

## Original Investigation

# Primary Care Provider-Delivered Smoking Cessation Interventions and Smoking Cessation Among Participants in the National Lung Screening Trial

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**IMPORTANCE** The National Lung Screening Trial (NLST) found a reduction in lung cancer mortality among participants screened with low-dose computed tomography vs chest radiography. In February 2015, Medicare announced its decision to cover annual lung screening for patients with a significant smoking history. These guidelines promote smoking cessation treatment as an adjunct to screening, but the frequency and effectiveness of clinician-delivered smoking cessation interventions delivered after lung screening are unknown.

**OBJECTIVE** To determine the association between the reported clinician-delivered 5As (ask, advise, assess, assist [talk about quitting or recommend stop-smoking medications or recommend counseling], and arrange follow-up) after lung screening and smoking behavior changes.

**DESIGN, SETTING, AND PARTICIPANTS** A matched case-control study (cases were quitters and controls were continued smokers) of 3336 NLST participants who were smokers at enrollment examined participants' rates and patterns of 5A delivery after a lung screen and reported smoking cessation behaviors.

**MAIN OUTCOMES AND MEASURES** Prevalence of the clinician-delivered 5As and associated smoking cessation after lung screening.

**RESULTS** Delivery of the 5As 1 year after screening were as follows: ask, 77.2%; advise, 75.6%; assess, 63.4%; assist, 56.4%; and arrange follow-up, 10.4%. Receipt of ask, advise, and assess was not significantly associated with quitting in multivariate models that adjusted for sociodemographic characteristics, medical history, screening results, nicotine dependence, and motivation to quit. Assist was associated with a 40% increase in the odds of quitting (odds ratio, 1.40; 95% CI, 1.21-1.63), and arrange was associated with a 46% increase in the odds of quitting (odds ratio, 1.46; 95% CI, 1.19-1.79).

**CONCLUSIONS AND RELEVANCE** Assist and arrange follow-up delivered by primary care providers to smokers who were participating in the NLST were associated with increased quitting; less intensive interventions (ask, advise, and assess) were not. However, rates of assist and arrange follow-up were relatively low. Our findings confirm the need for and benefit of clinicians taking more active intervention steps in helping patients who undergo screening to quit smoking.

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Lung cancer is the leading cause of cancer death in the United States, and cigarette smoking is responsible for 87% of lung cancer deaths.<sup>1</sup> There are an estimated 8.6 million adults aged 55 to 75 years in the United States with a smoking history of 30 pack-years or more.<sup>2</sup>

The National Lung Screening Trial (NLST) found a 20% relative reduction in lung cancer mortality for current and former smokers with a smoking history of 30 pack-years or more screened with low-dose computed tomography (LDCT) compared with those screened with chest radiography.<sup>3</sup> In December 2013, the US Preventive Services Task Force (USPSTF) issued recommendations for annual screening for high-risk individuals.<sup>4</sup> These guidelines emphasized the importance of tobacco cessation treatment, specifically, the importance of advising smokers to stop smoking and offering cessation treatment as part of a screening program. The National Comprehensive Cancer Network also recommends smoking cessation counseling as an integral component of LDCT screening,<sup>5</sup> and the American Cancer Society recommends that clinicians initiate discussions about smoking cessation at LDCT screening.<sup>6</sup> In February 2015, Medicare announced its decision to cover annual lung screening for former and current smokers (aged 55-77 years) with a smoking history of at least 30 pack-years.<sup>7</sup>

With these newly released national guidelines and recommendations, lung screening could become widespread among eligible smokers, thus providing a critical opportunity to promote smoking cessation. Prior studies<sup>8-13</sup> have been inconclusive as to whether lung screening itself promotes cessation. A systematic review<sup>14</sup> concluded that there is limited evidence that lung screening itself promotes cessation. In the NLST, 7-day point prevalence quit rates (affirmative responses to the question, "Do you now smoke cigarettes [one or more cigarettes per week]?") reported annually for 5 years after enrollment ranged from 11.6% to 13.4%.<sup>15</sup>

Primary care clinicians are in a strategic position to help their patients quit smoking; the US Public Health Service guidelines recommend that advice to quit and brief counseling be offered at all, or nearly all, office visits to a primary care provider by a smoker.<sup>16</sup> These brief screening interventions by primary care clinicians, the 5As (ask, advise, assess, assist, and arrange follow-up), increase the likelihood of smoking cessation.<sup>16</sup> Studies<sup>17,18</sup> have found that 90% of smokers report that their physician asked about their smoking status. However, despite evidence that 1 in 5 smokers at a primary care appointment are willing to make a serious quit attempt with the help of treatment that incorporates evidence-based counseling and some form of pharmacologic aid,<sup>19</sup> most studies<sup>17,20,21</sup> report that clinician-delivered rates of assist (recommending and/or providing counseling or prescriptions) are low.

The prevalence and potential effect of primary care provider-delivered smoking cessation interventions delivered after lung cancer screening has not yet been assessed. The NLST collected data on nicotine dependence measures, smoking history, and smoking-related disease risks, as well as longitudinal measures of smoking outcomes and primary care provider-delivered interventions. These data provide a unique opportunity to comprehensively examine the association between clinician interventions and subsequent patient smoking

behaviors among trial participants. Thus, the objectives of this study are to examine (1) rates of delivery of the 5As to NLST participants who were smoking at enrollment, (2) the effect of the 5As on smokers' reported quitting behavior, and (3) patient factors associated with smoking cessation after 5A delivery.

## Methods

### NLST and Participants

The NLST was a collaboration of the National Cancer Institute-funded clinical trials cooperative group, the American College of Radiology Imaging Network (ACRIN), now part of the Eastern Cooperative Oncology Group-ACRIN Cancer Research Group, and the National Cancer Institute Early Detection Branch Lung Screening Study. The trial design and study population have been described in detail elsewhere.<sup>22,23</sup> In brief, to be high-risk individuals deemed eligible for the study, patients had to be 55 to 74 years old, have no history of lung cancer, and be a current or former smoker (quit within past 15 years) with a history of at least 30 pack-years. All NLST participants were randomized to LDCT or chest radiography and were offered an initial screen and 2 annual follow-up screens. Radiology results and follow-up recommendations were reported in writing to the participant and the participant's primary care provider within 4 weeks after each screen. This study was approved by the institutional review boards at each of the participating sites and at Brown University. All participants gave informed consent at the site of recruitment.

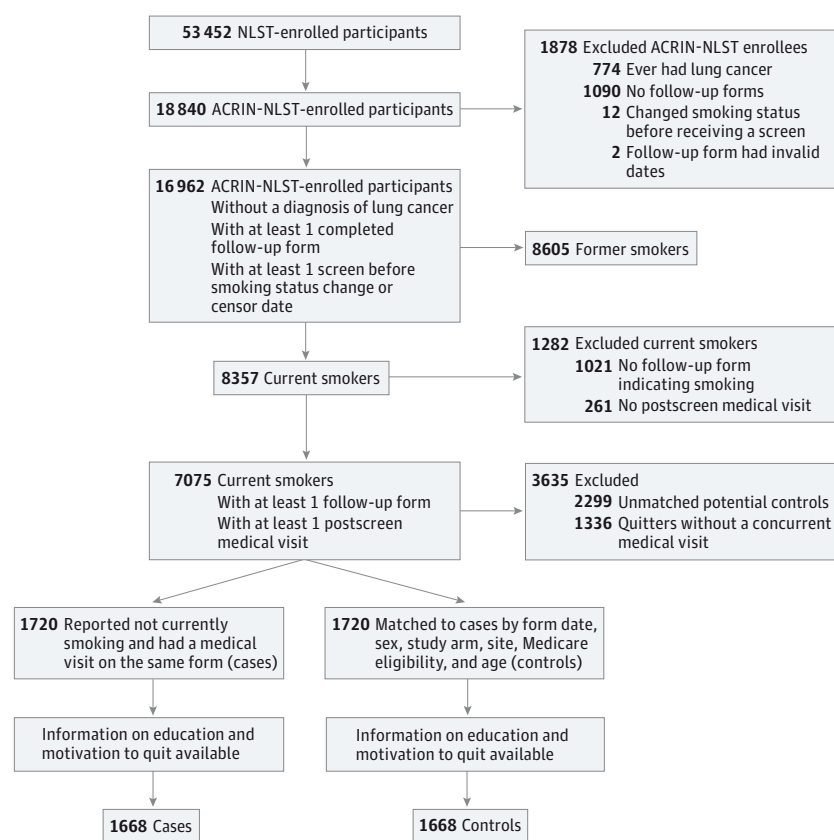
For the current study, we evaluated the prevalence of 5A administration for NLST current smokers by NLST study year; each participant was only included once for each study year. We used a nested case-control design to assess the association between reported delivery of 5As and smoking cessation behaviors. The case-control design accounted for the time-varying nature of 5A administration. We included participants from 23 ACRIN-NLST sites who were current smokers at trial enrollment (August 2002 to April 2004) (responding yes to the question, "Do you smoke now?"). Study selection criteria are displayed in **Figure 1**. The NLST participants who were smoking at trial enrollment were included in the current study if they (1) had a follow-up form reporting that they smoked, (2) had reported a primary care visit during the reference period (initially, this reference period was 12 months but was changed to 6 months to bring it in line with the smoking reference period 2.5 years into the study), and (3) had not developed lung cancer (because this diagnosis could affect quitting behaviors). Participants were censored 5.5 years from study enrollment or trial completion, whichever came first.

### Assessments

#### Baseline Assessment

At trial enrollment, data were collected on sociodemographic characteristics (sex, race, age, educational level, and marital status), positive medical history (participant reported history of emphysema, chronic obstructive pulmonary disease, stroke or heart disease, or a history of cancer), quit motiva-

Figure 1. Consort Diagram



ACRIN indicates American College of Radiology Imaging Network; NLST, National Lung Screening Trial.

tion (1-item, 10-response “scale”; higher score indicates greater motivation),<sup>24</sup> and a 6-item assessment of nicotine dependence (Fagerström Test for Nicotine Dependence [FTND]; score range, 0-10; higher score indicates greater level).<sup>25</sup>

#### Follow-up Assessments

Follow-up questionnaires were scheduled to be administered every 6 months and included questions on (1) smoking behavior (past 6 months), (2) medical visit to primary care provider reported during the reference period, and (3) provider-delivered 5As. Participants were asked, “In the last 6 months, have you smoked any cigarettes?” If they responded yes, then they were asked about point prevalence abstinence: “Do you now smoke cigarettes (one or more cigarettes per week)?” All reported smokers were asked if they had seen a primary care provider during the reference period. Participants who reported any smoking in the last 6 months and had seen a primary care provider during the reference period were queried about the 5As: “Did your primary care provider do any of the following: ask (ask you about smoking), advise (advise you to stop smoking), assess (ask you about your interest in quitting smoking), assist (talk with you about how to quit smoking or recommend using nicotine replacement therapy [patch, gum, inhaler, or spray] and/or Zyban [Wellbutrin, bupropion] to help you quit smoking or recommend counseling [classes, quit line] to help you quit smoking), and arrange follow-up (suggest a

follow-up visit or telephone call about quitting smoking).” Thus, information on the exposure (5As) and the outcome (quitting) was collected on the same form. The exposure information was retrospective, whereas the outcome information referred to current behavior.

#### Case-Control Design and Matching Algorithm

We constructed a case-control study nested within the cohort of ACRIN-NLST participants who were current smokers at trial enrollment (Figure 1). The population was limited to those participants who were still smoking at the time of selection into the study and who indicated that they had a medical visit during the reference period. We selected cases (quitters) based on the first form on which they reported a point prevalence abstinence. Controls reported continued smoking and were matched to cases based on completion of a follow-up form within 30 days of their matched case. Cases and controls were also matched on sex, study arm (LDCT or chest radiography), site, age caliper (5 years), and age ( $\geq 65$  years old). We extended these calipers when needed to match (1) within a 10-year age caliper, (2) within 60 days of follow-up form completion, and (3) without site criteria.

#### Statistical Analysis

All statistical analyses were conducted using the SAS/STAT statistical software package, version 9.2 (SAS Institute Inc). We

Table 1. Participant Characteristics

Characteristic	No. (%) of Patients <sup>a</sup>		Smokers in the ACRIN-NLST (n = 7075)
	Did Not Quit (n = 1668)	Quit (n = 1668)	
Study arm			
LDCT	824 (49.4)	824 (49.4)	3472 (49.1)
Radiography	844 (50.6)	844 (50.6)	3603 (50.9)
Sex			
Male	871 (52.2)	871 (52.2)	3763 (53.2)
Female	797 (47.8)	797 (47.8)	3312 (46.8)
Race			
White	1543 (92.5)	1533 (91.9)	6404 (90.5)
Black	96 (5.8)	110 (6.6)	539 (7.6)
Other	29 (1.7)	25 (1.5)	132 (1.9)
Marital status			
Not married	654 (39.2)	632 (37.9)	2884 (40.8)
Married	1014 (60.8)	1036 (62.1)	4191 (59.2)
Medical history <sup>b</sup>			
Not indicated	1143 (68.5)	1181 (70.8)	4911 (69.4)
Positive	525 (31.5)	487 (29.2)	2164 (30.6)
Screening results <sup>c</sup>			
Negative	1451 (87.0)	1465 (87.8)	...
Positive	217 (13.0)	203 (12.2)	...
Educational level, mean (SD; 95% CI) [range], y	13.8 (2.5; 13.7-13.9) [8-18]	14.1 (2.5; 13.9-14.2) [8-18]	13.9 (2.5; 13.8-13.9) [8-18]
Age, mean (SD; 95% CI) [range], y	61.0 (4.9; 60.8-61.2) [55-74]	61.1 (4.9; 60.9-61.4) [52-74]	60.9 (4.9; 60.8-61.0) [50-74]
FTND score, <sup>d</sup> mean (SD; 95% CI) [range]	5.7 (2.2; 5.6-5.8) [1-10]	5.3 (2.2; 5.2-5.4) [1-10]	5.5 (2.2; 5.4-5.5) [1-10]
Motivation score, <sup>e</sup> mean (SD; 95% CI) [range]	4.9 (1.3; 4.8-4.9) [1-10]	5.3 (1.4; 5.3-5.4) [1-10]	5.0 (1.5; 5.0-5.1) [1-10]

Abbreviations: ACRIN, American College of Radiology Imaging Network; FTND, Fagerström Test of Nicotine Dependence; LDCT, low-dose computed tomography; NLST, National Lung Screening Trial.

<sup>a</sup> Percentages may not total 100 because of missing data.

<sup>b</sup> Positive medical history indicates participant reported a history of emphysema, chronic obstructive pulmonary disease, stroke, heart disease, or cancer.

<sup>c</sup> Screening results for cases (quitters) were taken from the screen that directly preceded that chosen form. Controls were matched to cases by form. Of all the participants in the ACRIN, the positivity rate for TO (baseline screen) was 16.2%, T1 (follow-up screen) was 14.0%, and T2 (follow-up screen) was 9.4%. Negative indicates having no major abnormalities or significant abnormalities suspicious for lung cancer. Positive indicates having a nodule or other abnormality suspicious for lung cancer.

<sup>d</sup> The FTND score range is 0 to 10.

<sup>e</sup> The quit motivation score range is 1 to 10.

compared the study cases (quitters) and controls (continued smokers) to participants enrolled in the ACRIN-NLST trial on sociodemographic characteristics, medical history, nicotine addiction, and screening results. Rates of 5A delivery were computed for each of the 5 years after smokers' initial screen. Descriptive statistics compared cases and controls on each 5A delivery. Conditional logistic regression models examined the effect of each of the 5As and the covariates (race, highest level of education completed, marital status, positive medical history, screening result, quit smoking motivation, and FTND score) on the odds of quitting smoking.

## Results

### Participants

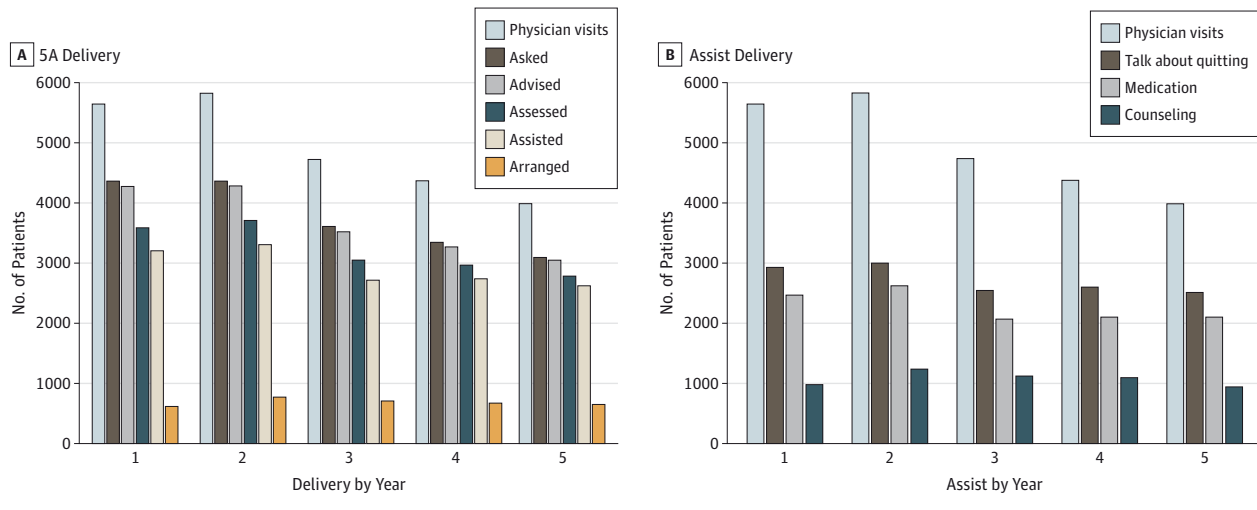
Characteristics of all participants enrolled in the ACRIN-NLST trial (n = 18 840), study cases (quitters; n = 1668), and matched controls (continued smokers; n = 1668) are given in Table 1. Study participants were a mean of 61 years of age, and 90.5% were white. More than half (53.2%) were male and married or living as married (59.2%); 30.6% had a positive medical history (reported history of emphysema, chronic obstructive

pulmonary disease, stroke or heart disease, or a history of cancer). The FTND scores were 5.7 (moderate to high) for the smokers and 5.3 (moderate) for quitters. Half had undergone LDCT, and 13.0% of smokers and 12.2% of quitters had positive screening results (a nodule or other finding that was potentially related to lung cancer) on their most recent screen before the follow-up.

### 5A Delivery

To assess provider-delivered smoking cessation intervention among all smokers enrolled in the ACRIN-NLST during the trial period, 5A delivery rates among all smokers enrolled in the ACRIN-NLST who reported a primary care provider visit during the reference period (N = 7075) are shown in Figure 2. In the first year after participants' initial screens, the 5A rates were as follows: ask, 77.2%; advise, 75.6%; assess, 63.4%; assist, 56.4%; and arrange follow-up, 10.4%. Assist comprised having been talked to about quitting (51.3%), recommended to use stop-smoking medications (43.0%), or recommended to undergo stop-smoking counseling (17.8%). Ask and advise delivery rates remained relatively stable 4 years after the initial screen, but assess, assist, and arrange follow-up increased slightly in the follow-up years.

**Figure 2. Smoking Cessation Interventions for 7075 Smokers (Excluding 9 Patients Who Completed Their Follow-up in Year 5.5) at American College of Radiology Imaging Network-National Lung Screening Trial Sites With a Primary Care Physician Visit in That Study Year During the 5-Year Period After the Initial Screen**



**Table 2. Reported 5A Delivery in Study Quitters and Continued Smokers**

Delivery of Each A	No. (%) of Patients (n = 3336)		Quitters vs Continued Smokers, OR (95% CI)	
	Quitters (n = 1668)	Continued Smokers (n = 1668)	Unadjusted	Adjusted <sup>a</sup>
Ask	1281 (76.8)	1262 (75.7)	1.07 (0.91-1.25)	1.10 (0.93-1.30)
Advise	1232 (73.9)	1237 (74.2)	0.98 (0.84-1.15)	0.99 (0.84-1.17)
Assess	1122 (67.3)	1084 (65.0)	1.11 (0.96-1.28)	1.14 (0.98-1.32)
Assist	1080 (64.8)	961 (57.6)	1.35 (1.18-1.56)	1.40 (1.21-1.63)
Arrange follow-up	291 (17.4)	224 (13.4)	1.37 (1.13-1.67)	1.46 (1.19-1.79)

Abbreviation: OR, odds ratio.

<sup>a</sup> Adjusted for race, educational level, marital status, positive medical history, screening result, baseline Fagerström Test for Nicotine Dependence score, and quit motivation score.

### Effect of 5A Delivery on Quitting Behaviors

Among case-control study participants, unadjusted and adjusted models of associations between 5A delivery and quitting are given in Table 2 (see the eTable in the Supplement for further detail on case and control reports). Delivery of ask (odds ratio [OR], 1.07; 95% CI, 0.91-1.25; adjusted OR, 1.10; 95% CI, 0.93-1.30), advise (OR, 0.98; 95% CI, 0.84-1.15; adjusted OR, 0.99; 95% CI, 0.84-1.17), and assess (OR, 1.11; 95% CI, 0.96-1.28; adjusted OR, 1.14; 95% CI, 0.98-1.32) were not significantly associated with postscreen quitting. However, assist (OR, 1.35; 95% CI, 1.18-1.56; adjusted OR, 1.40; 95% CI, 1.21-1.63) and arrange follow-up (OR, 1.37; 95% CI, 1.13-1.67; adjusted OR, 1.46; 95% CI, 1.19-1.79) were both associated with quitting. In particular, assist significantly increased the odds of quitting smoking by 35%, which increased to 40% in adjusted analyses. Arrange follow-up significantly increased the odds of quitting smoking by 37%, which increased to 46% after controlling for the relevant confounders.

### Factors Associated With Quitting Upon Receipt of the 5As

Factors associated with quitting among case-control study participants upon delivery of the 5As are listed in Table 3. Age, race, marital status, positive medical history, and screening result were not associated with quitting after delivery of the 5As. Higher educational level (ORs, 1.14-1.26 for college degree or

higher vs high school education), lower nicotine dependence (OR, 0.94), and higher quit motivation (OR, 1.28) were significantly associated with quitting after delivery of each of the 5As.

## Discussion

This is the first study, to our knowledge, to examine the delivery and effect of clinician-delivered smoking cessation interventions among participants in the NLST. We assessed the patterns and rates of delivery of each of the 5As (ask, advise, assess, assist, and arrange follow-up) and whether these interventions increased chances of quitting smoking after screening. Our study rates of ask and advise were similar to patient- and primary care provider-reported rates in previous community-based and national studies, which ranged from 51% to 90%<sup>17,18,21,26,27</sup> and 46% to 89%.<sup>17,18,26-30</sup> As has been previously found, rates of assist were lower than rates of being asked. Rates of assess readiness to quit have ranged from 56% to 81%<sup>17,18</sup>; reported rates of being talked to or counseled about smoking have ranged from 15% to 36%,<sup>21,26,29</sup> and rates of medication discussions have ranged from 32% to 67%.<sup>28-30</sup> Despite providers' receipt of documentation detailing patients' screening participation and results, only 1 in 10 smokers reported that their provider arranged follow-up for smoking cessation in the

**Table 3. Factors Associated With Quitting After 5A Delivery**

Comparison	OR (95% CI)				
	Ask	Advise	Assess	Assist	Arrange
Delivery of an A (yes vs no)	1.10 (0.93-1.30)	0.99 (0.84-1.17)	1.14 (0.98-1.32)	1.40 (1.21-1.63)	1.46 (1.19-1.79)
Age	1.03 (0.99-1.06)	1.03 (0.99-1.06)	1.03 (0.99-1.06)	1.03 (0.99-1.06)	1.03 (0.99-1.07)
Race					
Other vs white	0.84 (0.47-1.50)	0.84 (0.47-1.50)	0.84 (0.47-1.50)	0.88 (0.49-1.58)	0.80 (0.45-1.44)
Black vs white	1.16 (0.85-1.57)	1.16 (0.85-1.58)	1.15 (0.85-1.57)	1.18 (0.86-1.60)	1.16 (0.85-1.58)
Married vs not married	1.07 (0.92-1.24)	1.07 (0.92-1.24)	1.07 (0.91-1.24)	1.07 (0.92-1.25)	1.06 (0.91-1.24)
Educational level, y					
10 vs 12	0.95 (0.82-1.10)	0.95 (0.82-1.10)	0.95 (0.82-1.10)	0.95 (0.82-1.10)	0.95 (0.82-1.10)
16 vs 12	1.14 (1.01-1.29)	1.14 (1.01-1.29)	1.14 (1.02-1.29)	1.15 (1.02-1.30)	1.15 (1.02-1.29)
18 vs 12	1.24 (1.00-1.53)	1.23 (1.00-1.52)	1.24 (1.01-1.54)	1.26 (1.02-1.56)	1.25 (1.01-1.54)
Positive history vs history not indicated	0.88 (0.75-1.03)	0.88 (0.75-1.03)	0.87 (0.75-1.02)	0.86 (0.73-1.01)	0.88 (0.75-1.03)
Positive vs negative screening result	0.96 (0.76-1.20)	0.95 (0.76-1.19)	0.96 (0.77-1.21)	0.98 (0.78-1.22)	0.95 (0.75-1.19)
FTND score	0.94 (0.91-0.98)	0.94 (0.91-0.98)	0.94 (0.91-0.98)	0.94 (0.91-0.97)	0.94 (0.91-0.97)
Motivation score	1.28 (1.21-1.35)	1.28 (1.21-1.35)	1.28 (1.21-1.35)	1.28 (1.21-1.35)	1.28 (1.22-1.35)

Abbreviations: FTND, Fagerström Test for Nicotine Dependence; OR, odds ratio.

year after the initial screen; this is similar to previously reported low rates of arranging follow-up (3%-31%).<sup>17,18,26,27</sup>

Ask, advise, and assess did not significantly affect smokers' abstinence rate, but assist and arrange follow-up significantly increased the odds that a participant would report abstinence. This result is similar to findings from Quinn and colleagues,<sup>30</sup> who reported that, among smokers treated at 9 health maintenance organizations, being offered smoking cessation medications and counseling was associated with 12-month abstinence. Our findings are concordant with previous research indicating that the intensity of treatment, in terms of number and length of sessions, is associated with quitting success; more intensive treatments result in greater rates of abstinence.<sup>31</sup> Our findings confirm the need for clinicians to take more active intervention steps in helping patients who undergo screening to quit smoking.

Albeit challenging for busy clinicians and practices to incorporate into care, the potential gains of delivery of the 5As for patient health outcomes, as well as patient satisfaction with care, are enormous. Smokers may experience stigma in the current social context of tobacco denormalization,<sup>32</sup> and a practitioner who does not extend beyond ask, advise, and assess may be perceived as simply evaluative or may even evoke feelings of discomfort or helplessness from a patient. Assist and arrange may have a more positive connotation with patients because the clinicians are aligning themselves with patients and helping them to take action by providing support and links to resources that will help them quit. The effect of provider support, through assist and arrange, could be a collaborative and constructive experience for them. Indeed, Woods and Jaén<sup>33</sup> proposed another step of clinician-delivered 5As, agree, in which a clinician and patient agree to a proposed plan; this

is the type of active, collaborative discussion from which patients undergoing lung screening could likely benefit.

Although drawn from a well-established national data set, this study has limitations. Smoking status was assessed via self-report, although self-report is a reliable means of assessing smoking status among participants undergoing lung screening.<sup>34</sup> Questions about provider-delivered 5As and current smoking status were assessed simultaneously, which could lead to biased recall of the provider-delivered 5As, with those who quit reporting more provider-delivered interventions. In addition, despite guideline recommendations that emphasize delivery of the 5As to all smokers, it is also possible that clinicians refrained from assisting and arranging follow-up with decidedly unmotivated smokers.

Study findings may be limited in generalizability because these data are from patients in the context of a clinical trial and may not reflect provider smoking cessation intervention behaviors or their influence on patients in a real-world clinical setting when patients are referred for lung screening. However, these findings may be similar to the experiences of high-risk smokers, who proactively undergo lung screening based on the USPSTF guideline recommendations. Furthermore, the motivation levels of study participants were similar to motivation levels of smokers in population-based studies.<sup>24,35</sup>

## Conclusions

Our findings indicate that primary care provider assistance to quit smoking (talking about quitting and recommending stop-smoking medication and counseling) and/or arranging follow-up facilitates smoking cessation after lung screening, as

it does for ambulatory care in general. Unfortunately, only approximately half of smokers reported being assisted during postscreening follow-up primary care visits; recommendations are not being regularly made for stop-smoking medications and counseling. If we are to maximize the utility of lung screening for smokers at high risk for lung cancer, clinicians should actively intervene with all their patients who smoke after screening. In addition, providers may use the 2013 USPSTF Grade B recommendation for annual lung screening for

high-risk current and former smokers as an opportunity to discuss a patients' risk profile and to address smoking cessation and reinforce the importance of abstinence. These discussions about lung screening and follow-up visits after screening offer providers a unique opportunity for smoking cessation intervention. In particular, providers should engage with patients with lower levels of education who are more highly addicted to smoking and are most vulnerable to continued smoking after screening.

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**Author Contributions:** Ms DeMello and Ms Sicks had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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**Drafting of the manuscript:** Park, Hyland.

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**Administrative, technical, or material support:** Park, Japuntich, Lennes, Hyland.

**Study supervision:** Park, Gareen, Rigotti.

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## Invited Commentary

## Tobacco Cessation—We Can Do Better

Michael K. Ong, MD, PhD

**Tobacco use** continues to be the leading preventable cause of mortality in the United States, despite a decrease in the overall prevalence of cigarette smoking. In this issue of *JAMA Internal Medicine*, Siegel et al<sup>1</sup> report that cigarette smoking continues to be the attributable cause of death for nearly half of people dying of 12 different cancers and notably 80% of people dying of lung cancer. Recent data also suggest that focusing only on mortality from conditions in which causal relationships have been established underestimates smoking-related mortality because an additional 17% of excess smoking-related mortality is associated with causes not formally established as attributable to smoking.<sup>2</sup>

Fortunately, the increased focus on outcomes and population management owing to the changes caused by health care reform has renewed interest in how to improve tobacco cessation efforts. The article by Park et al<sup>3</sup> in this issue reveals that we have a long distance to go in improving physician-delivered tobacco cessation efforts. Participants of the National Lung Screening Trial, who were randomized to low-dose computed tomography vs chest radiography for lung screening, reported on whether their physicians had delivered the 5 A's of tobacco cessation: asking about use, advising users to quit, assessing readiness to quit, assisting with a quit attempt, and arranging for follow-up.<sup>4</sup> Only active smokers were included, and they were queried 1 year after the screening. Similar to prior work,<sup>8</sup> participants reported relatively high rates of asking about use and advising users to quit, with slightly lower rates of assessing readiness to quit. Unfortunately, also similar to prior work,<sup>5</sup> assistance with a quit attempt was provided only 50% of the time, and there were poor rates of arranging for follow-up. As expected, only assistance

with a quit attempt and arranging for follow-up were associated with cessation at 1 year.

It would not be appropriate to conclude from the study by Park et al that asking about tobacco use, advising tobacco users to quit, or assessing readiness to quit are not important. They are necessary steps to helping tobacco users with their quit attempts and increase the likelihood of a quit attempt.<sup>4</sup> However, these steps by themselves are not sufficient for effective tobacco cessation.

The low rates of assisting and arranging for smoking cessation are particularly distressing because physicians and patients were provided the written results of the lung screening examination. High rates of effective action did not occur despite the teachable-moment opportunity of discussing the results of the lung screening.

Park et al note that their findings are based on patient reports of physician actions, which could underestimate actual physician actions. However, what patients hear and remember is likely more important than what is said. More effective actions by physicians are also needed. Handing out a brochure on smoking cessation, which was routinely done to meet prior Joint Commission requirements for inpatient tobacco cessation counseling, may fulfill physician requirements but alone is not sufficient for significant tobacco cessation.

The new Joint Commission inpatient tobacco treatment measures ([http://www.jointcommission.org/tobacco\\_treatment/](http://www.jointcommission.org/tobacco_treatment/)) and Medicare requirements for paying physicians for tobacco cessation (<https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNMattersArticles/downloads/MM7133.pdf>) are welcome recent developments, but more changes are needed to maximize success on tobacco cessation. The new Joint Commission measures expand the prior measure to include provision