Lung Cancer Screening Eligibility, Risk Perceptions, and Clinician Delivery of Tobacco Cessation Among Patients With Schizophrenia

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Objective: Individuals with schizophrenia experience increased lung cancer mortality and decreased access to cancer screening and tobacco cessation treatment. To promote screening among individuals with schizophrenia, it is necessary to investigate the proportion who meet screening criteria and examine smoking behaviors, cancer risk perception, and receipt of tobacco cessation interventions from psychiatry and primary care.

Methods: The authors performed a cross-sectional survey and medical record review with 112 adults with schizophrenia treated with clozapine in a community mental health clinic (CMHC).

Results: Among older participants (ages 55–77 years) with schizophrenia, 34% met the criteria for lung screening on the basis of smoking history (heavy current or former smokers), and more than half believed they had a low risk of developing lung cancer. Of all participants, 88% had

visited their primary care provider (PCP) in the past year; PCPs represented 35 different practices. Only one in three current smokers reported that their PCP or psychiatrist assisted them in obtaining medications for tobacco cessation.

Conclusions: Given smoking history, many older adults with schizophrenia have potential to benefit from lung screening, yet most older participants underestimated their lung cancer risk. Although participants regularly accessed care, PCP and psychiatric visits may be missed opportunities to engage patients with schizophrenia in tobacco cessation and decrease preventable premature mortality. Embedding interventions in a CMHC, a centralized access point of care delivery for patients with schizophrenia, may have unique potential to increase uptake of cancer screening and tobacco cessation interventions.

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Adults with schizophrenia are dying 15–25 years earlier than the general population (1–3). This mortality gap is widening (2, 4, 5), and more than two-thirds of the excess deaths are due to smoking-related diseases such as lung cancer (6). Specifically, adults with schizophrenia are more than twice as likely to die from lung cancer than adults in the general population, in part because of delays in cancer diagnosis and inequities in cancer treatment (2, 7, 8). To improve lung cancer outcomes, adults with schizophrenia need to be engaged in tobacco cessation treatment and engaged in interventions designed to promote early cancer detection.

The National Lung Screening Trial (9) demonstrated that lung cancer screening with low-dose computed tomography decreased lung cancer mortality by 21% among high-risk eligible patients when combined with tobacco cessation. The U.S. Preventive Services Task Force (10) subsequently recommended annual screening, and the Centers for Medicare and Medicaid Services (CMS; 11) authorized screening counseling and shared decision making for eligible

HIGHLIGHTS

- Among older participants (ages 55–77 years) with schizophrenia, 34% met criteria for lung cancer screening on the basis of smoking history (heavy current or former smokers).
- More than half of current and former smokers believed they had a low risk of developing lung cancer.
- Among all current smokers, only one in three reported that their primary care provider (PCP) or psychiatrist assisted with their obtaining medications for tobacco cessation.
- Although participants regularly accessed care, PCP and psychiatric visits may be missed opportunities to engage patients with schizophrenia in tobacco cessation treatment and decrease preventable premature mortality.

beneficiaries. However, despite these recommendations, lung cancer screening rates in 2015 remained lower than 4%, with rates among vulnerable patients likely considerably lower (12).

Although the prevalence of smoking in the United States has decreased from 42% to 19% since the 1960s, 60%–80% of adults with schizophrenia currently smoke (13). This population smokes more cigarettes and inhales more deeply, both of which are factors associated with increased risk of lung cancer (14). Moreover, despite clinical practice guidelines recommending the 5As framework (Ask, Advise, Assess, Assist, and Arrange Follow-Up) for tobacco cessation for all patients (15), many mental health professionals are reluctant to address smoking and provide cessation treatment (16). However, adults with schizophrenia can quit safely, particularly with bupropion or varenicline, and especially in conjunction with cessation counseling (17, 18).

Targeted approaches are needed to decrease disparities in lung cancer risk and detection among individuals with schizophrenia. Mental health clinicians may be uniquely suited to address tobacco cessation and educate patients about cancer risk, given established relationships and frequent communication (19). Although primary care providers (PCPs) are more likely than psychiatrists to report participation in patients' tobacco cessation (20), clinician differences in delivery of tobacco cessation to adults with serious mental illness remains unstudied. In addition, although data are lacking regarding rates of lung cancer screening for patients with schizophrenia, we expect lower rates given disparities in rates of breast (6%-20% lower) and colorectal (>20% lower) cancer screening compared with patients without schizophrenia (21, 22). Thus, in this study we aimed to establish the prevalence of older adults with schizophrenia who meet eligibility criteria for lung cancer screening, investigate patient lung cancer risk perceptions, and examine patient-reported PCP access and clinician delivery of smoking cessation interventions.

METHODS

Study Population and Design

In 2014, we conducted a cross-sectional study of patients with schizophrenia who were receiving treatment with clozapine at a community mental health clinic (CMHC). Eligible participants were 18 years or older, diagnosed as having a schizophrenia spectrum disorder (schizophrenia or schizoaffective disorder), and treated in a clozapine clinic and had scheduled visits at the CMHC at least every four weeks. Mental health clinicians assessed whether potentially eligible patients had the capacity to be approached to participate in the study. Reasons for exclusion included severe disorganization or agitation that affected the ability to complete the questionnaire.

A member of the research team obtained consent and administered the survey during a mental health appointment.

Participants provided consent to access their CMHC medical records and request records from their PCP. They received a \$15 gift card for their time. Study procedures were approved by the Partners Healthcare Institutional Review Board.

Measures

Participants completed a survey that included sociodemographic questions (age, gender, ethnicity, race, education), the Heaviness of Smoking Index (23), smoking behaviors, patient cancer risk perceptions, and clinician delivery of tobacco cessation through the 5As framework (15). All questionnaire items were validated with a national sample during the National Lung Screening Trial (9). Boardcertified psychiatrists and psychologists with expertise in psychotic disorders and cancer risk perceptions reviewed the measures for burden and fit for patients with schizophrenia.

Eligibility for screening was based on CMS guidelines (age 55–77 years, current or former smokers within the past 15 years, \geq 30 packs per year smoking history). We also assessed the number of current smokers ages 40–54 who would become eligible for screening at age 55 if they continued to smoke. Sensitivity analyses were conducted for the subgroup of current and former smokers who met age criteria for screening (age \geq 55 years) regarding their cancer risk perceptions compared with those of the overall group.

Smoking Behaviors

Nicotine dependence was determined on the basis of the Heaviness of Smoking Index (23). Additional items from the National Lung Screening Trial questionnaire included readiness to quit smoking (ranging from "I enjoy smoking so much and will never consider quitting" to "I have quit and am 100% confident I will never smoke again") and quit attempts within the past year.

Lung Cancer Risk Perceptions

For current and former smokers, we assessed National Lung Screening Trial items on cancer risk perceptions, including the participants' beliefs about their risk of developing lung cancer (five items, scored on a scale ranging from very high to very low), whether the patient is in danger of developing lung cancer because they smoke or used to smoke (five items, scored on a scale ranging from strongly agree to strongly disagree), perceived risk of developing lung cancer compared with other smokers or former smokers (five items, scored on a scale ranging from much lower to much higher), how much would or did quitting reduce their risk of developing lung cancer (four items, scored on a scale ranging from not at all to very much), how likely the patient is to develop lung cancer compared with the average person their age (three items, scored on a scale ranging from less likely to more likely), the additional risk of lung cancer for a pack-aday smoker compared with a nonsmoker (no additional risk, two times, five times, 10 times, and 20 times), and whether

the patient worries about developing lung cancer (four items, scored on a scale ranging from rarely or never to all the time). Participants were classified as underestimating risk if they reported that the additional risk of lung cancer from smoking one pack per day was "no additional risk" or "two times the risk."

Clinician Delivery of Tobacco Cessation

As in the National Lung Screening Trial, we asked current smokers about clinician delivery of the 5As framework for tobacco cessation. We compared patient-reported interactions with primary care and psychiatry for delivery of the 5As.

Data Analysis

We conducted data analysis using SAS, version 9.4 (24). Descriptive statistics characterized demographic characteristics, smoking behaviors, clinician-delivered tobacco cessation, and lung cancer risk perceptions. Comparisons of dichotomized variables were performed by using Fisher's exact test. Dichotomized variables were as follows: "How high do you think your risk of developing lung cancer is?" (very or somewhat low versus moderate, somewhat, or very high); "I am in danger of developing lung cancer because I smoke or used to smoke" (disagree or strongly disagree versus neutral, agree, or strongly agree); "Compared with other current or former smokers, what is your risk of getting lung cancer?" (much or slightly lower versus about the same, slightly, or much higher); "How much would or did quitting reduce your chances of developing lung cancer?" (not at all versus a little, somewhat, or very much); "[What is] your likelihood of developing lung cancer compared with sameaged person?" (less likely versus about as likely or more likely); "How much higher is the risk of developing lung cancer for a pack-per-day smoker than a nonsmoker? (no additional risk or two times the risk versus five or 20 times the risk or doesn't know); "How often do you worry about developing lung cancer?" (rarely or never versus sometimes, often, or all the time); and the Heaviness of Smoking Index (moderate or high dependence versus low dependence).

We calculated whether participants were motivated to quit by grouping responses to the items "I plan to quit in the next 6 months," "I plan to quit in the next 30 days," and "I have already cut down and have set a quit date." We calculated whether participants thought about quitting but had no active plans to quit by grouping responses to "I [rarely, sometimes, or often] think about quitting and have no plans to quit." We calculated pack-years by dividing the average number of packs smoked per day for each participant by years of smoking history.

RESULTS

Patient Characteristics

At the clozapine clinic, we requested clinicians' permission to approach 199 patients who met the eligibility criteria;

TABLE 1. Characteristics of 112 CMHC patients with schizophrenia^a

Characteristic	Ν	%
Age (M±SD)	44.9±13.5	
Gender	70	
Male	/9	/1
	55	50
Hispanic or Latino	9	8
Non-Hispanic or Latino	98	92
White	77	71
Black or African American	15	14
American Indian or Alaska Native	2	2
Asian	2	2
Other	12	11
Highest education level	20	10
Did not complete high school	20	19
	20 41	19 38
Completed college or higher	26	24
Perceived overall health		
Excellent condition	12	11
Very good or good condition	75	67
Fair condition	21	19
Poor condition	4	4
Primary care utilization	105	0.4
Identified primary care provider (PCP)	105	94
Saw PCP in past year	99	00
l obacco use	FO	45
Former smoker	50 38	45 34
Never smoker	24	21

^a Numbers may not add up to 112 because of missing data.

22 were then excluded because of paranoia or disorganization that impaired study participation, and 26 were not available for approach in the clinic. Study staff approached 151 patients, and 113 (75%) consented to participate. One participant withdrew (N=112).

Sociodemographic Characteristics

Sociodemographic characteristics are displayed in Table 1. Participants were 71% male and had a mean age of 44.9 years. Thirty-two patients (29%) were 55 years or older, and 37 (33%) were 40–54 years old. Seventy-one percent were white, 24% had a college education, and 19% did not complete high school or receive a GED.

Screening Eligibility

Of the participants, 79% were current or former tobacco smokers (45% and 34%, respectively); 21% were never smokers (Table 1). Among older adults (\geq 55 years), 91% (N=29) were current or former tobacco smokers (44% [N=14] and 47% [N=15], respectively), and 34% (N=11) met CMS screening criteria. Among adults ages 40–54 (current smokers, N=18, 49%), 78% (N=14) of the current smokers would become eligible for screening as they age if they continued to smoke.

Smoking Behaviors

Current cigarette smokers smoked a mean of 17.6 cigarettes per day and had an average smoking history of 24.5 packyears. Among current smokers, 62% had moderate or high nicotine dependence, and 43% reported at least one quit attempt in the past year. Former smokers smoked a mean of 21.4 cigarettes per day and averaged 26.2 pack-years, and 59% had moderate to high nicotine dependence (Table 2). Of current smokers, 40% (N=18) reported planning to quit and 38% (N=17) reported thinking about quitting but had no active plans to do so (Figure 1); 19% of former smokers reported worrying about relapsing.

Older current cigarette smokers smoked a mean of 15.7 ± 10.2 cigarettes per day and had an average smoking history of 32.7 ± 22.4 pack-years. Of older smokers, 75% had moderate to high nicotine dependence, and 42% reported at least one quit attempt in the past year. A larger proportion of older current smokers (six of 11) than younger current smokers (11 of 34) thought about quitting (Figure 1).

Lung Cancer Risk Perceptions

Current and former smokers reported significantly different perceptions of their cancer risk (Table 2). Compared with current smokers, former smokers perceived lower cancer risk; 75% of former smokers believed they had a very or somewhat low risk of developing lung cancer compared with 46% of current smokers (p=0.008). When comparing themselves with other current or former smokers, former smokers were more likely to report having slightly or much lower risk of lung cancer (former smokers, 72%; current smokers, 36%; p=0.002). Former smokers were also less likely than current smokers to report that they were in danger of developing lung cancer (former smokers, 27%; current smokers, 63%; p=0.002) In contrast, current smokers were more likely than former smokers to underestimate the risk of developing lung cancer for a pack-aday smoker (current smokers, 45%, former smokers, 17%; p=0.010). In addition, 15% of current smokers believed that quitting would not reduce their risk of developing lung cancer.

Although older (>55 years) and younger adults with schizophrenia perceived lung cancer risk similarly, 69% (N=20) of older current and former smokers reported rarely or never worrying about developing lung cancer compared with 55% (N=48) of the overall sample of current and former smokers.

Primary Care Delivery

Of the participants, 94% identified a PCP, and 88% reported at least one PCP visit within the past year (Table 1). All participants received psychiatric care at the CMHC and had monthly psychiatry appointments in the clozapine clinic. Yet, despite being seen in one CMHC, participants received primary care from 91 different PCPs based in 35 distinct primary care practices.

Clinician Delivery of Clinical Practice Guidelines for Tobacco Cessation

Participants who identified as current smokers described delivery of the 5As over the past year by their PCPs and psychiatrists (Figure 2). Although 85% (N=38) reported being asked whether they smoked by their PCP (60% [N=27] by their psychiatrist), only 54% (N=24) reported being advised to quit (45% [N=20] by their psychiatrist). Notably, only one in three current smokers reported being assisted with medications for tobacco cessation by both their PCP (33%, N=15) and their psychiatrist (36%, N=16), and only 13% (N=6) reported being referred for smoking cessation counseling by their PCP (versus 20% [N=9] by their psychiatrist). A similar pattern was observed for older participants (\geq 55 years).

DISCUSSION

More than 90% of older adults with schizophrenia seen in a CMHC were current or former tobacco smokers, and more than one-third met criteria for lung cancer screening. Moreover, if middle-aged adult participants (ages 40–54) continue to smoke, more than three-fourths will become eligible for screening as they age. Therefore, this high-risk, aging population may benefit from targeted interventions to build awareness of lung cancer screening and tobacco cessation. Specifically, given the premature cancer mortality faced by this population, the ideal age to begin screening patients with schizophrenia should be reassessed and merits further research to inform population-based guidelines.

As in the National Lung Screening Trial (25), former smokers in this study were significantly more likely to believe they were not in danger of developing lung cancer and reported having a lower risk of lung cancer than current smokers. Many current and former smokers underestimated their lung cancer risk; approximately three-fifths of current and former smokers believed they had a low risk of developing lung cancer, and more than half reported rarely or never worrying about developing lung cancer. Given that older smokers reported worrying less about developing lung cancer than younger smokers, those delivering interventions should consider differing cessation motivations by age.

Although both current and former smokers could benefit from increased education about their cancer risk, our findings suggest that former smokers need targeted education regarding their elevated risk of developing cancer. However, risk is a complex, abstract construct for clinicians to convey, particularly when engaging patients with schizophrenia who experience cognitive deficits in abstract thinking and working memory. Specifically, although the National Lung Screening Trial found that patients use cognitive dissonance to justify their decreased risk perception, patients with schizophrenia are at greater risk from this lowered risk perception because of cognitive impairments. Additional research is needed to determine how to best combat these deficits and facilitate increased understanding of cancer risk

TABLE 2. Perception of lung cancer risk and smoking behaviors among 88 CMHC patients with schizophrenia who reported being current or former smokers^a

	Total (N=88)		Current smokers (N=50)		Former smokers (N=38)			
Variable	N	%	N	%	N	%	р	
Lung cancer risk perception								
How high do you think your risk of developing lung							.008	
cancer is? ^D								
Very to somewhat high	10	12	9	19	1	3		
Moderate	25	30	17	35	8	22		
Very to somewhat low	49	58	22	46	27	75		
I am in danger of developing lung cancer							.002	
because I smoke or used to smoke ^c								
Strongly agree or agree	31	37	27	55	4	11		
Neutral	18	21	9	18	9	26		
Strongly disagree or disagree	35	42	13	27	22	63		
Compared with other current or former smokers,							.002	
what is your risk of getting lung cancer? ^d								
Much or slightly higher	10	12	9	19	1	3		
About the same	30	36	21	45	9	25		
Much or slightly lower	43	52	17	36	26	72		
How much would or did quitting reduce your							.289	
chances of developing lung cancer? ^e								
Very much	47	56	20	42	27	75		
Somewhat	18	21	14	29	4	11		
A little	10	12	7	15	3	8		
Not at all	9	11	7	15	2	6		
[What is] your likelihood of developing lung							.028	
cancer compared with same-aged person? ^f								
Less likely to get lung cancer	36	43	15	32	21	57		
About as likely to get lung cancer	37	44	23	49	14	38		
More likely to get lung cancer	11	13	9	19	2	5		
How much higher is the risk of developing lung							.010	
cancer for a pack-per-day smoker than								
a nonsmoker? ^g								
No additional risk	7	9	6	13	1	3		
2×	20	24	15	32	5	14		
5×	18	22	7	15	11	31		
10×	24	29	12	25	12	35		
20×	10	12	5	11	5	14		
Doesn't know	3	4	2	4	1	3		
How often do you worry about getting lung							.052	
cancer? ^h								
Rarely or never	47	55	22	46	25	67		
Sometimes	21	25	11	23	10	27		
Often	11	13	10	21	1	3		
All the time	6	7	5	10	1	3		
	0	,	0	10	-			
Circuit dev (M+CD)			17 6 + 12 1		21.4 ± 17.6			
Cigarette park vere (M±SD)			1/.0±12.1		21.4±17.0			
Cigarette pack-years (M±SD)			24.3±10.3		20.2=27.2		020	
	70	70	10	70	1 4	44	.820	
Low dependence	32	39	10	38 50	14	41		
Mouerate dependence	5/ 17	45	25	5Z	12	35		
nigh dependence	12	10	5	10	ŏ	24		

^a Numbers may not add up to the N for the column because of missing data.

^b p value for comparison between current and former smokers on a dichotomous variable (very or somewhat low vs. moderate, somewhat, or very high).

^c p value for comparison between current and former smokers on a dichotomous variable (disagree or strongly disagree vs. neutral, agree, or strongly agree). ^d p value for comparison between current and former smokers on a dichotomous variable (much or slightly lower vs. about the same or slightly or much higher).

^e p value for comparison between current and former smokers on a dichotomous variable (not at all versus a little, somewhat, or very much).

^f p value for comparison between current and former smokers on a dichotomous variable (less likely vs. about as likely or more likely).

^g p value for comparison between current and former smokers on a dichotomous variable (no additional risk or twice the risk vs. 5 or 20 times the risk or doesn't know).

^h p value for comparison between current and former smokers on a dichotomous variable (rarely or never vs. sometimes, often, or all the time).

¹ p value for comparison between current and former smokers on a dichotomous variable (moderate or high dependence vs. low dependence).

by patients with schizophrenia. Potential strategies include incorporating concrete examples; discussing immediate risks and benefits; and using directive language, repetition, and breaking down information into manageable pieces. Thus, to promote understanding of cancer risk among patients with schizophrenia, guidelines should account for differences in risk perceptions by smoking status. In addition, guidelines for clinicians should address building trust





^a Patients ages \geq 55 years, N=11; ages <55 years, N=34. Data were missing for five patients.

and promoting shared decision making for lung cancer screening to better inform individualized, effective care.

Although gaps in knowledge about lung cancer risk among patients with schizophrenia may reflect cognitive deficits in abstract thinking and executive functioning, health care clinicians may also not be communicating adequately about tobacco cessation. The National Lung Screening Trial found that 76% of participants reported that their PCPs had advised them to quit smoking (26). However, in this study, only 54% of participants reported that their PCPs advised them to guit smoking, and only 45% of participants reported that their psychiatrists advised them to quit smoking. Moreover, although participants regularly attended PCP and psychiatry appointments, few patients reported that their PCP or psychiatrist assisted with their smoking cessation.





^a Information was provided by 46 participants for interventions by primary care providers and by 50 participants for interventions by psychiatrists. NRT, nicotine replacement therapy.

Assessed

Assisted by NRT/

bupropion

Advised

to quit

Assisted by

counseling

Despite the increasing need for patients with schizophrenia to be included and actively engaged in conversations with their providers about smoking cessation and cancer screening, our findings suggest that further work is required to examine physician-level barriers and educate providers on the efficacy and benefits of smoking cessation interventions for patients with serious mental illness. In addition, the lack of clarity regarding whose role it is to provide tobacco cessation (primary care or mental health clinicians? Which team member?) poses another barrier. Practice guidelines and integrated approaches are likely needed to increase screening.

Patients from a single CMHC received primary care in 35 distinct practices, suggesting that mental health clinics and, especially, clozapine clinics, given the frequency of visits and longitudinal relationships, may have unique potential to become centralized access points for the delivery of tobacco cessation counseling and education and referrals for cancer screening to individuals with schizophrenia. Given CMS-authorized counseling about lung screening and shared decision making for eligible beneficiaries (11) and tobacco cessation treatment can be successfully incorporated into mental health settings for patients with schizophrenia (27, 28), CMHCs may have the greatest opportunity to offer these resources to a wide range of patients with little financial burden. Therefore, embedding tobacco cessation and cancer screening interventions in CMHC settings may increase access to care for an underserved population that currently experiences premature mortality from smoking-related diseases.

This is a novel study in a disadvantaged, high-risk population. To our knowledge, this is the first study to explore in-depth the barriers that may prevent patients with schizophrenia from lung cancer screening uptake. We used multiple data sources, including self-report questionnaires and medical records from psychiatry and primary care visits.

Asked

50

25

0

Regarding limitations, study participants were patients with schizophrenia who were prescribed clozapine in a CMHC. Psychiatrists were affiliated with an academic hospital. Moreover, patients had a high rate of access to primary care, were insured (primarily by public payers), were predominantly male and white, and had relatively high educational attainment. Thus our findings cannot be generalized to patients who access mental health care less frequently or in other care settings who may have various smoking behaviors and cancer risk perceptions. Also, although psychiatrists and psychologists assessed the survey items that were previously used in a national sample and the questions were piloted with patients with schizophrenia, the questionnaire was not validated for adults with schizophrenia.

CONCLUSIONS

To inform lung cancer screening interventions for adults with schizophrenia, research needs to elucidate barriers and facilitators of tobacco cessation and screening at the patient, clinician, and health care system levels (29). Specifically, at the patient level, targeted tobacco cessation and screening education is needed to account for the underestimation of cancer risk, cognitive deficits, negative symptoms, and social isolation common among individuals with schizophrenia. At the clinician level, mental health and primary care clinicians can benefit from training in tobacco cessation and lung cancer screening, safety of tobacco cessation medications, and clarity of role definition. At the systems level, integrated approaches to engaging patients with schizophrenia at CMHCs and during PCP visits (where and when they access clinical care) may help to mitigate disparities in cancer screening and outcomes. Future research should assess whether CMHC-based interventions can promote tobacco cessation, increase awareness of screening, and contribute to improved lung cancer survival for individuals with schizophrenia.

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Short Descriptions of Novel Programs Invited

Psychiatric Services invites contributions for Frontline Reports, a column featuring short descriptions of novel approaches to mental health problems or creative applications of established concepts in different settings.

Text should be 350 to 750 words. A maximum of three authors, including the contact person, can be listed; one author is preferred. References, tables, and figures are not used. Any statements about program effectiveness must be accompanied by supporting data within text.

Material to be considered for Frontline Reports should be sent to one of the column editors: Francine Cournos, M.D., New York State Psychiatric Institute (e-mail: fc15@cumc.columbia. edu), or Stephen M. Goldfinger, M.D., Department of Psychiatry, SUNY Downstate Medical Center (e-mail: smgoldfingermd@aol.com).