Attitudes and Perceptions About Smoking Cessation in the Context of Lung Cancer Screening

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IMPORTANCE  Broad adoption of lung cancer screening may inadvertently lead to negative population health outcomes if it is perceived as a substitute for smoking cessation.

OBJECTIVE  To understand views on smoking cessation from current smokers in the context of being offered lung cancer screening as a routine service in primary care.

DESIGN, SETTING, AND PARTICIPANTS  As an ancillary study to the launch of a lung cancer screening program at 7 sites in the Veterans Health Administration, 45 in-depth semi-structured qualitative interviews about health beliefs related to smoking and lung cancer screening were administered from May 29 to September 22, 2014, by telephone to 37 current smokers offered lung cancer screening by their primary care physician. Analysis was conducted from June 15, 2014, to March 29, 2015.

MAIN OUTCOMES AND MEASURES  Attitudes and perceptions about the importance of smoking cessation in the context of lung cancer screening.

RESULTS  Lung cancer screening prompted most current smokers to reflect for the first time on what smoking means for their current and future health. However, 17 of 35 (49%) participants described mechanisms whereby screening lowered their motivation for cessation, including the perception that undergoing an imaging test yields the same health benefits as smoking cessation. Other misperceptions include the belief that everyone who participates in screening will benefit; the belief that screening and being able to return for additional screening offers protection from lung cancer; the perception by some individuals that findings from screenings have saved their lives by catching their cancer early when indeterminate findings are identified that can be monitored rather than immediately treated; and a reinforced belief in some individuals that a cancer-free screening test result indicates that they are among the lucky ones who will avoid the harms of smoking.

CONCLUSIONS AND RELEVANCE  In this qualitative, lung cancer screening prompted many current smokers to reflect on their health and may serve as a potential opportunity to engage patients in discussions about smoking cessation. However, several concerning pathways were identified in which screening, when offered as part of routine care and described as having proven efficacy, may negatively influence smoking cessation. Health care professionals should be aware that the opportunity for early detection of lung cancer may be interpreted as a way of avoiding the harms of smoking. To promote cessation, discussions should focus on the emotional response to screening rather than clinical details (eg, nodule size) and address misperceptions about the value of early detection so that screening does not lower motivation to quit smoking.
Health care professionals and health systems are beginning to implement lung cancer screening following the publication of the National Lung Screening Trial (NLST) and recommendations by organizations, including the US Preventive Services Task Force, that patients with a history of heavy smoking be offered annual lung cancer screening with low-dose computed tomographic (LDCT) chest imaging.\textsuperscript{1-4} Guidelines have emphasized, and Medicare requires, carefully counseling patients to ensure that screening is not perceived as a substitute for prevention (smoking cessation).\textsuperscript{5}

Prior reports on smoking cessation rates following lung cancer screening have been mixed.\textsuperscript{6–11} In the ongoing Dutch-Belgian screening trial,\textsuperscript{12} participation in screening was associated with a lower quit rate of 14.5% at 2 years among current smokers, compared with 19.1% (\textit{P < .05}) in the group that did not receive screening. When these rates were adjusted for the lower follow-up response rate by the control group, the difference was no longer significant (\textit{P = .35}).\textsuperscript{6} The NLST\textsuperscript{8} reported that participation in LDCT screening had little effect on cessation, with the quit rate at 3 years of 23.8% in those undergoing LDCT screening and 23.2% in those undergoing chest radiography (\textit{P = .38}). Little is known about how patients will respond to lung cancer screening as it moves from being offered as an exploratory intervention in the context of a clinical trial to a service with proven efficacy offered as part of routine care. Enthusiasm for cancer screening is widespread in the United States; more than 90% of adults believe cancer screening is almost always a good idea.\textsuperscript{13} The large National Survey of Medical Decisions (DECISIONS study)\textsuperscript{4} of breast, colorectal, and prostate cancer screening observed that patients substantially overestimate the benefit of cancer screening and have misperceptions about how much screening will reduce their chances of being harmed by cancer. Discussions about the risks and benefits of other cancer screening tests have proved to be challenging, with many patients not fully understanding the limitations of screening.\textsuperscript{13} Distortions of logic, specious rationalizations, and cognitive dissonance related to health outcomes and tobacco use are common among smokers, especially heavily addicted,\textsuperscript{16} long-term smokers who are the target group for screening.\textsuperscript{17,18}

The Veterans Health Administration (VHA) Lung Cancer Screening Clinical Demonstration Project is one of the first efforts to implement screening in routine practice using a system-wide clinical reminder, similar to prompts for breast and colorectal cancer screening.\textsuperscript{19} Details about the Demonstration Project, including the educational materials developed for this effort, are available from the VHA National Center for Health Promotion and Disease Prevention.\textsuperscript{20} The objective of our interview study was to learn from patients who were offered screening how the availability of screening influenced their motivations regarding smoking cessation.

### Methods

#### Study Context and Recruitment

Patients in this study were participating in the VHA’s Lung Cancer Screening Clinical Demonstration Project,\textsuperscript{20} which is a pilot study implementing a primary care–based clinical reminder in a sample of the VHA’s 151 medical centers. The lung cancer screening project is being implemented with the objective of identifying the processes and resources needed for broad dissemination of a lung cancer screening program across the VHA. For this study, from May 29 to September 22, 2014, we approached potential participants within a few days of being offered screening using the VHA’s medical record system.\textsuperscript{20} Our goal was to conduct 2 interviews: 1 shortly after being offered screening and a second interview after the participant had received the results of the screening test, although owing to how quickly participants underwent their screening tests, most were interviewed only once, after they had received their results. Potential participants were identified consecutively at 7 sites, oversampling women and nonwhite individuals. Up to 30 invitations were sent per week. Participants were offered a $50 cash incentive for participation in each interview. Analysis was conducted from June 15, 2014, to March 29, 2015. All study procedures were reviewed and approved by the VA Puget Sound Health Care System Institutional Review Board and the University of Washington Institutional Review Board. All participants returned signed written informed consent forms by mail before the interviews were conducted.

#### Data Collection

In-depth semi-structured telephone interviews were used to explore veterans’ experiences with being offered lung cancer screening and receiving the results of the tests. The interview guides were developed to elicit attitudes and beliefs toward smoking and discussions with health care professionals regarding smoking and screening findings. Interviews were

### Table. Characteristics of Patients Who Participated in Study Interviews

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (range), y</td>
<td>62 (55–72)</td>
</tr>
<tr>
<td>Sex</td>
<td>Male 33 (89) Female 4 (11)</td>
</tr>
<tr>
<td>Race</td>
<td>White 23 (62) Black or Pacific Islander 10 (27) Missing/declined 4 (11)</td>
</tr>
<tr>
<td>Participants from a zip code area where ≥29.4% of population has attained a bachelor’s degree</td>
<td>14 (38)</td>
</tr>
<tr>
<td>Pack-year history, mean (range), pack-years</td>
<td>49 (18-135)</td>
</tr>
<tr>
<td>Fagerström scores, mean (range)</td>
<td>4.75 (0-10)</td>
</tr>
<tr>
<td>Nodule findings (&lt;1 cm)</td>
<td>9 of 30 (30)</td>
</tr>
<tr>
<td>Nonpulmonary incidental findings noted</td>
<td>12 of 30 (40)</td>
</tr>
</tbody>
</table>

*Data are presented as number (percentage) of patients unless otherwise indicated.

\textsuperscript{7} A total of 29.4% of the adult US population has attained a bachelor’s degree or higher.\textsuperscript{27} Fourteen participants in our study resided in a residential area where 29.4% or more of the population achieved this level of educational attainment. The other 23 participants resided in areas with lower-than-average educational attainment.

\textsuperscript{8} Fagerström scores are a measure of nicotine dependence, with 0 indicating low dependence and 9 and 10 very high dependence.\textsuperscript{26}
Results

Participation
Forty-five interviews were conducted with 37 patients. We approached 186 patients who were offered screening, for an overall participation rate of 19.9%. There were no significant differences in characteristics of veterans who participated in interviews vs those who declined in terms of pack-year smoking (P = .93), average age (P = .22), and educational attainment (P = .72) (Table).

Eight patients were interviewed twice, first after being offered screening but before undergoing it, and again after they had been notified of their results. Twenty-two patients were interviewed once after undergoing screening and being notified of their results. Seven patients were interviewed once after being offered screening but had not been screened at the time of the interview, with 4 of these patients declining screening within the study period. Three participants self-reported during their interview that they had quit smoking for at least 30 days since they were first offered screening.

Main Findings
We identified 3 major themes related to how lung cancer screening may influence attitudes and motivations around smoking cessation (Box 1): screening universally stimulated multiple complex emotions in the participants about smoking; screening is perceived as an external agent of change in contrast to the internal challenge of cessation; and screening reinforced the perception for some smokers that lung cancer is their main concern and dissociated smoking from other cardiovascular and coronary disease risks. In addition to these main themes, we identified 5 groups of misperceptions reported by patients offered lung cancer screening.

Screening and Self-reflection About Smoking
The interviews started by asking participants about the discussion they had with their health care professional in regard to lung cancer screening, and almost all participants began by describing their long history of smoking and failed attempts to quit. Participants described the offer of lung cancer screening as stimulating a period of self-reflection. Most participants described the availability of screening very positively; however, some participants described being anxious for many days thinking about smoking and lung cancer during the entire screening process, from the time of being offered the test, scheduling it, and waiting for the results.

The emotional arousal induced by screening was strongly influential to some participants. Notably, 3 participants reported having quit smoking for at least 30 days because of screening. One participant indicated that he quit after being offered screening because the conversation caused him to think differently about his health and smoking. One participant who reported quitting described how suspicious findings provided motivation for quitting: “I feel I am not going to smoke any more especially now, knowing they [2 nodules] will grow.” Other participants described being motivated to consider quitting by results of their tests, although most ultimately commented that now was not a good time to try quitting, said they could wait to see if the findings on their LDCT scan progressed, or provided other reasons why they were not likely to take immediate action to quit.

Screening Perceived as an External Agent
Nearly all participants provided unsolicited descriptions early in the interviews of prior experiences trying to quit smoking. The exasperated and hopeless tone about quitting contrasted strongly with the language used to describe the ease and effortless nature of screening. These participants described relief at being able to do something good for their health that their physician recommended. They described lung cancer screening as much simpler than other cancer screening tests. One participant described the test as “no fuss, no muss.” Although no participants directly stated that they saw screening as a substitute for cessation, most were extremely enthusiastic about how simple the screening process was while earlier in the interview they had spent a significant amount of time recounting the futility of trying to quit smoking.

Reinforced Cognitive Biases About Risk of Lung Cancer
Participants were asked during the interviews to think generally about their future health and what screening or their screening results (if available) meant for their future health. Most participants focused on talking about their future risk of lung cancer, with only 2 of 37 participants mentioning any other diseases attributed to smoking. This focus stood out, as many participants discussed their existing health problems, including chronic obstructive pulmonary disease, peripheral artery disease, prior myocardial infarction, or other conditions, for which smoking was a risk factor. There was little concern about...
Box 1. Potential Pathways in Which Lung Cancer Screening May Influence Motivation Around Smoking Cessation

**Emotional arousal**

“I hadn’t quit smoking when I took the test...got me thinking about lung cancer. As many years as I have been smoking, I could get cancer or have cancer and not know it right this minute. It kind of scared me a little bit so I figured I would like to go ahead and have the screening done so I know.” (Participant self-reported to have quit smoking for 4 weeks with the aid of lozenges.)

“When I hadn’t taken the test, I never gave much thought about having cancer or anything else. When I did take the test I looked back, you know my dad was 84 when he passed away from cancer, my mother was 59 when she passed away and I got to thinking...”

“My doctor called me on my cell 2 days later and told me I have 2 nodules on lungs and I need to go back to be checked again in 3 months. She said I should stop smoking right now if smoking so that my nodules won’t grow...I feel I am not going to smoke any more especially now, knowing they will grow. My wife encouraged me to stop smoking when I told her about the results. She was very patient. She helped me to understand my smoking was hurting myself and her. She told me she wanted me to be around for the grandkids.” (Participant self-reported to have quit smoking for 4 weeks.)

“If I do find out that there is something coming down the line because of my smoking, maybe it will encourage me to change my habits.”

“I think [knowing the results] is going to make it easier [to quit], knowing that I have something wrong going on is going to give me more incentive to want to quit. It is a lot different than someone saying this might happen to you and then it actually is happening to you.”

[When probed about setting a quit date]: “Just my own [quit] date a few months down the road. I have got my daughter’s wedding coming up and irons in the fire. I just know I am not going to be relaxed enough to want to quit.”

“Fortunately, mine came out negative, not to say that it’s going to stay negative, but for right now I’m a whole lot more comfortable with life since I’ve taken the test. I assume to think that it’s given me a whole new perspective on life, I’ve got the chance to do what’s right, which number one would be to quit smoking. I think I got two to start exercising a little bit more and try to be a little bit more healthy about what I eat and how I take care of myself daily. I definitely think the cancer screening was a good thing. It is an emotional thing that I need to quit smoking, but then I always fall back on its going to be one of the hardest things I’ve ever had to do in my life.”

“I’ve seen it too many times…and my mom went through radiation and my uncles and chemo and everything like that I don’t know if it would be worth it because I saw them suffer so much and maybe you are better off not to know. Honestly that is the way I really feel about it.”

“Making me smoke more cigarettes for one because I am worried about it.”

**Screening provides an external agent in contrast to internal locus of control**

“But it is nice to know that no fuss no muss I can have these tests done.”

“Two nodules on lungs and I am going to go back to be checked again in 3 months...Thought a lot about it after the test. It [quitting] must be done—time to do it....”

[When probed about taking action]: “I’m happy the nodules were small, if they are large in 3 months, I will have to act.”

“You want to see if that thing is growing in case it is really cancerous but like most or some people I guess you made it this far smoking, you ain’t going to quit just to quit.”

“So it’s easy to me to just have it, because it helps you, it educates you and it’s no pain, no discomfort, no nothing. It’s a simple procedure that takes a few minutes.”

“Basically my doctor has been badgering me for years to quit smoking. He heard of your lung screening test and basically thought I could benefit from being screened since I met your criteria. Since I’d like him to stop his badgering of me, I did what he said. I know he is badgering me for my own good.”

**Emphasizes cancer as the main harm of smoking: de-emphasizes association between smoking and other smoking-related diseases**

“It was kind of a relief knowing that it was okay. I do have to go back in because they found something with blood vessels that they want to check out further but there were no signs of cancer so that was lovely.”

“I don’t think it [quitting] makes any difference one way or the other especially since it is negative right now. I think it is an issue of the arteries and rest of my body we need to tackle right now. One of my bypass arteries has a possibility of going bad already and an aneurysm doesn’t give you much time when it does happen.”

Misperceptions About Screening and Smoking
We identified 5 groups of themes that emerged related to how patients described misperceptions about lung cancer screening and their smoking behaviors (Box 2).

Protection Offered by Screening
Many study participants expressed that offering screening was a highly valuable service because everyone who undergoes screening will receive a benefit from it. Although patients were provided with education about the limited absolute benefit of screening, nearly all participants mentioned the belief that everyone who is screened will benefit in some way. Several patients used future-looking phrases to describe how they felt protected from lung cancer just knowing that a screening program is available.

Lung Damage Shown by Screening
We identified a similar theme focusing on beliefs about the individual benefit current smokers described receiving from screening. Many participants wanted to undergo screening to see “how much damage” they had done to their lungs, a theme that arose both in interviews prior to knowing the LDCT results as well as interviews after results were known. When probed about quitting smoking, participants indicated that they how continuing to smoke would affect existing or future conditions. In probes on this topic, most participants were only concerned about how smoking contributed to lung cancer.
Box 2. Misperceptions and Illogical Rationalizations About Screening Reported by Current Smokers Offered Lung Cancer Screening

Screening offers protection for everyone who gets screened
“If every veteran associated with veterans medical, if everyone in the database in continental US or world could be sent a form letter about this lung cancer screening, available free of charge, and would they like to go through the test—I think almost everyone would do it just for the medical benefits alone.”

“Basically did it so that if I have an issue they might spot it before it gets out of hand.”

“They’re just giving you the option to see what’s going on and the option to possibly stop what’s going on.”

Screening can tell how much damage has been caused individually by smoking
“What I like best is that I figured I was going to know where I was standing with my...what damage I had done to my lungs.”

“In our discussion I think we spoke that given that I am a smoker the screening would be a benefit right now because at least I would know at what stage...how the smoking...the screening will indicate where I am at right now in terms of if any signs of cancer are beginning to develop.”

“Because it came back negative it is a positive part of your body that 45-50 years of this hasn’t contaminated it.”

“It is more of a relaxing thing that there is a part of my body that I know is working and looks like it is continuing working fine for the rest of this year at least.”

“Being able to go through this thing and finding out no huge abnormalities or problems going on with my x-ray [sic]. It’s a huge relief...don’t have to worry about your lungs giving out in the next couple years.”

“I thought it would be beneficial, prescan for cancer. If I was at risk and if I did have something, an excellent way to bring it out.”

Identification and monitoring of a lung nodule is evidence that cancer can be caught early
“What else I can say—yes knowing it is a little gray matter—why not let’s check it out in 6 months.”

“Like they told me, just because you have the test doesn’t mean you have anything, but the test will light up if you do have anything, and it did.”

“They told me they would see me next year at the earliest, because I believe that’s when your thing [screening] is once a year, right, to follow the progress. I am just glad I found out what I got before it gets too bad that they can’t do anything about it...I didn’t really like it but glad I did find out at an early stage that I have cancer [sic].”

“People just keep an eye on it and we’ll do a test in a year to see if it’s moved around or whatever...”

“They found a very small 5 cm or mm, a small little gray mass. I wouldn’t worry much about it but let’s schedule another one in about 6 months...They will tell me when and watch the growth.”

“Nurse called me and told me that it could be cancer but most likely isn’t because it’s only 5 mm and if it is growing at 9 mm or bigger then we have worry...They recommend I do it again in a year, which I have no problem with.”

Screening reduces likelihood of needing cancer treatment
“It is all so new and I am told I don’t have to worry about going to go in for chemo next week.”

“If it stops the cancer, stops it early in people, that is what it is all about.”

Verification of belief that smoking doesn’t harm everyone and isn’t going to harm me personally
“People have been smoking for centuries and a lot of people over 100 have been smoking for over 50 years and they haven’t had any problems...Maybe I am saying that for myself...Being able to go through this thing and finding out no huge abnormalities or problems going on with my x-ray [sic]. It’s a huge relief.”

“I guess she [nurse] kind of tried to [explain the screening results] because she told me that there was a spot but don’t be nervous that it’s cancer because it could be many other things and then she named 3 or 4 other things it could be...an old scar or an infection or something. Did it end up upsetting me? No; if that’s what you’re getting at....If I find out I’ve got cancer, I don’t think there’s any real need to go ahead and stop smoking right now; if I’ve got it, I’ve got it. I never really gave any thought [to risks of smoking] because like I said I’m 70 years old and my mother died at 83 and she smoked all her life and my grandparents all smoked; all of them died old, no cancer.”

“Once they told me they found a little gray matter, you know as a smoker that you are very susceptible and that one day it is going to catch up to you, but like most smokers it’s not going to be me.”

“Well I have been a smoker for years plus I have been working on trucks my whole working career and I’ve been smoking for years and years, which from what I hear is not good. Back 40 years ago the trucks smoked really bad, and I have been breathing stuff my whole life almost. Anyway obviously didn’t cause me too many problems plus smoking on top of it. Anyway it was good to know I didn’t have that issue, yet anyway.”

Knew they needed to quit smoking, but often the interviewees would change the topic, focusing on the value of “catching [cancer] early.” Several participants brought up the idea that screening would provide a more precise estimate of their individual risk of developing cancer.

Identification of Nodules Seen as Early Detection of Cancer
One unexpected theme that emerged from the interviews was the frequently expressed belief that detection of a nodule meant that screening was working for the participant. Rather than being alarmed by identification of a nodule or suspicious findings requiring monitoring with future imaging, 28,29 several participants expressed the belief that identification of the nodule meant their cancer had been found so early that it was currently harmless, and that monitoring would tell them when they needed to start treating it. Several participants indicated that they were expecting bad news; so when they were told the findings were not urgent and did not require immediate action, they expressed relief. In interviews conducted after patients had received the results of their scan, some participants reported feeling they should be more motivated to quit. However, when asked in more depth to describe those feelings, several patients described a lack of urgency for quitting linked with plans to follow their findings with additional imaging.
Reduced Likelihood of Needing Cancer Treatment
A minor theme that was mentioned by a few participants was the belief that screening could help them avoid devastating chemotherapy and other treatments experienced by relatives who received a diagnosis of cancer. These participants described beliefs that screening by itself could cure cancer if the cancer was found early enough. Descriptions of family members going through cancer treatment were very detailed, with several participants expressing interest in screening to avoid needing similar treatment.

Belief of Lack of Personal Harm From Smoking
Several participants voluntarily relayed stories about relatives or individuals they knew who smoked heavily all their lives and lived to be very old or died of something other than lung cancer. These stories were often prompted by probes about why they were interested in screening or what they thought their screening results meant for their health. Although participants did not explicitly state that their cancer-free results were proof that they were among these lucky individuals, this theme was tightly woven into their narratives about what the screening results meant to them. Interestingly, even participants who were identified with nodule findings described feeling that their smoking had not yet harmed them because they were not told they have a cancer diagnosis.

Discussion
These interviews summarize some of the first experiences of current smokers’ reactions to lung cancer screening as part of routine care. They also highlight several important points that health care professionals and health systems should consider in the efforts to broadly implement lung cancer screening. The topic of lung cancer triggers many emotions among current smokers, and nearly every participant described misperceptions about smoking that were exacerbated by screening. The finding that 3 of 37 participants reported they had quit smoking for at least 30 days is encouraging, suggesting that screening can lead to a change in behavior.

Our finding that current smokers attach exaggerated personal benefits to lung cancer screening results has not been noted, to our knowledge, in studies among screening trial participants. Park and colleagues conducted qualitative interviews with current smokers from the NLST, highlighting a lack of emotional effect of screening results, and did not report that screening appeared to instill trial participants with a feeling of protection from the harms of smoking. An important difference is that Park and colleagues interviewed participants 1 year or more after undergoing screening; thus, recall bias may be one reason for the difference in the emotional reactions they observed compared with reactions seen in our participants. In addition, participants in the NLST were more educated, voluntarily enrolled in a trial, and their expectations may be different compared with those of patients offered a service by their primary care physician that now has demonstrated efficacy.

Our results highlight evidence from other areas of risk communication that find patients are highly affective in how they process medical risk information, with behaviors driven more by emotions than by factual information. How best to use screening to motivate smokers to quit rather than perpetuating and increasing misperceptions about smoking is not known. We recommend that health care professionals de-emphasize clinical aspects of screening results (eg, nodule size) and focus on emotional reactions smokers have to undergoing screening. Rather than confront such cognitive biases directly, which is likely to be ineffective or even strengthen such biases, we propose that health care professionals use the opportunity of screening to engage smokers who are reluctant to quit in a broader discussion around personal risks of smoking (including, but not limited to, lung cancer), benefits of quitting, and barriers to cessation. It is not surprising that current smokers hold misperceptions about their susceptibility to the harms of tobacco. However, we must acknowledge that these beliefs can be reinforced and potentially exacerbated by screening. Our finding that cancer-free screening test results were consistently perceived by current smokers as support for the belief they have avoided the harms of smoking may indicate that it will be challenging to dissuade patients of such misperceptions.

The lack of concern when a nodule or other abnormal finding was detected by screening contrasts with reports from patients with incidental nodules detected on diagnostic imaging, where patients have reported being surprised and distressed. This response may be owing to patients entering into the screening process looking for (and sometimes even expecting) abnormalities, and are relieved that they are not told they have cancer. Expectations are clearly important and have implications for using screening results as a teachable moment for cessation counseling.

This study has both strengths and limitations. The qualitative nature of the study provides rich descriptions of study participants and their potential motivations regarding cessation but does not allow us to quantify how screening will affect quit rates or generalize to broad populations. Our participation rate was 19.9%, which is appropriate for a qualitative study; however, those who participated may have been more positive toward screening. Although we did not observe differences between participants and those who declined in demographic variables and other factors including pack-years, there may be differences in other factors such as trust in health care professionals. Study themes were present across all demographic groups; however, despite purposive sampling of women and nonwhite patients, these groups remained underrepresented, precluding subgroup analyses. The number of participants identified with abnormal screening results in our sample (18 of 30 [60%]) was higher than in the NLST, which only reported positive nodule findings. Community studies have reported that between 16% and 73% of patients will have some type of abnormal finding on initial screening LDCTs.

Conclusions
Offering lung cancer screening to current smokers triggers many strong emotions. Health care professionals should be aware that many patients will overestimate the value of screen-
Lung Cancer Screening in Smokers and the Motivation to Quit Smoking

...and that patients will work to interpret the findings in a way that reinforces cognitive biases about their smoking behavior. We need to develop messages to address misperceptions, especially because many long-term smokers are undergoing screening looking for evidence that smoking has not harmed them or are hoping screening will protect them from future cancer risks. We should also carefully monitor smoking cessation rates as screening is implemented, because these cognitive biases may not be able to be eliminated and lower cessation rates may be an unavoidable harm of screening.

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LESS IS MORE

The Psychological Effects of Lung Cancer Screening on Heavy Smokers
Another Reason for Concern

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In August 2011, the National Lung Screening Trial (NLST) investigators published their results: screening with low-dose computed tomography (LDCT) reduces mortality from lung cancer among heavy smokers.1 For some, these results were evidence enough to begin LDCT screening programs. Others2 more closely examined the total evidence about the value of lung cancer screening, that is, the extent to which the benefits justify the harms and costs.3

One of the important analyses in this effort used NLST data to assess cost-effectiveness.4 This analysis found that screening heavy smokers has an incremental cost-effectiveness ratio (ICER) of $81,000 per quality-adjusted life-year (QALY), with a wide 95% CI ($52,000-$186,000) and marked variation among subgroups. For example, a subgroup analysis showed that the ICER for people with a history of heavy smoking (at least 30 pack-years) who were currently smoking was $43,000 per QALY; for those who had previously stopped smoking, the ICER was $615,000 per QALY. This analysis involved 2 critical assumptions about the psychological effects of screening on heavy smokers: that the cascade of screening leads to few psychological harms and that screening has no effect on smoking behavior. The qualitative study by Zeliadt et al5 in this issue of JAMA Internal Medicine should prompt us to revisit these 2 assumptions.

Although many acknowledge the potential psychological effects of lung cancer screening,6 we have little useful evidence to help determine the frequency and burden of the potential psychological harms of lung cancer screening. The critical question that needs to be answered is what are the short- and longer-term psychological effects of offering LDCT screening as a proven program to heavy smokers, compared with not offering screening? Studies that compare screened vs nonscreened groups within randomized clinical trials do not address this question because participation in the trial itself has psychological effects and participants usually differ from community nonparticipants in important ways. Studies that compare false-positive with negative screening results do not help us answer the critical question. Studies that do not use sensitive condition-specific measurement instruments are unlikely to detect the types of psychological effects that may result from screening.

This issue is where the qualitative analysis by Zeliadt et al5 is helpful. The investigators use a more sensitive qualitative approach to gain a richer understanding of the association between screening and heavy smokers’ sense of their health. It


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