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Healthcare Professionals' Perspectives on Adapting a Community Health Worker Model to Facilitate Lung Cancer Screening for Chinese For-Hire Vehicle Drivers

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Abstract

Background—Chinese immigrant for-hire vehicle (FHV) drivers who smoke or smoked are at high risk for lung cancer due to the combined impact of tobacco use and air pollution exposure yet underutilize lung cancer screening (LCS). Community Health Worker (CHW) programs have been effective at improving cancer screening rates. This study describes a community needs assessment to inform the adaptation of an existing CHW intervention to facilitate LCS among Chinese FHV drivers.

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Authors' contributions: Jennifer Leng was the lead in project conception, development, implementation, and manuscript writing, and provided overall guidance and direction; Randall Li contributed to data collection and analysis; Florence Lui contributed to data analysis and manuscript development; and Francesca Gany provided overall supervision, oversight and guidance.

Conflicts of interest: The authors declare that they have no conflict of interest.

Declarations:

Ethics approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors. The study was reviewed and approved by MSKCC's Institutional Review Board.

Consent to participate: Informed consent was obtained from all individual participants included in the study.

Methods—Interviews were conducted until saturation with 13 Chinese-serving health professionals to determine the community's needs, priorities, and preferences. Transcripts were qualitatively analyzed using Atlas.ti.

Results—Seven frequently occurring themes were identified: Knowledge of Guidelines/Access to LCS, Acceptability of CHW Program, CHW Role in Screening Process, Qualities of an Ideal CHW, Barriers to LCS, Challenges to Implementing a CHW Program, and Adaptations to CHW Program.

Discussion—The adapted CHW intervention should include culturally tailored health education to increase LCS knowledge for patients and providers.

Keywords

lung cancer screening; community health workers; for-hire vehicle drivers; Chinese immigrants; cancer prevention

Background

Chinese immigrant men evidence high rates of smoking and employment in occupations that put them at higher risk for lung cancer mortality, including for-hire vehicle (FHV) driving. In our preliminary work assessing health needs among Chinese foreign-born male FHV drivers in New York City (NYC), 73% were current or former smokers (49% current, 24% former) [1]. High rates of smoking in Chinese immigrant men may reflect the high prevalence of smoking in China, where 52.9% of men smoke [2]. Foreign-born Asian men have a 35% higher rate of non-small cell lung cancer than U.S.-born Asian men [3], consistent with their smoking prevalence (45.5% of foreign-born Asian men are lifetime smokers vs. 29.5% of U.S.-born Asian men) [4].

Chinese male FHV drivers in NYC who smoke or smoked may be at exceptionally high risk for lung cancer due to the combined impact of tobacco use and air pollution exposure. Drivers have high rates of stress, sedentary lifestyle, cultural/linguistic barriers to care, long work hours that limit access to care, including smoking cessation programs [5–7], and exposure to ambient particulate matter (PM), which increases health risk [8, 9]. PM exposure has been specifically linked to lung cancer [8] and many studies have demonstrated a high prevalence of lung cancer among drivers, suggesting a possible association with PM (for a review, see [9]).

The U.S. Preventive Services Task Force (USPSTF) recommends annual screening for lung cancer with low-dose computed tomography (LDCT) in adults aged 55–80 years with a 30 pack-year smoking history and who currently smoke or have quit within the past 15 years [10]. In the Dutch-Belgian lung cancer screening (LCS) randomized controlled trial (Nederlands-Leuvens Longkanker Screenings Onderzoek [NELSON]), lung cancer mortality was 25% lower in men and 33% lower among women in the screening group than in the control group [11]. Although the NELSON trial demonstrated a false positive rate of 1.2% and an upper limit overdiagnosis rate of 8.9% [11], the number of false positives is significantly smaller than the number of lives saved, suggesting the balance of risk to mortality reduction is acceptable [11].

No published data are available on LCS rates among FHV drivers or Asian Americans, though previous research describes lower rates of screening for other cancers among foreign-born Asian Americans and Pacific Islanders (AAPIs) compared to U.S. born AAPIs after adjusting for access to care [12]. Chinese immigrant participation in LCS may be particularly low due to misconceptions about cancer screening (e.g. testing for cancer can cause cancer) and unfamiliarity with screening as a preventive measure [13]. A study found that facilitators of LCS with LDCT for Korean immigrant men included recommendations from physicians and family members, positive perceptions of the healthcare system, and having an interest in health; barriers included costs of health care in the U.S, lack of time/knowledge (about lung cancer and screening), attitudes about prevention, and lack of physician recommendation [14].

Community health workers (CHWs) are local and trusted members of underserved communities who can serve as a bridge between peers and health professionals [15]. CHW programs have been effective at improving cancer screening rates (for a review, see [15]) and supporting low income and minority populations to overcome barriers to cancer prevention services [15]. Yet CHWs are an innovation that has yet to be taken to scale [16].

In this study, we sought to inform the adaptation of an existing CHW intervention (Taxi HAILL [Health Access Interventions for Linkages and Longevity]) (R01 NR015265), to facilitate LCS among Chinese FHV drivers. Taxi HAILL utilizes CHWs to facilitate primary care uptake among male NYC FHV drivers by providing tailored healthcare access assistance (e.g. identifying conveniently located primary care providers (PCPs), scheduling PCP appointments, making pre-appointment reminder calls, assisting with payment and insurance issues, and encouraging eligible uninsured drivers to apply for health insurance). The adapted intervention will incorporate elements of IMPaCT™ (Individualized Management for Patient-Centered Targets), a scalable CHW model designed to provide tailored support to help high-risk patients achieve individualized health goals [16] (Table 1). The adaptation process is guided by the Diffusion of Innovations theory developed by Rogers [17], which describes attributes that increase successful adoption of innovations (Table 2).

For most adults, PCPs are the first point of contact with the healthcare system and play a critical role in offering preventive healthcare and facilitating early diagnosis, e.g. by identifying patients who qualify for LCS [18]. This study therefore utilizes interviews with Chinese-serving providers with a range of expertise related to cancer prevention and care. The aim of this study, along with a companion focus group study of Chinese FHV drivers (manuscript in preparation), is to inform a culturally and linguistically responsive adaptation of Taxi HAILL to facilitate LCS for high-risk Chinese FHV drivers who smoke or who have quit within the past 15 years.

Method

Study staff worked closely with partners in the Chinese community to identify key Chinese-serving health professionals. Staff also collated from publicly available online resources a list of PCPs and free-standing radiology sites located in Flushing Chinatown (Queens),

Manhattan Chinatown, and Sunset Park (Brooklyn Chinatown). The study was reviewed and approved by [*BLINDED FOR REVIEW*] Institutional Review Board.

Potential interviewees were approached by telephone, e-mail, or in person to assess interest in participation. Interviews were conducted in person, in English. An interview guide with the following areas of inquiry was utilized: (1) Introduction to CHW intervention to facilitate LCS, which lung cancer guidelines were followed (if any), insurance coverage for LCS; (2) Adaptation of the five attributes in Diffusion of Innovations theory; (3) the four components of the IMPaCT™ model [16] and (4) Facilitators and barriers to intervention success.

Interviews were transcribed and analyzed using Atlas.ti, a qualitative analysis software package [19]. A grounded theory approach was utilized for this formative study; its central idea is that data serve to generate rather than verify hypotheses [20]. Two team members coded each focus group transcript independently by marking passages of text with codes within Atlas.ti to be later used to compare sets of responses by theme and subtheme. Coded transcripts were compared and areas of disagreement were resolved through consensus meetings with the entire team. Atlas.ti was used to store the final codebook and identify coding frequencies. The study team reviewed significant quotes across all 13 transcripts within each code category, which were aggregated by Atlas.ti into a single quote report. This quote report was then then exported from Atlas.ti, and independently reviewed by each team member to identify major themes. Study authors then met to come to a consensus on the significance of themes, subthemes, and subtopics and to manually select and agree on quotations to illustrate themes.

Results

75 potential interviewees were approached by phone and/or email, 40 did not respond; the remaining 35 were reached by phone, email, or in person, among whom 22 refused participation, citing lack of time and/or interest. Thirteen agreed to participate. Of the 13 interviewees, 5 were female and 8 were male. Six were primary care providers (PCPs), 3 radiologists, 2 internists, 1 a cardiothoracic surgeon, and 1 a case manager. Employment settings included public hospitals, private practice, radiology clinics, community health centers, and the NYC Department of Health and Mental Hygiene. Eleven were ethnically Chinese and spoke Chinese, one was South Asian, and one was White (none were Hispanic). All had direct experience with Chinese patients and/or served the Chinese community. Most participants' practices (n=10) were composed primarily of Chinese patients (70–95%). All participants served the Chinese community in general, with varying degrees of familiarity with Chinese FHV drivers.

Inductive analysis of the transcripts yielded 66 codes (subtopics) within 7 key themes: 1) Knowledge of Guidelines/Access to Screening, 2) Acceptability of CHW Program (Diffusion Theory), 3) CHW Role in Screening Process, 4) Qualities of an Ideal CHW, 5) Barriers to Facilitating Uptake of LCS, 6) Challenges to Implementing a CHW Program, and 7) Adaptations to a CHW program for the Chinese Community. (Table 3)

Knowledge of Guidelines/Access to Screening

Some interviewees (n=4) explicitly named the USPTSF LCS guidelines when asked about screening methods for lung cancer. Of these, one stated that though they personally followed the guidelines, they believed other providers serving the Chinese community did not. Others (n=5) were aware of the requirement of a 30-pack-year history but used different age cutoff criteria from the USPTSF guidelines. Interviewees also discussed patient access to LCS. The majority (n=11) stated that they took multiple forms of insurance, including Medicaid, that covered LCS for eligible individuals. Nearly all (n=12) discussed available options for uninsured patients to obtain LCS through a sliding scale or flexible payment schedule. Of these, costs ranged widely, from $15 to $350 for a LDCT scan.

Acceptability of CHW Program

All interviewees described being willing to collaborate with a CHW program, and a majority (n=11) felt such a program was needed for the Chinese driver population. All (n=13) agreed that an initial, time-limited pilot program would be better received. Nearly all (n=12) stated that they could envision CHWs in their clinical setting. A majority (n=8) had little to no prior knowledge and experience with CHW programs and most thought that the program would be simple enough to be implemented (n=11). Those who felt a CHW program could potentially be complex to implement (n=2) emphasized the need for CHWs to sustain engagement with patients: “Have them stay engaged with the drivers … [given] how migratory they are.” Relatedly, the majority envisioned CHWs as based in the community (n=11) vs. the clinic setting (n=1), so that CHWs could help patients “actually get into the doctors’ office.”

CHW Role in Screening Process

Recommendations included having CHWs educate patients about the importance of smoking cessation (n=11): “Getting people to stop smoking has so many other positive downstream aspects, not just lung cancer … Incorporating that into part of the screening effort [is] vital.” Interviewees also suggested having CHWs help patients navigate eligibility and insurance requirements (n=4) and healthcare systems (n=12); issue reminders to attend screening appointments (n=1); and follow up with patients after LCS (n=7). Interviewees recommended that CHWs identify and connect patients with PCPs (n=8) and radiology facilities (n=5); ascertain free or low-cost options for uninsured patients (n=4); help patients obtain insurance if uninsured (n=3) and fill out paperwork (n=4).

Interviewees emphasized the need for CHWs to assist with linguistic and cultural barriers by directly acting as interpreters for patients (n=4). Some suggested having CHWs act as peers to encourage LCS (n=6): “[Patients] won’t tell [physicians] everything because there is a power differential … but they might be able to say it to [a peer].” Interviewees suggested CHWs connect with family members to support smoking cessation (n=6) and proactively discuss cancer stigma: “Some people will think that if I go to a cancer screening, that means I have cancer, or my family member will think I have cancer. The stigma [can] prevent them from going forward.”

Qualities of an Ideal CHW

With regards to experience, some interviewees felt CHWs who were themselves former smokers (n=6), former taxi drivers (n=7), and/or had personal experience with LCS (n=5) would be best suited to facilitate LCS: “If you’re a smoker your defense mechanisms are already up [with a physician]. Versus, the CHW who [says], ‘I was a taxi driver myself, and I know it was long hours and sitting and you don’t get much exercise and you eat terrible because you just buy whatever you can … and a lot of us smoke, too. How can I help you?’” Good communication skills were also emphasized (n=5): “[If] the patients don’t feel comfortable talking to this person, they’re not going to come [for LCS].”

In the domain of language and culture, a few interviewees felt CHWs who were ethnically Chinese would be most relatable (n=3). Most felt CHWs should be able to speak English and Chinese dialect(s) fluently (n=8). Some suggested that CHWs familiar with a variety of Chinese regions would be accepted more readily by patients from diverse Chinese provinces (n=4). Interviewees raised the importance of hiring CHWs who understood underlying stressors in this population that perpetuated smoking habits (n=4): “Having a person they can identify with … ‘I have to stay awake working long hours and [smoking] helps.’”

Suggestions regarding CHW recruitment included recruiting through community-based and civic organizations (n=5), FHV bases and/or places where taxi drivers spend their time (n=4), and medical schools (n=1).

Barriers to Facilitating Uptake of LCS

Healthcare system barriers to LCS included insurance barriers (n=10), limited availability of free/low cost options at radiology facilities (n=4), patients lost to follow up (n=6), complexity of setting up appointments (n=3), lacking a PCP (n=2), and difficulty identifying at-risk patients due to lack of electronic medical record (EMR) systems (n=2).

Cultural barriers included language barriers/multiple Chinese dialects (n=4) and fear of cancer risk from radiation from LCS (n=1). Interviewees also discussed the lack of belief that smoking causes cancer (n=3): “One of the problems in China is that no one believes smoking causes cancer … We have to have education so they understand, ‘Oh, I can get cancer from this.’ That’s the reason for screening.” Chinese patients’ challenges with self-advocacy in the health care environment were discussed (n=2), as was the phenomenon of patients not wanting to know their cancer status (n=1): “Cancer is such a taboo thing in the Chinese population that [many] don’t want to know about it until it’s too late.” Two interviewees also discussed the cultural barrier of smoking as a form of social enjoyment: “[Smoking] is their social bonding … So there’s that peer pressure.” Interviewees also raised the issue of low preventive care utilization in this population (n=7): “People [say], ‘I don’t feel sick, why do I need to go to the doctor?’”

Reported occupational barriers included FHV drivers being very busy (n=7) and the opportunity cost of missed work (n=5).

Challenges to Implementing a CHW Program

Many challenges raised by interviewees related to the healthcare system (n=5): “We have social workers, mental health people, care managers, so [patients] might think, how does [the CHW] fit in?” Time (n=9) and space (n=2) constraints for CHWs to work within healthcare settings were also discussed. False positives were considered (n=2): “Patients need to know there is a false positive risk … Because what if the false positive ends with a cost to pay?” Interviewees also discussed potential misperceptions about the CHW program competing with clinics (n=3) and providers being less inclined to accept uninsured patients (n=3).

Remaining implementation challenges related to effective training and supervision for CHWs and their managers (n=13): “Ideally, you’re going to want to have quality control … The last thing you want to do is get in trouble for misinformation.”

Adaptations to a CHW Program for the Chinese Community

Interviewees (n=7) stressed the need for the adapted program to include education in a community generally unaware of smoking risks: “I don’t know if the connection has been made that smoking causes lung cancer.” Some (n=6) suggested including smoking cessation as part of the LCS program and organizing community events and providing educational literature at these events (n=5). Recommended adaptations aimed toward increasing awareness of the program included offering free services, activities, and products at health fairs (n=6); advertising in local newspapers and radio stations (n=11) and social media (n=7); and interfacing with key organizations, such as churches and taxi unions (n=4), community-based organizations such as the Coalition of Asian American Independent Practice Association (CAIPA) and the Chinese American Medical Society (CAMS) (n=8), radiology facilities serving Chinese communities (n=8), and FHV base management (n=3).

Discussion

This study, an exploration of community providers’ perceptions of the needs of Chinese immigrant FHV drivers to inform a cultural adaptation of a CHW intervention to facilitate LCS, highlights the importance of considering the population’s culturally and occupationally influenced priorities. Interviewees explained how language, demanding work schedules, lack of belief that smoking causes cancer, and cancer stigma presented potential barriers to LCS. These themes echo findings from an Institute of Medicine (IOM) report that recommends the use of CHWs to reduce racial/ethnic health care disparities [21] as well as previous research suggesting that health behavior interventions are more effective when they are responsive to the cultural practices and perspectives of the groups for whom they are intended [22].

Our findings also indicate that CHWs hold much promise as a potential solution to increase access to preventive health care for racial/ethnic minorities [23]. Interviewees consistently discussed ways CHWs could reduce barriers to LCS for Chinese immigrant FHV drivers by providing linguistically and culturally sensitive health education and practical assistance (e.g. with obtaining insurance or scheduling appointments). These suggestions mirror a

growing body of research suggesting that CHWs, by acting as a “bridge” between patients and clinics, are particularly effective in increasing access to care for low-income, ethnic minority groups [15, 23]. In addition, this study is a valuable contribution to the limited literature on CHW programs serving Chinese immigrant communities [24, 25].

The study’s limitations included a small sample size, which limits its generalizability. Results may also be limited by participants’ varying levels of familiarity with the Chinese FHV driver population. Participants acknowledged having little experience with CHWs, potentially reflecting CHW underutilization in the community of interest [24, 25] and limiting conclusions to be drawn about the potential impact of CHWs in their clinical settings. Our companion focus group study of Chinese immigrant FHV drivers (manuscript in preparation) will provide additional insight, by exploring drivers’ preferences and priorities related to LCS directly.

Our findings offer important information on the perspectives of providers serving this high-risk group and expand upon findings reported in the limited number of other studies that address the challenges involved in developing culturally sensitive preventive health interventions for ethnic minority FHV drivers [5–7]. These, together with the present study, suggest that a successful CHW intervention will need to engage drivers within their communities and proactively address systemic, cultural, linguistic, and occupational barriers to accessing care. Consideration of relevant cultural preferences and factors and needed information (e.g., preferred characteristics of CHWs, prevalence of cancer stigma, lack of community awareness of smoking risk) in intervention design will facilitate the successful cultural adaptation of a needed public health intervention for Chinese FHV drivers and may provide a model for reaching other, similarly at-risk and underserved populations.

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Table 1

IMPaCT™[a] Model Domains

Domain	Goal
Recruitment and Hiring	Identify community members to serve as CHWs who have characteristics that patients want
Training	CHWs must have the skills necessary to overcome barriers reported by patients
Care	CHWs must provide care tailored to patient needs
Integration	CHWs must be integrated into healthcare systems in order to successfully bridge the gap between patient and provider

[a]Kangovi et al. (2014).

Table 2

Diffusion of Innovations Theory[a] Attributes

Attribute	Corresponding Question
Relative Advantage	Is the intervention better than what we already have?
Compatibility	Is the intervention consistent with the existing values, past experiences, and needs of the population?
Complexity	Is the intervention difficult to understand and use?
Trialability	Can the intervention be experimented with on a limited basis?
Observability	Are the results of the intervention visible to others?

[a]Rogers (1995).

Table 3

Key Themes, Subthemes, and Subtopics

Theme	Subtheme	Subtopic
Knowledge of Guidelines/Access to Screening	Doctor Knowledge	Knowledge of USPTSF LCS guidelines
	Patient Access	Types of insurance taken
		Options for uninsured patients
Acceptability of a CHW Program (Diffusion Theory)	Relative Advantage	Need for CHW program for the Chinese driver population
		Providers willingness to collaborate with CHWs
	Trialability	Desirability of an initial time-limited pilot program
	Compatibility	Compatibility with health providers' clinic flow
	Complexity	Complexity/simplicity of implementing CHW programs
		CHWs based in the community vs. in the clinic
	Observability	Prior experience with CHW programs
CHW Role in Screening Process	Screening Logistics	Educate patients regarding the importance/process of LCS
		Educate patients about insurance requirements
		Navigate healthcare system and set up appointments
		Remind eligible patients to attend screening
		Follow up with patients after screening
		Identify and connect patients with PCP
		Identify and connect patients with radiology facilities
		Ascertain free/low cost options for uninsured patients
		Help patients with process of attaining insurance
		Help patients with paperwork
	Assistance with Language/ Cultural Barriers	Act as an interpreter
		Facilitate recommendation for screening through relatable peer
		Connect with family members and patient support structure
		Address cancer stigma in the Chinese community
Qualities of an Ideal CHW	Experience	Former smoker
		Previously had LCS
		Good communication skills
		Former taxi driver
	Language & Culture	Chinese community member
		Bilingual/multilingual
		Familiar with Chinese culture
		Understands underlying stressors in Chinese community that perpetuate smoking habit
	Recruitment	Community-based and civic organizations
		FHV bases/places where taxi drivers spend their time
		Medical schools

Theme	Subtheme	Subtopic
Barriers to Facilitating Uptake of LCS	Healthcare System Barriers	Insurance barriers
		Limited availability of free/low cost radiology options
		Patients lost to follow up
		Complexity of setting up appointments
		Patient does not have PCP
		Difficulty identifying at risk patients because many PCP offices do not use EMRs
	Cultural Barriers	Language barriers and multiple Chinese dialects
		Fear of cancer risks from radiation from screening
		Lack of belief that smoking causes cancer
		Patients lacking self-advocacy
		Patients do not want to know cancer status
		Smoking as a form of social enjoyment
		Patients do not believe they need screening
	Occupational Barriers	FHV drivers very busy
		Opportunity cost of missed time
Challenges to Implementing a CHW Program	Healthcare System Challenges	Time/space constraints for CHWs within healthcare settings
		Low rates of positive screening or false positives
		Perceived competition between CHW program and clinic
		Healthcare providers less inclined to increase business with uninsured patients
	CHW Challenges	Providing effective training for CHWs and managers
Adaptations to a CHW Program for the Chinese Community	Chinese Community Needs	Chinese community unaware of smoking risks
		Smoking cessation
		Organize educational community events
		Interface with leaders of key organizations
	Increasing Awareness	Free activities & giveaways through health fairs
		Newspaper and radio
		Social media
	Building Alliances	Partnerships with community-based organizations
		Partnerships with radiology facilities
		Communication with FHV base management