

### Disparities Between Blacks and Whites in Tobacco and Lung Cancer Treatment

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#### ABSTRACT

Racial disparities exist in lung cancer incidence, morbidity, and mortality. Smoking is responsible for the majority of lung cancers, and racial disparities also exist in smoking outcomes. Black smokers are less likely than white smokers to engage in evidence-based tobacco treatment, and black smokers are less likely than white smokers to stop smoking. Continued smoking following

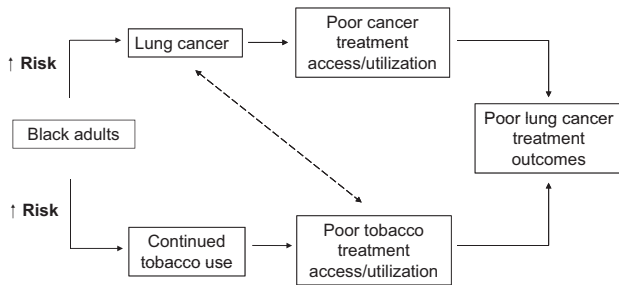
a lung cancer diagnosis is a potential indicator of poor lung cancer treatment outcomes, yet lung cancer patients who smoke are unlikely to receive evidence-based tobacco treatment. The risks from continued smoking after diagnosis deserve attention as a modifiable factor toward lessening racial disparities in lung cancer outcomes. *The Oncologist* 2011;16:1428–1434

#### BLACKS ARE AT RISK FOR LUNG CANCER AND POOR TREATMENT OUTCOMES

Lung cancer is the leading cause of cancer death for both men and women. With 222,000 new cases per year [1], lung cancer accounts for more deaths in the U.S. than breast cancer, prostate cancer, and colon cancer combined. Although the lung cancer incidence is higher among blacks than whites within all disease stages [2], these findings are driven by disparities between black men and white men. Black males have a higher annual lung cancer incidence (104.8 cases per 100,000 black males versus 85.9 cases per

100,000 white males) and mortality rate (90.1 cases per 100,000 black males versus 69.9 cases per 100,000 white males) [1, 3, 4], whereas lung cancer mortality rates among black and white women are now comparable (41.9 cases per 100,000 white females versus 40.0 cases per 100,000 black females) [5–7]. Black lung cancer patients are diagnosed with lung cancer at a younger age [8] and with more advanced disease (53.4% of blacks versus 47.8% of whites present with distant disease;  $p < .001$ ) [9], and they face higher mortality rates than white lung cancer patients with comparable disease severity [9, 10].

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**Figure 1.** A higher risk for continued tobacco use coinciding with a lung cancer diagnosis leads to a poor lung cancer treatment outcome.

Racial differences in lung cancer outcomes have been attributed to numerous risk factors [6, 11–13], such as higher rates of poverty [8, 14, 15] and medical comorbidity (e.g., hypertension, diabetes) [8] among black patients, treatment access [9], and patient–provider interactions [16, 17]. Using the Surveillance Epidemiology and End Results data, Lathan and colleagues (2006) reported that black lung cancer patients were less likely than early-stage white lung cancer patients to undergo staging (odds ratio, 0.75; 95% confidence interval [CI], 0.67–0.83) and receive a recommendation for surgery (67.0% versus 71.4%;  $p < .05$ ) [16]. McCann and colleagues reported that black lung cancer patients were more likely than white lung cancer patients to decline surgery (18% versus 5%;  $p = .002$ ) [17]. There is evidence of less effective communication patterns between patients and providers who are race discordant versus race concordant [18]. Lastly, black cancer patients have lower rates of enrollment in cancer clinical trials [19].

Taken together, studies of racial disparities in lung cancer outcomes have increased our understanding of the underlying risk factors but have not completely accounted for the elevated risk among black patients. Despite the anticipated role of smoking in lung cancer and adverse treatment outcomes, no research has focused on the contribution of continued smoking behavior and related factors in disparities in lung cancer treatment outcomes.

### BLACKS ARE AT RISK FOR CONTINUED SMOKING AND POOR CESSATION OUTCOMES

Cigarette smoking is responsible for 87% and 70% of lung cancer deaths in men and women, respectively [20]. Figure 1 illustrates how a higher risk for continued tobacco use coinciding with a lung cancer diagnosis can lead to poor lung cancer treatment outcomes. As in lung cancer treatment, disparities also loom in tobacco treatment and are likely a result of multiple predisposing risk factors. blacks initiate

smoking later (average age at onset, 17.4 years for blacks versus 14.7 years for whites;  $p < .05$ ) [21] and smoke fewer cigarettes per day than whites (14.1 versus 18.4 cigarettes per day) [21, 22]. However, despite later initiation, black adults smoke at rates similar to whites (black men, 23.9%; black women, 19.2%; white men, 24.5%; white women, 19.8%) [23]. This is of particular concern because evidence suggests that racial differences in nicotine exposure (nicotine intake per cigarette is 30.0% greater) and metabolism of tobacco (slower clearance of nicotine) place black smokers, compared with white smokers, at a higher risk for tobacco-related diseases [24, 25]. Blacks also have a lower rate of successful quitting [4, 26]. According to a Morbidity and Mortality Weekly Report of the National Health Interview Survey findings, successful quit rates of ever smokers were 51.0% (95% CI,  $\pm 1.1\%$ ) among whites and 37.3% (95% CI,  $\pm 2.7\%$ ) among blacks [27].

There could be several reasons for low quit rates among blacks. Racial differences in continued smoking may be attributable to socioeconomic vulnerabilities, such as poverty, stress, and secondhand smoke exposure [28]. Although the majority of black smokers express a desire to quit [29], they are less likely to receive and use evidence-based treatments [30, 31] (e.g., screening for tobacco use and advice to quit [32–34], smoking cessation pharmacotherapy [35–38], and counseling [31]). In addition, black smokers are less likely to enroll in smoking cessation trials [39]. Blacks are more likely to smoke mentholated cigarettes, and mentholated cigarettes might be harder to quit than nonmentholated cigarettes [21], which leads to poorer cessation outcomes [40]. Blacks report less accurate knowledge about the risks and prevalence of smoking [41–43] and about the benefits and risks of effective smoking cessation treatments. However, culturally targeted treatments can increase blacks' smoking risk perceptions [44], and evidenced-based smoking cessation treatment can improve blacks' quit rates [45]. Thus, although the underlying causes of racial differences in smoking patterns and related outcomes are not fully understood, improvements in tobacco treatment use and targeted treatments are needed.

### LUNG CANCER PATIENTS WHO CONTINUE TO SMOKE MAY BE VULNERABLE TO POORER CANCER TREATMENT OUTCOMES

Recent estimates of smoking at the time of a lung cancer diagnosis are 20%–30% [46–48]. However, whereas estimates of quitting around the time of diagnosis are in the range of 35%–79% [49, 50], about one third of nonadvanced-stage lung cancer patients resume smoking within the first year after surgery [50–52]. Dr. Park and colleagues

examined data from the Cancer Care Outcomes Research and Surveillance cohort survey and reported that 90% of lung cancer patients had a history of ever smoking and approximately one third of lung cancer patients reported smoking around the time of diagnosis [53]. It is important to note that many participants reported quitting tobacco use prior to, during, and immediately following a cancer diagnosis, resulting in a significant group of lung cancer patients who were relatively new former smokers and thus vulnerable to smoking relapse [50].

Research on the risks of continued smoking during cancer treatment suggests that quitting tobacco use upon a lung cancer diagnosis can improve the chance for treatment efficacy, reduce the chance for secondary tumors, and may double the chance for survival [54–58]. In a recent systematic review of observational studies using meta-analysis, continued smoking was associated with a significantly greater risk for all-cause mortality in early-stage non-small cell lung cancer patients (hazard ratio, 2.94; 95% CI, 1.15–7.54) and in limited-stage small cell lung cancer patients (hazard ratio, 1.86; CI, 1.33–2.59) [59]. Examinations of the effect of smoking on adverse events suggest that continued smoking is associated with treatment delays and more complications from surgery, including more complications from general anesthesia, a higher risk for severe pulmonary complications, and detrimental effects on wound healing [49, 60]. Continued smoking may also affect processes that increase the risk for complications of radiation and chemotherapy [55, 58]. Complications from smoking while undergoing radiation therapy include worse treatment efficacy and greater toxicity and side effects [61, 62]. Smoking while receiving chemotherapy exacerbates drug toxicity side effects and increases the incidence of infection [46, 63–65]. Future work examining the effects of continued smoking on treatment-related adverse events in lung cancer patients, particularly black adults, is needed.

#### **LUNG CANCER PATIENTS, PARTICULARLY THOSE WHO CONTINUE TO SMOKE, EXPERIENCE PSYCHOSOCIAL PROBLEMS**

Depression affects over one third [66–68] of the cancer patient population and is more prevalent [68, 69] and persistent [70] among lung cancer patients than among patients with other common tumor types. Depression is prevalent among smokers as well; the role of depression in smoking may be bidirectional, with smokers being more likely to be depressed than nonsmokers, and, in turn, depression posing a barrier to tobacco abstinence [71–74]. In fact, depressed smokers may perceive quitting as difficult and stressful, and may use cigarettes to self-medicate depressive feelings

[75, 76]. Depression is associated with continued smoking following a lung cancer diagnosis [48, 77], which may worsen the prognosis (e.g., through behavioral and biological pathways such as chronic hypothalamic–pituitary–adrenal axis activation) [78]. Thus, the psychological effects of having lung cancer and depression concurrently may lead to a heightened sense of vulnerability, delaying quit attempts [75]. This is of particular concern for blacks, because studies from the general population indicate that depression is more severe, chronic, debilitating, and undertreated [79] among blacks than among whites, with substantial racial disparities in the level and type of mental health care received.

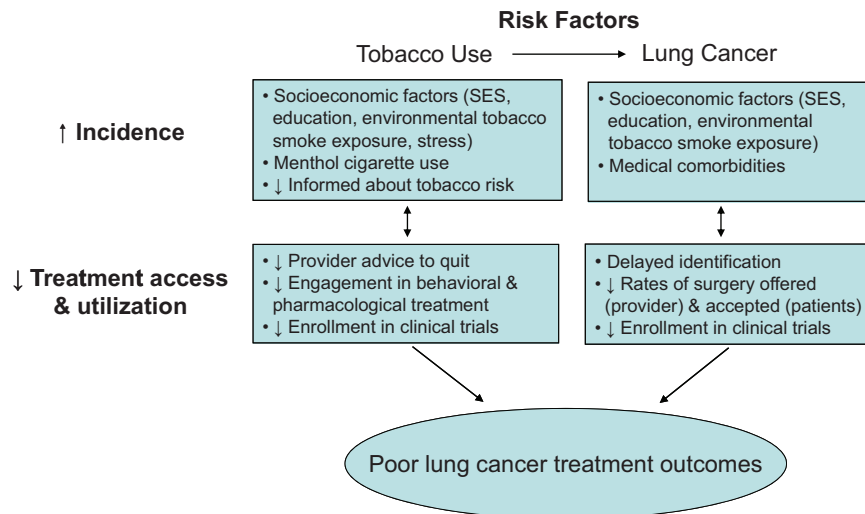
#### **Lung Cancer and Stigma**

Higher rates of depression in lung cancer patients and lung cancer patients who smoke may be a result, in part, of perceived and experienced stigma. Stigma is associated with cancer patients whose behavior may have contributed to their disease [80], which is especially true for lung cancer patients [81, 82]. Lung cancer patients are more likely than breast and prostate cancer patients to report internal causal attributions for their cancer [83, 84]. Within the past 20 years, cancer patient populations, such as breast cancer patients, have received greater sympathy and social awareness [85], but lung cancer patients are less likely to receive sympathy and support.

Lung cancer patients report feeling stigmatized regardless of their smoking status [81, 86]. However, patients who continue to smoke after diagnosis are at further risk for perceived stigma as well as barriers to seeking support for quitting tobacco use. In a survey of current smokers living in New York City, participants who perceived high compared with low levels of smoker-related stigma reported being less likely to disclose their smoking status [87]. Social norms, including disapproval of smoking and the poor prognosis for lung cancer patients, are factors in smoking stigma and may explain the heightened stigma experienced by lung cancer patients who are smokers [88]. Because of the association of lung cancer with smoking [80–82], lung cancer patients who continue to smoke experience shame [81, 83] for causing their disease and thus may be reluctant to discuss smoking with oncology providers.

#### **LUNG CANCER PATIENTS, PARTICULARLY BLACKS, ARE A VULNERABLE GROUP FOR WHOM SMOKING CESSATION TREATMENT IS EXTREMELY IMPORTANT**

Most lung cancer patients who smoke want to quit smoking [49, 50] but need help in order to do so. In the 2 years following a lung cancer diagnosis, 86.4% of smokers try to



**Figure 2.** Risk factors for tobacco use and lung cancer are associated with lower treatment access/use among black adults and may lead to a poor lung cancer treatment outcome.

Abbreviation: SES, socioeconomic status.

quit [50]. Recently, the American Society for Clinical Oncology's Quality Oncology Practice Initiative included among its core measures that: (a) cigarette smoking status be documented by the second medical visit and (b) tobacco treatment counseling be recommended to patients receiving cancer treatment [89]. Unfortunately, despite these new guidelines, half of comprehensive cancer centers do not have tobacco treatment programs [90]. Lung cancer patients generally do not receive tobacco treatment from their oncology providers, nor is smoking routinely addressed in the primary care setting following diagnosis [52, 91–93]. Consequently, most lung cancer patients who smoke have not used established behavioral and pharmacological tobacco treatment [48], and a lack of patient–provider communication in the context of smoking and a lung cancer diagnosis might exacerbate this gap in treatment.

## GENERAL DISCUSSION

Black lung cancer patients who smoke experience a confluence of risk factors for poor lung cancer treatment outcomes. Figure 2 summarizes how risk factors for a higher incidence of tobacco use and lung cancer and poorer treatment access and utilization for tobacco use and lung cancer may lead to poor lung cancer treatment outcomes among black adults. Black smokers are less likely to receive effective tobacco treatment and are more likely to have poor tobacco treatment outcomes. Because blacks and smokers are vulnerable to inadequate treatments for smoking and risk factors for smoking relapse (e.g., depression), they may be more likely to have adverse events from lung cancer treatment, poorer lung cancer treatment outcomes and, ultimately,

a higher mortality rate from lung cancer. Thus, some of the disparities in lung cancer outcomes in blacks could be a result of smoking and related disparities in tobacco treatment.

Smoking could be a modifiable risk factor for poor lung cancer outcomes in blacks, and addressing smoking could have immediate effects on treatment efficacy, adverse events, and quality of life. Models have been posited for addressing smoking during oncology care [48] and for targeting treatment to black smokers [94]. Important cancer-related factors to consider when targeting treatment to lung cancer patients include: the benefits of quitting following a cancer diagnosis (for treatment and for preventing secondary tumors and other smoking-related disease), the shame and stigma about a cancer diagnosis, preparing for cancer treatment, pain and symptom management, fatalism, and disease-targeted materials [48]. Important factors to target smoking cessation treatment for black smokers include health disparities (both in the rate of lung cancer and in treatment outcome), emotional and psychological concerns (targeted to unique stressors for this population), family and religion, and culturally appropriate materials [44, 94]. These factors should be considered in future work to decrease the prevalence of continued smoking after diagnosis, as a step toward lessening racial disparities in lung cancer outcomes.

## AUTHOR CONTRIBUTIONS

**Conception/Design:** Elyse R. Park, Sandra J. Japuntich, Lara Traeger, Sheila Cannon

**Manuscript writing:** Elyse R. Park, Sandra J. Japuntich, Lara Traeger, Sheila Cannon, Hannah Pajolek

**Final approval of manuscript:** Elyse R. Park, Sandra J. Japuntich, Lara Traeger, Sheila Cannon, Hannah Pajolek

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