scenarios, and perceived barriers.

Results: The American Association for Public Opinion Research response rate 3 was 59% (652 respondents); 599 completed supplemental questions regarding lung cancer screening. A total of 88% of respondents discussed LDCT in the previous year, and 78% had ordered at least one LDCT. Most (59%) knew the tobacco exposure criteria for LDCT and correctly identified appropriate clinical scenarios (49%–86% responded correctly). Less than half of respondents correctly identified the age eligibility criteria (44%–45% responded correctly). In general, male physicians, those who graduated after 1990, and family medicine physicians were more likely to report accurate knowledge regarding LDCT eligibility. The top perceived barriers to LDCT were cost to the patient (48% identified as a major barrier), insurance not covering screening (46% major), and patients being unaware of lung cancer screening (40% major).

Conclusion: Knowledge and practices about lung cancer screening are improving, though remain suboptimal. The most common barriers remain cost or insurance-based and suggest the need for a systems-based response to increase awareness and reduce the underutilization of LDCT.

Keywords: Barriers; LDCT; Lung cancer; Physician; Screening

Introduction

Lung cancer accounts for 24% of all cancer deaths in the United States, making it the leading cause of cancer death for both men and women.[1] Early detection is crucial, as survival depends on the stage of diagnosis: 59.8% of patients survive 5 years at the localized stage, but only 6.3% survive after metastatic spread.

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Unfortunately, only 18% of lung cancers are diagnosed at a localized stage whereas 56% are diagnosed after cancer has metastasized.[2]

In 2002, the National Lung Screening Trial compared annual low-dose computed tomography (LDCT) versus chest radiograph (CXR) for lung cancer screening; in 2011, they reported a 20% reduction in lung cancer mortality and 6.7% reduction in overall mortality.[3] Bolstered by this and other studies, the U.S. Preventive Services Task Force (USPSTF), in March 2013, issued a grade B recommendation for annual LDCT screening in asymptomatic patients aged 55 to 80 with a 30-pack-year smoking history who currently smoke or have quit within 15 years.[4] By February 2015, the Centers for Medicare and Medicaid Services added LDCT screening to cover preventive services under the Medicare program meeting certain criteria.[5] The USPSTF recommendation was updated in March 2021 and lowered the age threshold to 50 and pack-year exposure to 20.[6]

LDCT is underutilized despite being highly effective. Although LDCT screening has been known to reduce lung cancer mortality for over a decade and recommended for more than six years, utilization remains inappropriately low, with 19.2% of the eligible population receiving LDCT screening in 2018.[7] As a comparison, screening rates for other common cancer screenings are much higher, at roughly 80% for Papanicolaou testing, 70% for mammograms, and 60% for colonoscopies.[3,8–10]

There are several reasons for the lower utilization of LDCT compared with other cancer screening tests. Appreciation of the mortality benefit of LDCT screening by physicians may be low.[11] False-positive results are a concern, as are following up nodules in a health care system that does not facilitate the practice.[12,13] The cost of LDCT screening, especially for patients lacking insurance, is frequently cited as a barrier, as is the processes for insurance authorization being too burdensome.[14] Indeed, 70% of physicians in one survey would recommend LDCT if cost were not an issue.[11]

Because of the physicians' critical role in engaging patients in screening and ordering LDCT, it is important to understand the perceived barriers that are currently preventing primary care physicians from higher LDCT utilization. This study will evaluate the knowledge, beliefs, and barriers to lung cancer screening among a national sample of primary care physicians. In doing so, it will inform policymakers and professional practice societies in improving LDCT utilization.

Material and Methods

This study was part of a repeated cross-sectional survey regarding physicians' knowledge, attitudes, and communication about electronic cigarettes, tobacco use, and treatment.[15] In brief, random samples of 750 board-certified office-based family medicine, internal medicine, obstetrics and gynecology, and pediatric physicians were drawn from the American Medical Association's physician master file, a comprehensive database of both American Medical Association member and nonmember physicians. Survey fielding occurred from April to July 2019 and used the Dillman Tailored Design method[16] with personalized postal invitations that contained an upfront $50 (in U.S. dollars) Starbucks gift card incentive and link to the online survey.[17] The Rutgers Institutional Review Board approved the study procedures. A total of 652 internal and family medicine physicians responded to the survey; the American Association for Public Opinion Research's Response Rate 3, which incorporates an estimate of eligibility among nonresponders,[18] was 59.1% for family medicine and 59.3% for internal medicine.

Family medicine and internal medicine physicians received an additional online supplemental module about cancer screening perceptions and practices. As such, the present analysis includes data from the 599 family medicine and internal medicine physicians who completed the survey online.

Measures

We operationally defined lung cancer screening according to the USPSTF guidelines at the time of the study (2019) as annual LDCT among asymptomatic individuals ages 55 through 80 with a 30-pack-year history of smoking who currently smoke or quit within 15 years.[4] Participants were asked if they had ordered LDCT for lung cancer screening, ordered CXR for lung cancer screening, referred to a lung cancer screening program, or initiated the discussion about the benefits and risks of lung cancer screening. Perceived barriers and concerns regarding LDCT for lung cancer screening were assessed by a three-point Likert scale (not a barrier, minor barrier, and major barrier) for 13 potential barriers identified in previous studies.[12–15] Participants also received several knowledge assessment questions about LDCT screening recommendations including age eligibility, exposure eligibility, and screening interval. Finally, participants were presented with four patient scenarios, which varied by age and smoking history, and asked if they would order LDCT, CXR, or no screening.

Statistical Analyses

Analyses were conducted using Statistical Analysis System software version 9.4 (SAS Institute, Cary, NC). Descriptive statistics were used to characterize the sample overall and to describe screening practices,

Table 1. Participant Characteristics (N = 599)

Characteristic	n	%
Age, y[a]		
Median [IQR]	51 [15.0]	
Gender		
Female	312	54.8
Male	257	45.2
Race/Ethnicity		
White, Non-Hispanic	363	63.7
Black/African American, Non-Hispanic	26	4.6
Hispanic	27	4.7
Asian/Pacific Islander	81	14.2
South Asian	43	7.5
Other	30	5.3
Graduation y[b]		
Median [IQR]	1995 [15.0]	
Specialty		
Family Medicine	343	57.3
Internal Medicine	256	42.7

Frequencies may not total 599 because of item nonresponse.
[a]Imputed for two respondents as median age within the same specialty and graduation year.
[b]Imputed for 17 respondents as the median year within the same specialty and age.
IQR, interquartile range.

knowledge, and perceived barriers by demographic. Frequencies and percentages with 95% confidence intervals (CI) were calculated for categorical items, and mean scores were also calculated for Likert scale items. Bivariate comparisons were tested using chi-square statistics with p values less than .05 considered statistically significant.

Results

The final analytical sample was 599. The mean age was 51 years with most being women (54.8%) and non-Hispanic whites (63.7%) (Table 1). Slightly more family medicine physicians were in the sample compared with internal medicine (57.3% versus 42.7%).

In the year before the survey, about 88% of sampled physicians had initiated discussions regarding lung cancer screening benefits and risks with their patients, 78% ordered LDCT for lung cancer screening, and 42% ordered CXR for lung cancer screening (Table 2). Screening practices were similar across medical specialties. Physicians trained after 1990 were nonsignificantly more likely to have ordered LDCT (80 versus 74%, $p = 0.09$), and ordering CXR was significantly more prevalent among female physicians (47 versus 34%, $p = 0.0009$) (Supplementary Table 1).

Knowledge about LDCT eligibility varied on the basis of specific criteria but ranged between 44% and 87% responding correctly (Table 3). Overall, 44.9% of physicians knew that patients are eligible for LDCT at age 55 to 59 years, whereas 43.6% knew patients are no longer eligible for screening after age 80 years. More than half of the physicians (58.9%) knew the minimum pack-years to qualify was 30 (the survey was conducted before the USPSTF lowered the pack-years criteria) and that the screening interval was annual (58.3%). Most physicians knew second-hand smoke did not qualify for LDCT (78.8%) and that LDCT is recommended for current and former smokers (86.8%). In general, male physicians (65 versus 55% for pack-years, $p = 0.01$; 68 versus 53% for screening interval, $p < 0.0001$), those who graduated after 1990 (70 versus 56% for pack-years, $p = 0.0006$; 71 versus 56% for screening interval, $p = 0.0001$), and family medicine physicians (versus 52% for pack-years, $p = 0.0029$; 90 versus 83% for smoking status, $p = 0.02$; 62 versus 53% for screening interval, $p = 0.03$) were more likely to report accurate knowledge regarding lung cancer screening eligibility. Of note, 80.2% (95% CI, 77.0%–83.5%) of physicians knew that Medicare covers LDCT in asymptomatic, high-risk individuals (data not provided).

Table 2. Prevalence of Providing Lung Cancer Screening Order, Referral, and Discussion in the Past Year, Overall, and By Specialty

	Overall (N = 599)			Family Practice (n = 343)			Internal Medicine (n = 256)			
Behavior	n	%[a]	(95% CI)	n	%	(95% CI)	n	%	(95% CI)	p Value[b]
Initiated discussion re: benefits and risks of lung cancer screening	520	87.8	(85.2-90.5)	301	89.3	(86.0-92.6)	219	85.9	(81.6-90.2)	0.21
Ordered LDCT for lung cancer screening	461	77.9	(74.5-81.2)	261	77.5	(73.0-81.9)	200	78.4	(73.4-83.5)	0.78
Ordered chest x-ray for lung cancer screening	249	42.1	(38.1-46.0)	144	42.7	(37.5-48.0)	105	41.2	(35.1-47.2)	0.70
Referred patient to a lung cancer screening program	218	36.9	(33.0-40.8)	124	36.8	(31.7-41.9)	94	37.0	(31.1-43.0)	0.96

[a]Percentages exclude eight individuals (seven family medicine, one internal medicine) who did not provide a valid response to any of the four items.
[b]Pearson's chi-square test comparing each item by specialty.
LDCT, low-dose computed tomography scan; x-ray, radiograph.

Table 3. Knowledge of Lung Cancer Screening Criteria, Overall, and By Physician Characteristics

		Lower Age Limit[a]			Upper Age Limit[b]			Pack-y Exposure[c]			Second-hand Smoke[d]			Smoking Status[e]			Screening Interval[f]		
Characteristic	N	%	(95% CI)	*p* Value	%	(95% CI)	*p* Value	%	(95% CI)	*p* Value	%	(95% CI)	*p* Value	%	(95% CI)	*p* Value	%	(95% CI)	*p* Value
Overall	599	44.9	(41.1-48.8)	--	43.6	(39.8-47.4)	--	58.6	(54.8-62.4)	—	78.8	(75.7-82.0)	—	86.8	(84.2-89.4)	—	58.3	(54.5-62.1)	—
Gender																			
Female	312	45.4	(40.1-50.6)	0.73	42.2	(36.9-47.4)	0.16	54.7	(49.4-59.9)	0.01	75.6	(71.0-80.1)	0.0005	86.3	(82.7-90.0)	0.1	52.9	(47.6-58.2)	<.0001
Male	257	46.8	(40.9-52.6)		47.8	(42.0-53.7)		64.8	(59.1-70.4)		86.7	(82.7-90.7)		90.7	(87.2-94.1)		68.4	(62.9-73.8)	
Race/Ethnicity																			
NH White	363	48.4	(43.5-53.3)	0.005	43.9	(39.0-48.7)	0.37	57.6	(52.8-62.5)	0.65	80.0	(76.0-83.9)	0.92	87.0	(83.7-90.3)	0.6	60.2	(55.4-65.0)	0.72
NH Black	26	74.1	(57.5-90.6)		33.3	(15.6-51.1)		66.7	(48.9-84.5)		88.9	(77.0-100)		92.6	(82.7-100)		66.7	(78.9-84.5)	
Hispanic	27	35.5	(18.6-52.3)		48.4	(30.8-66.0)		54.8	(37.3-72.4)		80.7	(66.7-94.6)		83.9	(70.9-96.8)		51.6	(34.0-69.2)	
NH Asian/PI	81	38.9	(28.8-49.0)		40.0	(29.9-50.1)		58.9	(48.7-69.1)		78.9	(70.5-87.3)		88.9	(82.4-95.4)		56.7	(46.4-66.9)	
NH South Asian	43	39.1	(25.0-53.2)		56.5	(42.2-70.9)		69.6	(56.3-82.9)		80.4	(69.0-91.9)		93.5	(86.3-100)		65.2	(51.5-79.0)	
NH Other	30	30.0	(13.6-46.4)		50.0	(32.1-67.9)		60.0	(42.5-77.5)		80.0	(65.7-94.3)		93.3	(84.4-100)		53.3	(35.5-71.2)	
Graduation year[g]																			
After 1990	349	50.6	(45.4-55.8)	0.85	50.0	(44.8-55.2)	0.43	70.2	(65.4-75.0)	0.0006	89.2	(86.0-92.5)	0.062	96.0	(94.0-98.1)	0.31	71.3	(66.6-76.0)	0.0001
In or before 1990	216	49.8	(43.2-56.3)		46.6	(40.1-53.2)		56.1	(49.5-62.6)		83.9	(79.0-88.7)		94.2	(91.1-97.3)		55.6	(49.1-62.1)	
Specialty																			
Family Medicine	343	46.5	(41.3-51.6)	0.38	45.1	(40.0-50.2)	0.37	63.7	(58.7-68.6)	0.0029	82.2	(78.3-86.2)	0.02	89.6	(86.5-92.7)	0.02	62.0	(57.1-67.0)	0.03
Internal Medicine	256	43.0	(37.3-48.7)		41.6	(35.9-47.3)		52.1	(46.3-57.9)		74.5	(69.4-79.5)		83.2	(78.9-87.6)		53.5	(47.7-59.3)	

The *p* values correspond to the Pearson chi-square test comparing knowledge items by physician characteristic.
[a]Selected correct lower age limit (55 years).
[b]Selected correct upper age limit (80 years).
[c]Selected correct pack-years of exposure (30 pack-years).
[d]Correctly indicated that LDCT is not recommended for those who never smoked but have a history of second-hand smoke exposure.
[e]Correctly indicated that LDCT is recommended for both current and former smokers who meet pack-year exposure criteria.
[f]Selected correct screening interval (1 year).
[g]Graduation year was imputed for 27 respondents as the median year within the same specialty and age.
CI, confidence interval; NH, non-Hispanic; PI, Pacific Islander.

Table 4. Physician Screening Recommendations for Hypothetical Patient Scenarios

		Low-dose CT			Chest X-ray			No Screening		
Scenario	N	n	%	(95% CI)	n	%	(95% CI)	n	%	(95% CI)
Asymptomatic 60-year-old with 30 pack-y history who quit 5 ys ago	585	502	85.8	(83.0-88.6)	54	9.2	(6.9-11.6)	29	5.0	(3.2-6.7)
Asymptomatic 55-year-old menthol smoker with a 20 pack-y history	583	226	38.8	(34.8-42.7)	73	12.5	(9.8-15.2)	284	48.7	(44.7-52.8)
Asymptomatic 60-year-old with a 30 pack-y history who quit 20 y ago	584	124	21.2	(17.9-24.6)	72	12.3	(9.7-15.0)	388	66.4	(62.6-70.3)
Asymptomatic 83-year-old with a 40 pack-y history who quit 10 y ago	584	151	25.9	(22.3-29.4)	64	11.0	(8.4-13.5)	369	63.2	(59.3-67.1)

CI, confidence interval; CT, computed tomography; x-ray, radiograph.

When presented with a patient scenario about an asymptomatic 60-year-old with a 30-pack-year history of quitting five years ago, 85.8% responded that they would order LDCT (Table 4), which is consistent with lung cancer screening guidelines. Participants were also asked on three scenarios in which the patient was not eligible for screening on the basis of the 2019 criteria. In these scenarios, 38.8% reported they would order an LDCT for a 55-year-old with a 20-pack-year history, 21.2% indicated they would do so for someone who quit more than 20 years ago, and 25.9% indicated they would do so for an 83-year-old. Of note, about 10% of respondents indicated they would order CXR in each of the scenarios. There were differences in responses to some scenarios that would not meet 2019 eligibility criteria by sex, race/ethnicity, graduation year, and medical specialty (Supplementary Table 2). For example, family medicine physicians (24.9% versus 16.4%) and female physicians (24.9% versus 17.2%) were more likely to order LDCT for a 60-year-old patient with 30 pack-year history of smoking who quit 20 years ago (longer than the maximum 15 years indicated by screening guidelines), and physicians who graduated on or before 1990 were more likely to recommend CXR in two of the scenarios.

Nearly half of physicians reported that patients being unable to afford the cost of LDCT and that insurance would not cover lung cancer screening were major barriers to LDCT, at 48.4% and 46.0%, respectively (Table 5). By mean score and percentage, cited as a major barrier, the top three perceived barriers to ordering LDCT were cost to patients (mean 2.32, 48.4% cited as a major barrier), insurance not covering the screening (mean 2.23, 46% cited as a major barrier), and patients being unaware of lung cancer screening (mean 2.19, 39.8% cited as a major barrier). Barrier ratings were generally similar by physician subgroup; however, family medicine physicians rated these top concerns

Table 5. Perceived Barriers or Concerns Regarding Low-Dose CT Screening

		Not a barrier		Minor barrier		Major barrier		Average Score[a]	
Barrier	N	n	%	n	%	n	%	Mean	± SD
Patient cannot afford the cost	587	96	16.4	207	35.3	284	48.4	2.32	0.74
Insurance will not cover lung cancer screening	591	138	23.4	181	30.6	272	46.0	2.23	0.80
Patient is unaware of lung cancer screening	590	120	20.3	235	39.8	235	39.8	2.19	0.75
Risk of discovering benign, incidental findings that will require further monitoring and potential harm to patient	588	174	29.6	309	52.6	105	17.9	1.88	0.68
Patient fear of finding lung cancer	591	193	32.7	341	57.7	57	9.6	1.77	0.61
Time needed to do shared decision-making with patients before LDCT	587	217	37.0	294	50.1	76	13.0	1.76	0.66
Patient concern for radiation exposure	589	246	41.8	293	49.8	50	8.5	1.67	0.63
Lack of lung cancer screening programs in my community	588	313	53.2	160	27.2	115	19.6	1.66	0.78
Need to follow-up on nodules (surveillance)	589	273	46.4	243	41.23	73	12.4	1.66	0.69
Concern about exposing patients to radiation	588	285	48.8	260	44.2	43	7.3	1.59	0.62
Patient does not think lung cancer screening would help	590	327	55.4	228	38.6	35	5.9	1.51	0.61
Lung cancer screening may make smoking seem safer	585	401	68.6	144	24.6	40	6.8	1.38	0.61
There is insufficient evidence to recommend lung cancer screening	588	419	71.3	132	22.5	37	6.3	1.35	0.60

[a]1 correspond to not a barrier; 2 correspond to minor barrier; 3 correspond to major barrier.
LDCT, low-dose computed tomography scan.

more highly than internal medicine physicians (mean scores 2.40 versus 2.22; 2.28 versus 2.16; 2.30 versus 2.05) (Supplementary Table 3). In addition, non-Hispanic white physicians rated "lack of screening programs in my community" lower than nonwhite physicians as a barrier (mean scores 1.56 versus 1.92).

Discussion

These findings represent a national sample of 599 physicians in two major primary care fields, the largest study (to our knowledge) regarding physicians' knowledge, practices, and perceived barriers regarding lung cancer screening. Physicians' knowledge about eligibility criteria was modest, but their decision-making within several clinical scenarios was more encouraging: 86% correctly reported they would order LDCT screening for an eligible patient, with one-half to two-thirds correctly identifying ineligible patients. Most physicians reported discussing risks and benefits with patients and ordering an LDCT in the past year. The most typically cited barriers centered around cost and patient awareness.

Most physicians surveyed participated in lung cancer screening in the previous year by initiating discussions (88%) and ordering LDCT (78%). These results reveal continued improvement in the percentage of physicians who are screening for lung cancer than in previous years. Although not direct comparisons, previous large national studies from 2016 and 2018 found that 52% (N = 250) and 67% (N = 293) of physicians had ordered LDCT in the previous year, respectively.[19,20] Therefore, it seems that knowledge of lung cancer screening and how to order LDCT continues to improve among physicians over time. However, although these results suggest that physicians are aware of and have experience with ordering LDCT screening, only a small proportion of eligible individuals received screening the same year in the United States. There is still work to be done to ensure that a high proportion of eligible patients receive this test. Recent studies have found the benefit of community outreach and health promotion campaigns[21] and provider educational programs.[22]

One concerning finding is the 42% of respondents who ordered a CXR for lung cancer screening purposes. In terms of potential trends, this question is asked infrequently, with one 2013 regional survey noting 21% (N = 212) of physicians ordering a CXR for such purposes in the past year,[23] compared with 43% (N = 250) of providers in a 2016 national survey.[19] More frequently, physicians are asked whether they would recommend CXR in a variety of scenarios, with the percentile dropping into the teens when juxtaposed against LDCT or no screening.[20] We saw similar results in the current study, with 9% to 12% of physicians recommending CXR in our hypothetical clinical scenarios. One potential explanation could be the possibility that medical insurance requires a CXR before more advanced testing is done.[14] Another might be because of the greater availability and ease of testing for CXR versus LDCT.[24]

Regarding physician knowledge on eligibility for LDCT, most providers knew LDCT screening is recommended for current and former smokers but not for second-hand smoke exposure, that screening is annual, and that it takes 30 pack-years to qualify. However, fewer than half knew the ages for starting and stopping screening. Few previous studies asked specifics of lung cancer screening criteria, though one regional survey completed in 2015 found that only 36% (N = 101) knew that LDCT should be performed annually.[11] In contrast, physician knowledge in clinical screening scenarios was generally good. A total of 86% of physicians correctly identified a patient to be screened by USPSTF guidelines, whereas almost two-thirds correctly declined any screening in a patient who quit more than 15 years before (66%) or a patient with less than 30 pack-years of exposure (49%). This compares to similar scenarios from a national survey from 2016 to 2017 (81%, 52%, and 37%, respectively) (N = 286)[20] and a regional survey from 2015 (79%, 52%, and not asked, respectively) (N = 101).[11] However, in the context of recent changes to USPSTF recommendations (expanded age eligibility and reduced pack-year exposure threshold), additional surveillance about physician screening knowledge, perceptions, and practices is warranted.[25]

Despite being many years after the National Lung Screening Trial was conducted, the USPSTF making LDCT a recommended service, and the Centers for Medicare and Medicaid Services (CMS) adding it to their list of covered benefits, LDCT screening utilization remains low, and perceived barriers persist. Regarding perceived barriers, issues of cost to patients (48%) and insurance coverage (46%) are among the top reported major barriers to order LDCT. This is not a new concern. A series of national studies between 2015 and 2017 found that the major barriers to lung cancer screening (50%–72%) included insurance and cost-based concerns.[19,20,26,27]

Although our current study found cost and insurance coverage are less cited as a major barrier than in previous years, the decrease is small. We propose two potential explanations for cost and insurance concerns. The first is the out-of-pocket expenses required by LDCT. A series of interviews (N = 12) with primary care physicians from late 2016 to early 2017 noted the variety of costs associated with screening: not simply the cost of the test itself and costs owing to the findings of LDCT (which include work-up and procedures for nodules),

but also transportation and logistic costs, such as gas and parking, to get to a screening center.[28] Another study noted that cost barriers could be interpreted in different ways (e.g., a copay versus the perception that LDCT is a noncovered procedure).[29] The second explanation is that insurance coverage of LDCT screening is not well known or understood. Roughly 80% of physician respondents in our current study knew that Medicare required coverage for LDCT. Medicaid coverage for LDCT varies considerably by state from no coverage to full coverage without preauthorization. In 21 states, covering 48.5% of the US population, Medicaid plans make LDCT screening available without prior authorization or copay.[30] However, insurance coverage does not guarantee access. Even when LDCT screening is covered, the logistical challenges of obtaining an LDCT, and competing clinical priorities, are reported as contributing factors to its lower utilization.[14,29] Providers need to be made aware, through professional organizations and communication from funders, of the current state of cost and coverage, including the recent expansion of CMS eligibility.

These results should be interpreted in the light of certain limitations. First, although our survey samples were drawn at random from a highly-regarded list of U.S. physicians, our analyses were not weighted to account for nonresponse. As such, our findings may not necessarily be representative of all family medicine and internal medicine physicians in the United States. Second, all data were self-reported and subject to response biases such as social desirability bias; however, this is of less concern for knowledge-based questions (i.e., lung cancer screening criteria), and it is unlikely that misreporting would differ by key physician characteristics such as medical specialty. An additional limitation was that geographic and institutional variability in services offered was not analyzed. Finally, data collection preceded the 2021 revision to USPSTF guidelines. It is possible that physician knowledge about current guidelines is different than what we observed in our study. Continued surveillance of physicians' lung cancer screening knowledge, perceptions, and practices are, therefore, warranted.

In conclusion, lung cancer screening by means of LDCT is finding greater acceptance as a useful screening tool for patients at high risk for developing lung cancer. Primary care physicians' knowledge about and utilization of LDCT screening is improving. However, knowledge about certain eligibility criteria is only moderate and varies by physician demographic and recency of training, and the uptake of screening in eligible populations is far below that of comparable cancers. System-level barriers, such as financial concerns and awareness, still exist and need to be addressed at multiple levels including professional societies, nonprofit organizations, and government agencies, such as the recent adoption of expanded CMS guidelines.

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Supplementary Data

Note: To access the supplementary material accompanying this article, visit the online version of the *JTO Clinical and Research Reports* at www.jtocrr.org/ and at https://doi.org/10.1016/j.jtocrr.2022.100331.

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