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Strategies for smoking cessation among high risk populations to prevent lung cancer

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Introduction

Cigarette smoking has been identified as the primary causal risk factor in developing lung cancer [1], which is a leading cause of cancer death among both men and women in the United States (U.S.) [2]. Although the rate of smoking has declined since the 1960's, it remains widespread, with a rate of approximately 18% among U.S. adults [1]. While quitting smoking is the single most effective prevention for lung cancer, former smokers who have quit within the past 15 years remain at increased risk of developing lung cancer [3].

Given the established link between cigarette smoking and life threatening comorbid conditions (e.g., lung cancer) [1], several healthcare authorities have published clinical guidelines for implementing tobacco cessation treatments. The U.S. Public Health Service's clinical practice guidelines for treating tobacco use and dependence recommend that healthcare systems consistently identify and treat every tobacco user seen, encouraging every patient who is willing to make a quit attempt to use empirically supported tobacco-dependence treatments, including individual, group, and telephone counseling and first line FDA-approved medications (e.g., varenicline, nicotine replacement therapy [NRT]) [4]. Behavioral treatments are effective, particularly practical counseling (e.g., problem-solving/skills training) and social support, and effectiveness increases with treatment intensity [4]. Pharmacotherapy has been shown to be effective without counseling; however, combining pharmacotherapy with behavioral counseling leads to the highest quit rates [4]. The National Comprehensive Cancer Network (NCCN) recommends that smoking cessation be offered as part of oncology treatment and continued throughout the entire oncology care continuum [5]. The NCCN guidelines are in line with the U.S. Public Health Service's guidelines, and they further recommend that first-line pharmacotherapy options include combination NRT

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Declaration of Interest

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(nicotine patch plus + short-acting NRT [lozenge/gum/inhaler/nasal spray]) or Varenicline, combined with at least 4 behavioral counseling sessions.

Smoking Cessation and Lung Cancer

There is well-established evidence that quitting smoking reduces the risk of lung cancer, and also improves lung cancer prognosis and survival rates [6]. Continued smoking after initial diagnosis can negatively impact cancer patients' response to all forms of treatment (surgery, radiation, chemotherapy), increase the likelihood that they will develop second malignancies (which often prove fatal), and lower rates of survival [7]. In addition to improving the response to cancer treatment, quitting smoking can also improve quality of life. A recent study demonstrated that patients with advanced lung cancer who continued smoking after diagnosis reported poorer health-related quality of life compared to former smokers or non-smokers [8]. Despite the known benefits of quitting smoking, the implementation and availability of smoking cessation services remains limited. Though about 80% of smokers in the U.S. have contact with a primary care provider each year, fewer than half report being advised to quit, and even fewer (25%) receive evidenced-based smoking cessation services [9]. Moreover, even when smoking cessation services do exist, there is evidence that smokers may not have awareness of these services, have misconceptions about treatment (e.g., treatment is expensive or ineffective), or have concerns related to stigma of seeking services [10].

Integration of smoking cessation services into specialized healthcare (such as oncology) may engage more smokers in treatment. The American Association for Cancer Research (AACR) released a policy statement recommending that patients with cancer from all clinical settings (as well as cancer screening patients) should be provided with evidence-based tobacco cessation assistance, ideally within or associated with the oncology practice [7]. Importantly, this policy statement advises that the oncologist should take ownership of the tobacco treatment, following up with the patient at treatment visits to ensure they are engaging in smoking cessation interventions. Similarly, a recent "call to action" by the Comorbidity Workgroup of the Society for Research on Nicotine and Tobacco (SRNT) made the case to apply evidence-based cessation treatment to patients with comorbid conditions (e.g., lung cancer) within the context of treatment for their condition. There are specific features of treating patients with lung cancer that could influence smoking cessation, and smoking cessation could influence cancer treatment. However, not all healthcare systems are equipped to deliver this specialized level of tobacco treatment to cancer patients. A recent surveys of oncologists demonstrated that approximately 90% of oncologists ask patients about tobacco use and 80% advise patients to quit smoking, but less than half of oncologists regularly provide tobacco cessation support [11].

Even if the oncologist is motivated to arrange cessation support, accomplishing this goal within their specific healthcare system may be met with barriers. An assessment of NCI-designated Cancer Centers showed 58.6% had a tobacco treatment service within the center, but 20.7% reported no program or being unsure about affiliated tobacco treatment programs, while another 20.7% reported a program within the health care system or affiliated university to which patients could be referred [12]. Thus, 41% of centers do not have the

option of involving a comprehensive, systemic tobacco treatment program in the treatment of their cancer patients. In the treatment of lung cancer, prioritizing dedicated tobacco treatment services within each healthcare system has the potential to improve access to care for lung cancer patients, reducing surgery, radiation and chemotherapy complications, preventing second primary tumors, and improving survival rates. To accomplish systemic support for tobacco treatment services, the AACR policy statement suggests that an ongoing objective in cancer care is the recognition of the value of tobacco cessation interventions by health systems, payers, and research funders through provision of appropriate incentives for infrastructure development and intervention delivery [7].

Smoking Cessation and Lung Screening

Once tobacco treatment services are established within the healthcare system, there are also steps that can be taken to encourage smoking cessation in the *prevention* of lung cancer. Annual lung cancer screening with a low-dose computed tomography (LDCT) scan is recommended by the U.S. Preventive Services Task Force for high risk individuals (>30 pack years of smoking, <15 year quit-time, and 55–74 years of age) [13], with the Centers for Medicare & Medicaid Services and many private insurers now covering screening for this population. To promote the reach of smoking cessation services to these high risk populations, recent initiatives, including guidelines by the American College of Chest Physicians (ACCP) recommend that current smokers undergoing LDCT screening should be provided with tobacco treatment interventions that include counseling and pharmacotherapy [14]. Importantly, they note that the distribution of self-help materials at the time of screening and the act of screening alone are insufficient for achieving an increased rate of smoking abstinence. Instead, pairing evidence-based smoking cessation interventions (e.g., counseling and pharmacotherapy) with screening is likely to increase reductions in smoking [14] and result in improved downstream clinical outcomes for screening patients. The ACCP and American Thoracic Society published a policy statement indicating that one of the critical components of a comprehensive lung screening program is integration with a smoking cessation program [15], and the Association for the Treatment of Tobacco Use and Dependence/SRNT have encouraged incorporation of smoking cessation services into lung cancer screening [16]. Lung cancer screening provides an opportunity to intervene with smoking in a high-risk population that would not otherwise seek smoking cessation services, and lung cancer screening offers a modality through which access to these services can be expanded. Currently, there is little data on the optimal method and intensity to deliver cessation treatment in the screening environment [16]. Additional research is required to identify optimal methods, but implementation of the treatment approaches outlined in the U.S. Public Health Service’s clinical practice guidelines [4] should be considered for all screening programs.

Conclusions

In summary, tobacco treatment approaches that are recommended for the general population are also appropriate for lung cancer patients and should be pursued to reduce the burden of complications associated with continued smoking after cancer diagnosis. However, there may be instances in which tailoring of treatment options is required, such as offering

cessation counseling alone when pharmacotherapeutic support is contraindicated for the patient. Providers specializing in tobacco treatment services may need to be employed within (or associated with) oncology healthcare systems and consulted. We recommend this approach as a method to reduce barriers encountered on a systemic level to maximize the delivery of tobacco treatment for lung cancer patients. In addressing the issue of lung cancer prevention, we agree with prior policy statements and highly recommend incorporating tobacco treatment within the context of lung cancer screening. Behavioral counseling and pharmacotherapeutic support should be actively offered to all current smokers attending lung cancer screening.

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