NCI Monograph 23
Treating Smoking in Cancer Patients:
An Essential Component of Cancer Care

Chapter 5
Addressing Smoking in Medically Underserved and Vulnerable Cancer Populations

Chapter Contents

Figures and Tables

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Introduction

Although cigarette smoking prevalence and cancer deaths caused by tobacco have declined over the past several decades,[1] disparities in tobacco use and tobacco-related cancer burden persist among various populations in the United States.[2] Greater knowledge of health disparities caused by tobacco can provide useful information to health care systems and clinicians about population-specific needs for cigarette smoking cessation treatment, especially among patients with cancer. Such knowledge has the potential to enhance patient care and smoking cessation treatment effectiveness, reduce cancer-related health disparities, and promote population health. This chapter reviews research regarding medically underserved and vulnerable populations who experience disparities in cancer burden, smoking prevalence, access to smoking cessation treatment, and/or smoking cessation treatment success.

For the purposes of this monograph, "vulnerable" refers to a heightened risk for cancer or a higher cancer burden relative to the general population. Medically underserved and vulnerable populations discussed in this chapter include:

- Socioeconomically disadvantaged populations;
- Racial and ethnic minority populations;
- Individuals residing in rural areas (rural populations);
- Sexual and gender minority (SGM) populations (e.g., lesbian, gay, bisexual, transgender individuals);
- Individuals with co-occurring substance use disorders; and
- Individuals with serious mental illness (SMI), specifically those with schizophrenia spectrum disorders and bipolar disorder.

The intent of this chapter is to inform relevant stakeholders of the challenges medically underserved and vulnerable populations face, especially concerning enhancing treatment of cigarette smoking. This chapter characterizes the targeted populations regarding their status across multiple domains (e.g., individual, social, economic, cancer burden) that are associated with cigarette smoking and response to smoking cessation treatment. The characteristics reviewed were gleaned largely from empirical associations with a primary focus on characteristics seen as relevant to the clinical encounter and treatment of patients with cancer. Given the nature of the available evidence, there was no attempt to rank order such influences or to evaluate the validity of particular causal or theoretical frameworks, although some frameworks are discussed as background information. The chapter begins with a discussion of the challenges faced by medically underserved and vulnerable patients with cancer, both those who smoke and those who do not. The chapter reviews available data on the cancer burden (incidence, prevalence, and mortality) of these groups to underscore the observed health

disparities. The chapter then explores smoking patterns, cessation patterns, and barriers to care among medically underserved and vulnerable populations and seeks to apply lessons learned from the general population when data from patients with cancer are unavailable or limited.

The Socioecological Model

Health disparities among medically underserved and vulnerable groups have been conceptualized via the socioecological model (SEM),[3,4] which posits that health is determined and reinforced by multiple factors at the individual, interpersonal, community, and societal levels. These same factors may also result in health inequities.

- The individual, which encompasses characteristics such as race and ethnicity, income, educational attainment, sexual orientation, and gender identity; affective or psychiatric status; attitudes, knowledge, perceptions, and motivation of the members of medically underserved and vulnerable populations; and characteristics of clinicians, such as knowledge level, behaviors, or biases;
- Interpersonal social context, such as family systems and intimate relationships, experiences of discrimination or stigma, exposure to smoking in social networks, social norms, and clinician practice patterns (e.g., the offer of smoking cessation treatment);
- The community and health care system, which includes the availability of smoking cessation treatment services and resources; barriers to accessibility; policies, such as protocols for clinical screening for tobacco use and the cost of services, adaptation, and utilization/engagement; and shared attitudes among clinicians; and
- The societal level, including cultural and social norms; health, economic, educational, and social policies; discrimination; tobacco industry marketing patterns; educational opportunities; public service campaigns; and disparities in health care resources or health insurance coverage.

As explained by the National Cancer Institute's (NCI) Tobacco Control Monograph 22:

> The socioecological model underscores the interrelationships between tobacco use and multiple disparate circumstances—social, educational, health, residential, economic, and political disparities—and how each influences the other. This model makes it possible to critically examine the dynamic influences of factors (e.g., stressors, social or financial difficulties) on tobacco–disease trajectories, the timing of exposure to these factors, and the clustering of these factors at different points in relationship to disease outcomes. The socioecological model calls attention to the chronicity and incidence of disadvantages (e.g., discrimination, disenfranchisement, low SES) and how these disadvantages influence disparities.[5,p.9]

Thus, the SEM suggests that factors, such as stressors, arise and are expressed at multiple levels and contexts in a person's life[6] and therefore encourages consideration of a broad range of potential influences on cancer and smoking disparities.

Many medically underserved and vulnerable populations share exposure to potential barriers to smoking cessation, such as resource constraints; lower educational attainment; limited health care access; social barriers, such as stigmatization; exposure to high levels of smoking in their

environments; exposure to targeted tobacco industry marketing for menthol cigarettes and other tobacco products (e.g., little cigars); discrimination; stress; lack of or inadequate health insurance; and lack of access to effective smoking cessation treatment. Complex interactions among such factors, occurring at multiple levels and during the life course, could contribute to the high rates of cancer, cancer mortality, and/or tobacco use observed among medically underserved and vulnerable populations.[2,7,8]

Combinatorial Effects on Vulnerabilities

It is possible or likely that factors that affect cancer, smoking, and treatment disparities could exert effects in complex, multifactorial ways. Indeed, evidence indicates that combinations of identities or characteristics can produce effects on health outcomes that differ from those produced by single influences. Therefore, when evaluating possible influences on disparities in health outcomes, it is important such influences are not viewed as producing orthogonal or isolated effects. For example, data from the 2012–2013 National Epidemiologic Survey of Alcohol and Related Conditions-III show that tobacco use is especially high among sexual minority individuals who also report experiences of racial discrimination.[9] Perceptions of inequities and discrimination could exacerbate the effects of chronic stress,[10] which can affect health via psychological or physiological mechanisms.[11,12] This chronic stress could exacerbate the additional stress caused by cancer and could increase negative reactions to it, including reduced cancer treatment adherence, cancer fatalism (i.e., the belief that a cancer is uncontrollable and a death sentence),[13,14] and reduced likelihood of engagement with smoking cessation treatment and successful cessation.

This chapter identifies multiple factors that can be related to smoking behaviors by medically underserved or vulnerable individuals with cancer; however, the many possible causal pathways of such factors are not explored.

Stigma in Medically Underserved and Vulnerable Populations

Certain characteristics or experiences are likely to be relevant to all medically underserved and vulnerable populations, and these experiences could affect their willingness to engage in smoking cessation treatment and quit smoking. One such shared experience is stigma, a factor that might affect both access to and use of health care resources, including smoking cessation treatment.[6] Although stigma could affect any individuals who smoke, stigma could be especially pronounced for medically underserved and vulnerable populations.

The effect of stigma is particularly relevant because patients with cancer, medically underserved and vulnerable populations, and people who smoke can all experience varying degrees of stigma. For example, individuals with SMI, such as bipolar disorder, report significant concern about being devalued or discriminated against because of their mental health condition, and such concern is positively related to their level of symptomatic impairment.[15]

Stigma has two components. The internalized components are the individual's anticipation, experience, and subsequent internalization of negative appraisals from others or from generally held beliefs. The externalized components include the negative attitudes and behaviors that occur in reaction to another person's characteristics (e.g., poverty, ethnicity, race, substance use, disability). Externalized beliefs can be primary determinants of internalized stigma, although a

person's own attributions can also affect felt stigma.[6,16] There is evidence that stigma associated with smoking or with having a cancer caused by smoking can affect a patient's communication with their clinicians, including disclosure of smoking behavior; their pursuit of, or engagement in, smoking cessation treatment; their adherence to cancer treatment; and their likelihood of seeking cancer screening.[6,17]

Stigma is relevant to medically underserved and vulnerable populations in several ways. Some members of medically underserved and vulnerable populations, including racial and ethnic minority groups, low-income individuals, and SGM individuals, report high levels of discrimination,[18–20] which could affect their internalization of stigma. For example, members of SGM populations report discrimination related to their sexual/gender behaviors or identification, which could be responsible, in part, for their low rate of health care engagement and high levels of subjective distress.[19,21–25] Moreover, many medically underserved and vulnerable populations have especially high smoking prevalence rates,[26] and as such they are likely to experience stigma related to smoking or having cancer caused by smoking, such as lung cancer.[6,27–29]

In the cancer context, stigma connotes that those using cigarettes often feel "guilty" for continuing to smoke despite knowing the health risks of smoking, they could have "brought it [their cancer] on themselves," and are not worthy of help.[27] Public health messages intended to inform the public that cigarette smoking causes many types of cancers could have the unintended consequence of appearing to assign personal blame for these cancers, thus generating subsequent negative perceptions of those with cancers caused by smoking among the general public or clinicians, as well as negative internalized self-perceptions among patients with cancer.[6,16]

Stigma, both internalized and expressed, can contribute to multiple clinical challenges and present barriers to smoking cessation among patients with cancer. Stigma can trigger guilt and self-blame and, thus, affect willingness to enter smoking cessation treatment or disclose smoking status to one's clinician.[6,17] Stigma can also lead to defensive reactions, including a decreased desire to quit smoking.[30,31] Further, stigma can be expressed by clinicians in the form of reduced empathy and pessimistic assumptions about patients' interest in or ability to quit; such reactions might serve as a barrier to effective patient–clinician communication.[6,29] With respect to medically underserved and vulnerable groups, the effects of stigmatization of smoking should also be considered within the context of other factors faced by these individuals, including economic hardships, stress, and discrimination.[6]

Prevalence and Trends in Smoking: Relevance to Medically Underserved and Vulnerable Populations With Cancer

The number of individuals within the different medically underserved and vulnerable populations in the United States varies; some communities are quite large and, collectively, these populations constitute a large portion of the U.S. population. For example, SGM populations constitute an estimated 3%–11% of the U.S. population,[32,33] and about 20% of the U.S. population reside in rural areas.[34] When considered in totality, the prevalence of medically underserved and vulnerable groups in the United States, as well as their elevated cancer burden, suggests that they constitute a large portion of the patient population seeking cancer care. Further, although smoking prevalence has generally fallen across medically underserved and vulnerable populations, many continue to smoke at high rates (Table 5.1), resulting in a

potentially disproportionate smoking-associated cancer burden and need for cessation treatment by those receiving cancer treatment.[1,2]

Table 5.1 Prevalence of Current Cigarette Smoking Among U.S. Adults Aged 18 and Older, by Sex, Race and Ethnicity, Poverty Status, Income, Educational Attainment, and Sexual Orientation, 1994–2020

Category	1994	1998	2002	2006	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total	25.5	24.1	22.5	20.8	19.3	19.0	18.1	17.8	16.8	15.1	15.5	14.0	13.7	14.0	12.5
Sex															
Male	28.2	26.4	25.2	23.9	21.5	21.6	20.5	20.5	18.8	16.7	17.5	15.8	15.6	15.3	14.1
Female	23.1	22.0	20.0	18.0	17.3	16.5	15.8	15.3	14.8	13.6	13.5	12.2	12.0	12.7	11.0
Race/ethnicity[a]															
White	26.3	25.0	23.6	21.9	21.0	20.6	19.7	19.4	18.2	16.6	16.6	15.2	15.0	15.5	13.3
Black	27.2	24.7	22.4	23.0	20.6	19.4	18.1	18.3	17.5	16.7	16.5	14.9	14.6	14.9	14.4
Latino or Hispanic	19.5	19.1	16.7	15.2	12.5	12.9	12.5	12.1	11.2	10.1	10.7	9.9	9.8	8.8	8.0
American Indian or Alaska Native	42.2	40.0	40.8	32.4	31.4	31.5	21.8	26.1	29.2	21.9	31.8	24.0	22.6	20.9	27.1
Asian or Pacific Islander	13.9	13.7	—	—	—	—	—	—	—	—	—	—	—	—	—
Asian	—	—	13.3	10.4	9.2	9.9	10.7	9.6	9.5	7.0	9.0	7.1	7.1	7.2	8.0
Multiple races	—	—	—	—	25.9	27.4	26.1	26.8	27.9	20.2	25.2	20.6	19.1	—	—
Poverty status															
At or above	24.1	23.5	22.2	20.4	18.3	17.9	17.0	16.2	15.2	13.9	14.3	—	—	—	—
Below	34.7	32.3	32.9	30.6	28.9	29.0	27.9	29.2	26.3	26.1	25.3	—	—	—	—
Unknown	28.8	22.5	19.7	18.3	16.0	15.0	13.6	16.0	16.4	10.5	12.0	—	—	—	—
Income (USD)															
<35,000	—	—	—	—	—	—	—	—	—	—	—	21.4	21.3	21.4	20.2
35,000–74,999	—	—	—	—	—	—	—	—	—	—	—	15.3	14.9	15.7	14.1
75,000–99,999	—	—	—	—	—	—	—	—	—	—	—	11.8	13.3	11.4	10.5
≥100,000	—	—	—	—	—	—	—	—	—	—	—	7.6	7.3	7.1	6.2
Educational attainment[b]															
0–12 years (no diploma)	—	—	27.6	26.7	25.1	25.5	24.7	24.2	22.9	24.2	24.1	23.1	21.8	21.6	21.5
≤8th grade	23.7	21.9	19.3	17.4	16.2	15.0	15.2	15.4	13.7	14.4	16.2	—	—	—	—
9th–11th grade	38.2	36.8	34.1	35.4	33.8	34.6	32.1	33.2	29.5	31.6	30.7	—	—	—	—
12th grade (no diploma)	—	—	31.0	25.6	21.7	25.1	24.7	19.7	25.7	26.3	24.8	—	—	—	—
GED certificate	—	—	42.3	46.0	45.2	45.3	41.9	41.4	43.0	34.1	40.6	36.8	36.0	35.3	32.0

Table 5.1 (continued)

Category	1994	1998	2002	2006	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
High school graduate	29.8	27.4	25.6	23.8	23.8	23.8	23.1	22.0	21.7	19.8	19.7	18.7	19.7	19.6	17.6
Some college (no degree)	—	—	23.1	22.7	23.2	22.3	20.9	20.9	19.7	18.5	18.9	17.4	18.3	17.7	14.4
Associate degree	—	—	21.5	21.2	18.8	19.3	17.9	17.8	17.1	16.6	16.8	15.5	14.8	14.0	12.7
Undergraduate degree	—	—	12.1	9.6	9.9	9.3	9.1	9.1	7.9	7.4	7.7	7.1	7.1	6.9	5.6
Graduate degree	—	—	7.2	6.6	6.3	5.0	5.9	5.6	5.4	3.6	4.5	4.1	3.7	4.0	3.5
13–15 years	25.7	24.6	—	—	—	—	—	—	—	—	—	—	—	—	—
≥16 years	12.3	11.3	—	—	—	—	—	—	—	—	—	—	—	—	—
Sexual orientation[c]															
Straight	—	—	—	—	—	—	—	17.6	16.6	14.9	15.3	13.7	13.5	13.8	12.3
Gay/lesbian/ bisexual	—	—	—	—	—	—	—	26.6	23.9	20.6	20.5	20.3	20.6	19.2	16.1

Note: Numbers are percentages. Em dash (—) = data not collected in a category for a particular year. Current smoking includes individuals who smoked at least 100 cigarettes in their lifetime and who smoked every day or some days. The National Health Interview Survey (NHIS) was redesigned in 1997 and 2019, and trend analysis and comparison with prior years should be conducted with caution.

[a]All racial and ethnic groups are non-Hispanic except those categorized as Hispanic. In 1997, the Office of Management and Budget changed its data collection guidelines to require that Native Hawaiian and Other Pacific Islander data be collected separately from Asian populations. Limited data were collected on American Indian or Alaska Native people, and data for a single year could be unstable or unreliable due to a small sample size. Data on current smoking among Native Hawaiian or other Pacific Islander people are not reported. [b]Additional categories were added to education in 1999. Educational attainment data are provided for individuals aged 25 years or older. GED = general educational development certificate. [c]Response options provided on the NHIS were "straight, that is, not gay" for men, and "straight, that is, not gay or lesbian" for women.

Sources: National Health Interview Survey, 1994–2019: Agaku et al. 2014[362]; Centers for Disease Control and Prevention (CDC) 1996,[363] 2000,[364] 2004,[365] 2007,[366] 2012[367]; Cornelius et al. 2020,[368] 2022[41]; Creamer et al. 2019[369]; Jamal et al. 2014,[370] 2015,[371] 2016,[372] 2018[373]; Wang et al. 2018.[374]

In particular, smoking prevalence remains high among socioeconomically disadvantaged populations,[5,35–37] as well as among members of certain racial and ethnic minority groups,[5] residents of rural areas,[38] and those with SMI.[39]

As noted, it could be helpful to consider the effects of potential influences in combination rather than in isolation. Thus, there is evidence that smoking prevalence varies with different intersections of medically underserved and vulnerable populations. For example, smoking prevalence is especially high among individuals who are both socioeconomically disadvantaged and who experience mental illness.[40] In addition, smoking prevalence is higher among Black or African-American and Latino or Hispanic individuals living in rural areas compared with those living in urban areas.[41] As stated in the 1998 Surgeon General's Report on Smoking and Health:

> No single factor determines patterns of tobacco use among racial/ethnic groups; these patterns are the result of complex interactions of multiple factors, such as socioeconomic status, cultural characteristics, acculturation, stress, biological elements, targeted advertising, price of tobacco products, and varying capacities of communities to mount effective tobacco control initiatives.[42,p.6]

It is important for researchers and clinicians to increase understanding of these factors and others that drive tobacco-related disparities, such as contextual effects, education, discrimination, economic opportunities, and stress, and explore how this information can be used to enhance the reach and effectiveness of clinical and population-based smoking interventions among medically underserved and vulnerable populations. Clinicians attempting to intervene to effect smoking cessation by cancer patients who are members of these populations need to be prepared to recognize these attendant complexities.

Heterogeneity Among Medically Underserved and Vulnerable Populations

It is vital to recognize that medically underserved and vulnerable populations are not homogeneous, and any broad characterizations discussed in this chapter are likely to be inaccurate in describing many members of such groups. For example, there is not only inevitable variation among individuals in such groups, but there are also diverse subgroups within each population group. For example, SGM populations include lesbian, gay, bisexual, and transgender people, and include individuals of all races, ages, socioeconomic statuses (SES), and geographic locations, each of which can have somewhat distinct smoking patterns and cancer burden.[43–45] In Asian populations, who overall have higher levels of income and educational attainment compared with other racial and ethnic minority groups, some subgroups, including Cambodian and Hmong individuals, have lower levels of education and higher levels of poverty.[46–48] Recognition that subgroups within larger populations can have very distinct health profiles and outcomes has led to suggestions for research designs that focus on factors or dimensions within subpopulations that confer heightened vulnerability.[49] Such variation should be kept in mind when collecting, analyzing, and disseminating data on medically underserved and vulnerable populations and in the consideration or formulation of clinical or public health actions.

In sum, the individual who is a member of a medically underserved and vulnerable group is likely affected by influences that span individual to societal strata, with one possible influence being stigmatization. The complex nature of such influences could be increased by the fact that individuals can belong to multiple medically underserved and vulnerable groups and the fact that such groups are heterogeneous. Thus, researchers and clinicians should be aware of and sensitive to a person's membership in a medically underserved and vulnerable group, as well as unique individual features that can affect their health.

Cancer Burden

The medically underserved and vulnerable populations discussed in this chapter can be considered vulnerable, in part, because many of them have higher cancer incidence and mortality rates than the general population, although these figures vary by population and cancer site. This section will not attempt to thoroughly characterize the cancer burden of the populations reviewed in this chapter. Rather, specific examples will be offered to support two points: (1) multiple medically underserved and vulnerable populations face especially high levels of cancer incidence and mortality, and (2) the burden varies across populations in level and type of cancer so that the risk of each population warrants focused evaluation.

Socioeconomically disadvantaged groups have higher incidences of cancer and cancer-related mortality than do higher SES groups.[1,50] Substantial disparities by SES exist among patients

diagnosed with cancers caused by smoking, including lung, colorectal, cervical, stomach, and liver cancer.[1,8,51,52] For example, a study found that among individuals with fewer than 12 years of education or living below the poverty threshold, lung cancer incidence rates were 1.5 to 3 times greater than in college graduates or individuals with higher incomes.[51] Such evidence speaks to the important role of smoking in cancer incidence across medically underserved and vulnerable populations (see "Factors Associated with Cancer Burden" below).

In addition, some racial and ethnic groups in the United States face relatively high levels of cancer burden. For example, while the disparity between cancer mortality of Black or African-American and White individuals has narrowed over time, Black or African-American men and women in 2019 had the highest cancer mortality rate overall and for most cancer sites compared with all other racial and ethnic groups.[53] Black or African-American individuals have relatively high lung cancer incidence rates, especially among males, and they also have the worst survival rates.[54–56] Some racial and ethnic populations also exemplify the variation in the burden of specific cancers that occur across medically underserved and vulnerable populations. Latino or Hispanic and Asian or Pacific Islander individuals, for example, have lung cancer rates that are about half of those of White individuals, yet these two groups have a higher incidence of and mortality from liver cancers compared with White individuals.[57]

Individuals residing in rural areas provide further evidence of the variability in cancer burden that occurs across medically underserved and vulnerable populations. Rural populations have a lower incidence of cancer overall,[58] yet they tend to have a greater incidence and mortality from cancers caused by smoking, including lung and laryngeal cancers, compared with individuals living in urban areas.[58,59] In addition, a 2019 report found that lung cancer incidence rates were higher and decreased more slowly in nonmetropolitan than in metropolitan counties.[60]

Some SGM populations face a heightened cancer burden. For example, compared with heterosexual men, gay men are more likely to be diagnosed with cancer, even after controlling for demographic and socioeconomic factors.[61] In addition, bisexual women have a greater likelihood of being diagnosed with cancer compared with heterosexual women.[61]

Individuals who use tobacco along with other substances also tend to have especially high rates of cancer. For instance, the use of both cigarettes and alcohol can increase the risk of cancer synergistically.[62] A study using data from the International Head and Neck Cancer Epidemiology Consortium found a greater than multiplicative joint effect of tobacco and alcohol use on the risk of head and neck cancer.[63] In addition, the use of both tobacco and alcohol is also associated with increased risk of second primary cancer.[64,65] Abundant evidence indicates that alcohol use is associated with an elevated risk of multiple forms of cancer regardless of smoking status.[66–68]

With regard to SMI, a retrospective cohort study comparing Maryland Medicaid beneficiaries diagnosed with schizophrenia or bipolar disorder (N = 3,317) with the general population found a standardized incidence rate (SIR) of 2.6 for cancers of all types (95% confidence interval [CI], 2.2–3.0 for schizophrenia and 2.0–3.2 for bipolar disorder). Lung cancer SIRs among participants with schizophrenia and bipolar disorder were 4.7 (95% CI, 3.1–6.8) and 4.1 (95% CI, 2.2–7.2), respectively.[69]

Factors Associated With Cancer Burden

As noted above, there is variability not only in the level of cancer burden in medically underserved and vulnerable populations, but also in the likely causes of cancer risk. For instance, populations of lower SES or those living in rural areas tend to have less access to health care, including cancer screening,[70–72] less health insurance coverage,[73,74] and greater exposure to environmental toxicants.[70,72] These factors could contribute to heightened cancer mortality. Some SGM populations appear to incur greater cancer risk due to exposure to human immunodeficiency virus (HIV) or human papillomavirus (HPV) infection via sexual practices. Consistent with this, gay or bisexual men are over-represented among men with Kaposi sarcoma and anal cancer.[75,76] SGM populations, and other medically underserved and vulnerable populations, could also avoid accessing health care for fear of stigmatization and discrimination.[19,44] Finally, a major factor in the increased cancer burden of many medically underserved and vulnerable populations is higher rates of smoking. There is strong evidence that smoking contributes to differential cancer incidence and mortality rates in some racial and ethnic groups,[42,77–79] some SGM groups,[80] groups with low SES,[8,70,72] persons with SMI,[81,82] and individuals in some substance-using groups.[62,63,83]

Summary: Cancer Burden

Cancer risk among medically underserved and vulnerable populations defies simple characterization. However, evidence suggests that many of these populations experience higher risks of cancer relative to nonmedically underserved or vulnerable groups, and that in many cases, this risk is attributable, in part, to smoking. This disproportionate elevation in cancer burden underscores the need to encourage smoking cessation in these groups, increase their access to smoking cessation treatment, and understand the effectiveness of such treatment within specific populations. It also underscores the need to ensure that health care settings are perceived as welcoming to diverse population groups.

Smoking Cessation Treatment for Medically Underserved and Vulnerable Populations in the Clinical Cancer Care Context

The following section reviews the evidence on smoking cessation treatment within the context of cancer care for each of the following medically underserved and vulnerable groups: (1) socioeconomically disadvantaged populations; (2) racial and ethnic minority populations; (3) rural populations; (4) SGM populations; (5) individuals with co-occurring substance use disorders and smoking; and (6) individuals with SMI. Where possible, data on cancer populations are used, but relevant data from noncancer populations are also considered, largely due to the paucity of research on smoking cessation treatment among cancer populations.

Smoking Among Socioeconomically Disadvantaged Populations With Cancer

Epidemiology

Smoking is especially prevalent among socioeconomically disadvantaged populations with cancer, similar to populations without cancer.[36,37,84] Smoking prevalence overall has decreased among all populations over time, including among those living below the poverty threshold and with lower levels of educational attainment (Table 5.1), which reflects the influence over time of policies intended to prevent and control tobacco use and secondhand smoke (SHS) exposure,

along with steps taken to increase access to smoking cessation treatment (e.g., nationwide access to free tobacco cessation quitlines).[85] However, smoking prevalence remains substantially higher among socioeconomically disadvantaged populations with cancer or a cancer history than among higher-SES populations with a similar cancer status. This disparity occurs across cancer types and multiple measures of SES including poverty level, income, educational attainment, and health insurance status.[86–91]

Smoking Cessation

Observational studies show that socioeconomically disadvantaged individuals are more likely than higher-SES individuals to continue to smoke after a cancer diagnosis.[92,93]A study by Talluri and colleagues assessed factors that were associated with smoking cessation among adults with an initial cancer diagnosis in a cross-sectional study based on the National Health Interview Survey (NHIS) that captured data from 2006 to 2018.[94] This population-based survey of U.S. residents who were 18 or older included 381,989 respondents of whom 35,524 (8.8%) had a cancer diagnosis. The data revealed a strong association between measures of SES and smoking cessation success; having an undergraduate degree or a post-graduate degree was associated with greater success, while living below the poverty threshold was associated with much poorer success. The association between socioeconomic disadvantage and lower likelihood of cessation has also been found in studies of patients with cancers caused by smoking.[95–97]

Research with both patients with cancer and populations without cancer suggests that socioeconomic disadvantage is typically associated with poorer cessation outcomes both when making unaided quit attempts and when using formal treatment (i.e., medication and/or counseling).[93,98–108] This association does not appear to be due to fewer attempts to quit smoking.[104,106] For example, past-year quit attempts were similar among those living below the poverty threshold and those living at or above the poverty threshold in 2015 (55.5% and 55.2%, respectively).[85] However, adults living below the poverty threshold have less success in quitting. In 2017, the quit ratio (the number of former smokers divided by the number of ever-smokers) among those living below the poverty threshold was 42.2% (95% CI, 38.7%–45.7%) while it was 64.5% (95% CI, 63.2%–65.8%) for those living above the poverty threshold.[85] Unfortunately, little is known about smoking cessation treatment and success among low-SES cancer populations who smoke.

Barriers to Smoking Cessation

Socioeconomically disadvantaged patients with cancer face multiple barriers to smoking cessation. These barriers include low rates of health insurance and/or poor access to both health care and smoking cessation treatment resources,[109–116] as well as high levels of psychological distress, competing priorities, nicotine dependence, high levels of exposure to smoking in the environment, and relatively low perceived social support.[117,118]

There is also compelling evidence that socioeconomically disadvantaged populations have been targeted by tobacco companies through advertising and promotions. Such advertising is based on extensive research that characterizes the needs and motivations of these populations and tobacco companies develop tobacco products, advertising, and promotions to appeal to this audience.[5] Moreover, socioeconomically disadvantaged individuals often reside in neighborhoods that have

dense concentrations of tobacco retailers; this is especially true in neighborhoods with predominantly racial and ethnic minority residents.[119–121] Socioeconomically disadvantaged individuals could perceive smoking as more normative due to greater exposure to it in their social environments,[117,122,123] which could affect their motivation to quit smoking or to seek smoking cessation treatment.

Knowledge barriers might interfere with smoking cessation treatment engagement or motivation to quit, including those for socioeconomically disadvantaged patients with cancer. In the general population, individuals who smoke and who are of lower SES tend to have less awareness about the harms of smoking and the availability of effective smoking cessation treatments.[124–127] Consistent with this, a qualitative study conducted among lower-SES cervical cancer patients revealed a lack of awareness that smoking was associated with cervical cancer.[128]

While incomplete knowledge can serve as barriers to cessation treatment engagement in socioeconomically disadvantaged populations, there is evidence from the general population that such barriers can be effectively addressed. For example, quitlines attract a disproportionate number of people of lower SES who smoke.[129] Furthermore, evidence indicates that media campaigns are especially effective in attracting socioeconomically disadvantaged individuals to quitlines[130–132]; use of quitlines could therefore have utility when extended to patients with cancer who are socioeconomically disadvantaged.

Summary: Smoking Among Socioeconomically Disadvantaged Populations With Cancer

Socioeconomically disadvantaged populations have high smoking prevalence and are more likely than non-disadvantaged populations to continue smoking after a cancer diagnosis. Further, lower-SES individuals, in general, tend to be less successful in quitting compared with higher-SES individuals who smoke. Socioeconomically disadvantaged individuals who smoke face multiple barriers to successful smoking cessation, including relatively poor access to smoking cessation treatment resources, greater exposure to smoking in their environments, knowledge barriers, and greater exposure to tobacco advertising and promotion. These findings should encourage cancer care clinicians and programs to ensure that socioeconomically disadvantaged patients with cancer have access to smoking cessation treatment and are informed about the benefits of cessation in relation to their cancer.

Smoking Among Racial and Ethnic Minority Populations With Cancer

Epidemiology

In the general population, there are notable differences in smoking prevalence within and between different racial and ethnic minority groups. For example, although overall smoking prevalence among Latino or Hispanic individuals in the United States is lower than among people who are not Latino or Hispanic (Table 5.1), significant differences in prevalence exist within the U.S. Latino or Hispanic population (e.g., smoking prevalence is typically higher among men than women and among certain subgroups).[133] Similarly, while smoking prevalence is somewhat higher among Black or African-American men than among White men, Black or African-American women have a lower smoking prevalence than do White women.[26,134–136]

Smoking patterns among racial and ethnic groups also differ. For example, while Black or African-American individuals tend to smoke fewer cigarettes per day than White Americans, it has also been reported that they have lower rates of cessation[137] and derive more nicotine from each cigarette smoked.[138] These differences could account, at least in part, for higher rates of lung cancer at equivalent rates of cigarettes smoked per day.[55,139] Further, Black or African-American men have been reported to have higher prevalence of smoking nondaily (as opposed to daily) than White men.[135] Latino or Hispanic individuals are especially likely to have light and intermittent smoking patterns.[140,141] Additionally, Black or African-American individuals are significantly more likely to be exposed to SHS than are White individuals. Among nonsmoking individuals aged 3 years or older, the prevalence of SHS exposure was 50.3% for Black or African-American individuals and 21.4% for White individuals in 2013–2014.[142] Although SHS exposure has decreased over time, exposures remained higher among Black or African-American adults compared with White adults in 2015–2018 (39.7% vs. 18.4%, respectively).[143]

A striking characteristic of the smoking patterns of Black or African-American individuals is their high prevalence of menthol cigarette use.[144–146] Data from the 2019 National Survey on Drug Use and Health (NSDUH) indicate that, among Black or African-American adults who smoke, the majority (85%) use menthol cigarettes.[147] Menthol cigarette use is associated with reduced likelihood of smoking cessation, particularly among Black or African-American individuals who smoke.[148–154] A 2020 meta-analysis of 19 studies found that among Black or African-American individuals who smoked cigarettes, those who smoked menthol cigarettes had 12% lower odds of smoking cessation, which may be due in part to targeted tobacco industry marketing in Black or African-American communities.[153] In addition, an analysis of 2013–2018 data from the Population Assessment of Tobacco and Health (PATH) Study compared the quitting success of individuals who switched from smoking menthol cigarettes to non-menthol cigarettes versus the quitting success of those who continued to smoke menthol cigarettes. The results showed that switching to nonmenthol cigarettes was associated with a 58% increased probability of later abstinence from smoking when abstinence was defined as 30-days of no smoking, and was associated with a 97% increased probability of abstinence when abstinence was defined as 12 months of no smoking.[155] Patterns of menthol cigarette use among cancer patients are not available, but are likely to reflect those observed in the general population.

Several studies have used nationally representative data sources to examine racial and ethnic differences in cigarette smoking prevalence among populations with a cancer history. These studies have produced mixed results, but overall suggest that Black or African-American and Latino or Hispanic cancer survivors have a similar or lower likelihood of current smoking compared with White cancer survivors. According to data from the 2009 Behavioral Risk Factor Surveillance System (BRFSS), American Indian or Alaska Native and multiracial adults diagnosed with cancers caused by tobacco had the highest smoking prevalence after a cancer diagnosis (near 50%) compared with other racial and ethnic groups. Black or African-American and Latino or Hispanic survivors of cancers caused by tobacco had the lowest smoking prevalence (around 20%).[96] A study by Azagba and colleagues used longitudinal data from the Population Assessment of Tobacco and Health (PATH) study from 2013 to 2016 to examine 1,527 individuals with a history of a cancer diagnosis.[156] Among those with a cancer diagnosis, Latino or Hispanic individuals had lower odds of current smoking (OR = 0.58, 95% CI = 0.37–0.92) than White individuals; neither Black or African-American individuals nor other racial groups differed from White individuals with regard to odds of current smoking.[156] An analysis of

data from 3,672 cancer survivors who participated in the Health Information National Trends Survey (HINTS) from 2003 to 2014 found that both Latino or Hispanic and Black or African-American cancer survivors had lower odds of current smoking than White survivors.[157] A separate analysis of HINTS data (limited to the time period of 2003–2007) found no difference in current smoking prevalence when comparing Black or African-American and Latino or Hispanic survivors with White survivors, but found lower odds of current smoking among those of other races when compared with White survivors.[158] However, other studies that have examined BRFSS and PATH data have found no racial or ethnic differences among cancer survivors in terms of current cigarette use[87] or current use of any tobacco products.[159]

Additional information on smoking prevalence among patients with cancer can be gleaned from studies with smaller sample sizes or of specific, geographically defined groups. Blair and colleagues examined the correlation of ethnicity with current smoking in 283 survivors of colorectal cancer who resided in New Mexico. The study found that the prevalence of smoking was greater among Latino or Hispanic survivors than among those who were not Latino or Hispanic (28.5% and 18.1%, respectively).[160] However, in a study of adolescent and young adult survivors of childhood cancer,[161] Latino or Hispanic survivors reported less lifetime cigarette smoking than did White survivors. Therefore, more information on the smoking patterns of ethnic minority individuals in cancer populations is needed.

One limitation to the reliable assessment of racial and ethnic differences in cessation is that researchers' categorization of racial and ethnic groups can vary, sometimes making it difficult to compare smoking prevalence across studies. For example, two studies examined smoking prevalence in adult long-term cancer survivors using data gathered in 2009 via the population-based BRFSS. One used four racial and ethnic categories (White, African-American, Latino or Hispanic, and other)[87] while the other used a seven-category grouping of racial and ethnic groups.[96] The study using four categories showed that the "other" category had the highest smoking rate, while the study using seven categories showed that the highest smoking rate occurred among American Indian/Alaska Native individuals and those in the "other" category had midrange smoking rates. Clearly, the approach to categorizing race and ethnicity can affect the findings and subsequent interpretations of the data.

Smoking Cessation

Smoking Cessation and Black or African-American Individuals. Evidence about the association between Black or African-American race, cancer history, and smoking cessation is mixed. Among those who reported ever having had cancer and who were currently smoking (N = 877) in the 2015 BRFSS, Black or African-American cancer survivors had higher odds of having made a quit attempt in the past year than White survivors.[104] Data from the 2015 NHIS found that Black or African-American cancer survivors who reported current smoking had a slightly higher prevalence of past-year quit attempts (67.4%, 95% CI = 48.4%–82.0%) compared with White survivors (48.2%, 95% CI = 40.8%–55.6%).[88] These findings are consistent with data from the general population suggesting that Black or African-American individuals have high interest in smoking cessation; in 2017, 72.8% of Black or African-American NHIS respondents who smoked were interested in quitting, similar to White individuals (67.5%).[162] In another study, Black or African-American adults were more likely to quit smoking after a bladder cancer diagnosis than were adults of other racial groups.[108] However, Black or African-American race

was not significantly associated with quitting after a cancer diagnosis in a study of patients recently diagnosed with lung or colorectal cancer,[93] among 2017 NHIS participants with smoking-related and non-smoking-related cancer diagnoses,[163] or among cancer survivors who participated in the National Health and Nutrition Examination Survey (NHANES) from 1998 to 2008.[164]

In populations not diagnosed with cancer, Black or African-American individuals who smoke are less likely to quit smoking than White individuals who smoke.[85,165,166] Thus, additional research is needed to understand factors that could account for differences in quitting success between Black or African-American adults with and without cancer. Identification of such factors could inform efforts to enhance interventions across populations.

Smoking Cessation and Latino or Hispanic Individuals. Tseng and colleagues explored racial and ethnic differences in the likelihood of quitting smoking among individuals who smoked at the time of their cancer diagnosis, using data from NHANES 1999–2008 surveys.[164] Of the 2,374 cancer survivors aged 20 and over for whom data were available, 566 had regularly smoked at the time of their cancer diagnosis and were included in the analyses. Analyses showed that Latino or Hispanic survivors were significantly less likely to have quit smoking compared with White survivors, but the sample of Latino or Hispanic individuals was relatively small ($N = 58$). Other studies have found no association between Latino or Hispanic ethnicity and quitting[163] or making a quit attempt[104] among cancer survivors.

Evidence-Based Smoking Cessation Treatment. Little research exists on racial and ethnic differences in response to formal smoking cessation treatment. There is some evidence from the general population that Black or African-American individuals tend to achieve lower rates of long-term cessation (6 months or more) than do White individuals when engaged in a formal smoking cessation treatment program.[167–172] Although some studies have not found racial and ethnic differences in treatment response,[173,174] it is uncommon for Black or African-American individuals to achieve higher rates of smoking cessation in population-based data or after formal treatment compared with White individuals.[175] Despite this disparity in smoking cessation treatment efficacy across racial and ethnic subgroups, there is substantial evidence that Black or African-American adults benefit from treatment,[171,176] highlighting the importance of increasing their access via health care and other population-based delivery routes. Nollen and colleagues conducted a study investigating the effects of formal treatment (medication and counseling) in individuals from the general population and found lower cessation success among Black or African-American than White individuals. Secondary analyses suggested that this difference appeared to be related to socioeconomic factors and smoking characteristics, not race and ethnicity.[166] Another study by Nollen and colleagues suggested that differential response to cessation pharmacotherapy did not drive racial differences in smoking cessation treatment efficacy, as researchers also observed the difference in individuals who received placebo treatment.[171] Importantly, of the three pharmacotherapies evaluated in these analyses—varenicline, nicotine replacement therapy (NRT), and bupropion—only varenicline produced a significantly higher long-term cessation rate than did placebo among Black or African-American adults. However, both NRT and bupropion increased short-term abstinence relative to placebo, leading Nollen and colleagues to recommend research into extended pharmacotherapy strategies with Black or African-American individuals.[171]

While evidence-based smoking cessation treatment is effective across racial and ethnic groups,[176] more research is needed on effective interventions to promote smoking cessation among racial and ethnic minority individuals diagnosed with cancer. Targeted or culturally specific treatments have produced promising short-term results in noncancer populations,[175,177,178] although significant improvements in cessation and sustained abstinence in the long-term (≥6-month follow-up) remain an important goal. It is possible that targeted smoking cessation treatments could attract more individuals in minority racial and ethnic groups into treatment (i.e., improve reach) even if they do not consistently produce superior cessation outcomes in those treated.

Barriers to Smoking Cessation

There is a paucity of research on factors that hinder smoking cessation treatment use and effectiveness in racial and ethnic minority cancer populations. However, members of racial and ethnic minority populations frequently report experiences of discrimination and bias,[179] and many Black or African-American individuals live in environments that expose them to frequent encounters with smoking[180] and point-of-sale tobacco marketing.[120,181,182] One study found that the density of tobacco retailers in the United States was significantly higher in low-income neighborhoods and in neighborhoods with greater percentages of Black or African-American residents or Latino or Hispanic residents than in neighborhoods with lower percentages of those groups.[183] Such factors could affect either smoking cessation treatment use or effectiveness. In addition, data from the general population show that some racial and ethnic minority groups experience barriers related to availability of health insurance coverage and/or health care resources, lack of culturally competent care, clinician biases, health literacy, economic factors, patient–clinician communication barriers, and clinician assumptions that lead to the delivery of substandard care.[5,70,184,185]

Data derived from cancer populations suggest that lack of awareness of the benefits of evidence-based treatment and the potential harms of continued smoking might also limit treatment participation for some racial and ethnic minority groups. For example, compared with nonimmigrants, some immigrant cancer patients are less likely to perceive continued smoking as harmful.[186] However, this finding requires more investigation.

Racial and ethnic differences have been found in the provision of smoking cessation treatment in the general population. For example, some evidence suggests that clinicians are less likely to offer smoking cessation treatment, such as pharmacotherapy, to Black or African-American individuals than to White individuals.[187,188] There is also evidence that Black or African-American individuals are less likely to receive advice to quit smoking than are White individuals[189–191]; however, some studies report no differences related to race in rates of advice to quit or provision of counseling in the healthcare context.[192,193] It remains a possibility that decreased access to treatment or decreased clinician intervention rates could contribute to disparities in use of smoking cessation treatment as a function of race.[193,194] In addition, there is evidence that Black or African-American individuals have substantial concerns about the safety or addictiveness of smoking cessation medications[194] and such concerns might also affect their decisions to use such medications. In addition, Latino or Hispanic individuals are also less likely to use evidence-based smoking cessation treatment (counseling or medication) in quit attempts,[162,193,194] which could be related to their low rates of insurance coverage.[195]

While it is clear that the reach of smoking cessation treatment has been especially low among certain racial and ethnic groups in the past, findings from the NCI Center Cessation Initiative (C3I) suggest that enhanced health care systems changes could increase the reach of tobacco cessation treatment for racial and ethnic minority patients with cancer.[196] Seventeen participating NCI-Designated Cancer Centers that received funding in the first funding cohort implemented enhanced tobacco intervention system changes over a 1-year period. These changes included electronic health record (EHR) enhancements that connected patients with cancer directly with smoking cessation treatment resources, such as telephone counseling, text messaging, and web-based resources. The reach of the smoking cessation treatment was compared over the first 6-month period (Time 1) to the second 6-month period (Time 2) as a means of ascertaining the benefits of such enhanced treatment delivery. At Time 1, means computed across cancer centers showed that smoking cessation treatment reach occurred at the following percentages of those smoking in the various racial and ethnic groups: Latino or Hispanic = 19.0%; Black or African-American = 18.8%; White = 17.6%; Asian, Native Hawaiian, or Pacific Islander = 7.3%; American Indian or Alaska Native = 6.6%. Thus, even before the enhanced smoking interventions were fully implemented, reach was roughly equivalent across White, Latino or Hispanic, and Black or African-American groups. Time 2 data showed large increases in reach for all racial and ethnic groups with the increases being greatest for American Indian or Alaska Native (6.6%–24.7%, $p = .07$); Asian, Native Hawaiian, or Pacific Islander (7.3%–19.4%, $p = .04$); and Black or African-American (18.8%–25.9%, $p = .11$) individuals (although, only the increase for Asian, Native Hawaiian, or Pacific Islander groups reached statistical significance). Smaller gains in reach were observed among Latino or Hispanic individuals (19.0%–22.8%, $p = .56$) and White individuals (17.6%–23.4%, $p = .16$). These results suggest that considerable motivation to participate in smoking cessation treatment occurs across racial and ethnic groups, and health care systems can reach all races and ethnicities by using efficient strategies to facilitate the provision of evidence-based smoking cessation treatment. Similar results are observed in populations that do not have cancer.[197] Nonetheless, there remains an opportunity for improving the reach of smoking cessation treatment for all those who smoke (see chapter 4).

Very little evidence is available on the factors that influence quitting success among racial and ethnic minority patients with cancer. However, one study used data from the Detroit Research on Cancer Survivors study, a cohort of Black or African-American people with breast, prostate, lung, or colorectal cancer to identify factors associated with successful smoking cessation among Black or African-American adult cancer survivors.[198] Survivors diagnosed between 2013 and 2019 who had completed a baseline survey within 18 months of their cancer diagnosis were included in the analysis ($N = 1,145$). In this group, 18% ($N = 356$) smoked at the time of their cancer diagnosis and of these individuals, 57% ($N = 203$) continued smoking after they were diagnosed. Factors that were associated with continued smoking included living with someone who smokes (odds ratio [OR] = 2.78, 95% CI = 1.64–4.70), more cumulative years of smoking (OR = 1.03, 95% CI = 1.01–1.05), and having relatively low levels of social well-being (social support) (inverted OR = 1.04, inverted 95% CI = 1.00–1.08).

Greater diversity and inclusion in smoking cessation treatment clinical trials, including in the cancer context, are needed. Racial and ethnic minority groups tend to be underrepresented in smoking cessation clinical trials (as well as in cancer treatment trials), which could be due, in part, to restrictive trial inclusion criteria, mistrust of researchers and health care systems, and barriers to attending in-person sessions.[199–202] Strategies are needed that encourage and provide

equitable opportunities for individuals in racial and ethnic minority groups to participate in smoking cessation treatment research.

Summary: Smoking Among Racial and Ethnic Minority Populations With Cancer

In general, racial and ethnic minority populations have different patterns of smoking prevalence and cessation likelihood, and they appear to face different types and intensities of obstacles to their engagement in smoking cessation treatment than do other populations. Further, smoking patterns of minority racial and ethnic groups following a cancer diagnosis are not well documented, and responses to smoking cessation treatment and factors that influence cessation likelihood are vastly understudied relative to noncancer populations. However, some research shows that some racial and ethnic minority cancer populations, such as Black or African-American individuals, could be highly motivated to quit as indicated by their relatively high rates of quit attempts. Nonetheless, racial and ethnic minority individuals, like their nonminority counterparts, often continue to smoke after their cancer diagnoses, highlighting the need for additional research into factors that influence cessation attempts and the success of those attempts.

Smoking Among Rural Populations With Cancer

Epidemiology

Evidence from populations without cancer indicates that rural residents have significantly greater prevalence of tobacco use compared with residents of metropolitan areas.[35,41,203,204] Some studies have also shown that patients with cancer who live in rural areas have higher smoking prevalence than patients with cancer who reside in non-rural areas. Weaver and colleagues used 2006–2010 NHIS data to examine rural–urban differences in smoking among cancer survivors.[205] This study found that the prevalence of smoking was higher among survivors living in rural counties (25.3%) than survivors living in urban counties (15.8%). Further, 2009–2010 BRFSS data indicate that cancer survivors in Missouri living in rural counties had a higher smoking prevalence (24.9%) than cancer survivors in urban Missouri counties (14.8%).[206]

Smoking Cessation

While few reports of rural versus non-rural smoking cessation data among cancer populations exist, some evidence does exist for the general population. NHIS data from 2018 indicate that adult rural residents differ from adults living in metropolitan areas in prevalence of current cigarette smoking (20.4% vs. 13.0%)[207] and quit attempts (51.6% vs. 56.8%, respectively).[208]

Very few trials have examined the effectiveness of smoking cessation treatments as a function of rural residence.[209] However, one observational study provided group smoking cessation treatments via videoconferencing to residents of rural areas in Canada and compared this with in-person counseling delivered to residents of an urban area. Continuous abstinence rates at 12 months revealed no statistically significant differences in long-term (12-months) quit rates: 21.1% for urban residents (N = 370) and 25.5% for rural residents (N = 184).[210] No studies have examined the likelihood of quitting smoking among rural patients with cancer compared with non-rural patients with cancer. The effectiveness of evidence-based smoking cessation treatments in multiple smoking populations[176] suggests that such interventions should be effective with rural residents. However, randomized controlled trials comparing cessation in

rural cancer patients with urban cancer patients in response to evidence-based smoking cessation treatments have not been conducted.

Barriers to Smoking Cessation

Information on barriers to smoking cessation treatment for rural populations is largely available from populations without cancer. Rural residents face obstacles regarding access to both cancer care and smoking cessation treatment. Data on rural residents show that they are more likely to report exposure to smoking in their environments and are less likely to report smokefree policies at home and at work compared with individuals who reside in urban and suburban environments.[211] Frequent exposure to smoking could produce a variety of effects that undercut cessation: It contributes to smoking being viewed as normative, it could stimulate urges to smoke, and could provide easier access to cigarettes. Also, rural areas often have fewer financial resources and limited capacity to implement local cessation programs,[212] and often face shortages of health care professionals and facilities.[213] Individuals in rural communities could also have limited health resources, including a lack of health insurance or limited access to employer-sponsored health insurance, lack of consistent clinician availability, and difficulty covering costs of medical visits.[73,74] An American Society of Clinical Oncology (ASCO) workforce analysis revealed that only 3% of medical oncologists practice in rural areas, while nearly 20% of the total U.S. population resides in such areas.[214] As a result, rural cancer patients must often travel long distances to receive care.[215] Further, lack of access to care resources means that these patients often do not receive key elements of oncology care, such as radiotherapy and access to hospice.[216–218] Such obstacles likely reduce cancer control and prevention efforts in rural populations related to smoking cessation relative to urban dwellers.[74]

In addition, access to technology could affect rural residents' ability to engage in smoking cessation treatment. In 2021, around three-quarters of rural Americans (72%) said they had a broadband internet connection at home. While this is a notable increase from the 35% reporting a broadband internet connection in 2007, it is still lower than the level of broadband access reported among urban and suburban Americans (77% and 79%, respectively).[219] Further, in a 2018 survey, 24% of adults living in rural areas reported that access to high-speed internet was a major problem in their local community compared with only 13% of adults living in urban areas.[220] This lack of access could affect the availability of smoking cessation treatment delivery via telehealth for some of these populations.

Research suggests that smoking is just one element in a constellation of factors shared by many rural residents that might serve as obstacles to seeking smoking cessation treatment and achieving success in quitting smoking. Compared with residents of metropolitan areas, rural residents have higher levels not only of smoking, but also obesity and physical inactivity.[221] Data from the 2013 BRFSS showed that adults residing in nonmetropolitan counties, compared with those in metropolitan counties, had a lower prevalence of self-reporting four health behaviors important for avoiding chronic disease and injury: current nonsmoking, maintaining normal body weight, nondrinking or moderate drinking, and meeting aerobic leisure time physical activity recommendations.[203] Such health behaviors could serve as proxies for general risk factors that might thwart health-related behavior change. These factors might include treatment access, risk awareness, economic factors, social and structural determinants of health (e.g., educational and social policies), cultural factors, stress, and social network influences.

Summary: Smoking Among Rural Populations with Cancer

Research shows that rural residents have especially high smoking prevalence and could be less likely to attempt to quit smoking compared with non-rural residents. Little research exists regarding the effectiveness of evidence-based smoking cessation treatment in rural compared with non-rural populations. Barriers to smoking cessation in this population include high levels of exposure to smoking in their daily environments, relatively poor access to health care, and barriers to accessing cessation support resources. The same factors could present challenges to smoking cessation among rural residents with cancer.

Smoking Among Sexual and Gender Minority (SGM) Populations with Cancer

Epidemiology

Data from populations without cancer or a cancer history suggest a relatively high prevalence of smoking in SGM populations.[41,45,222] The nationally representative NHIS conducted in 2020 showed that the prevalence of any tobacco product use was greater in sexual minority individuals than in heterosexual individuals (25.1% [95% CI, 21.4%–29.1%] compared with 18.8% [95% CI, 18.2%–19.5%]), although prevalence of cigarette smoking was only slightly higher among sexual minority individuals (16.1%, 95% CI = 12.7%–19.9%) in comparison with heterosexual individuals (12.3%, 95% CI = 11.7%–12.8%).[41] There is also evidence from the 2009–2010 National Adult Tobacco Survey that, compared with heterosexual women, bisexual women initiate smoking at a younger age, exhibit greater nicotine dependence, and make fewer quit attempts.[223]

Transgender people appear to have especially high smoking prevalence. In a cross-sectional survey of 241 transgender women in the San Francisco area, Gamarel and colleagues reported prevalence estimates of 83% for past 30-day smoking and 62% for daily smoking.[21] However, differences in smoking prevalence between transgender and cisgender populations could be due in part to sociodemographic differences. Data from the 2014–2015 PATH survey indicate that transgender individuals had a higher prevalence of current use of any tobacco product (33.0%) compared with cisgender individuals (23.8%). However, after adjusting for sociodemographic variables including race and income, transgender identity was not significantly associated with current tobacco use.[45]

Little evidence exists regarding smoking prevalence among SGM cancer populations. Some data regarding sexual minority cancer survivors are available from California Health Interview Survey data pooled across 2001, 2003, and 2005.[224] This survey identified respondents who reported cancer of any kind after age 18; it asked respondents to categorize their behavior concerning ever smoking, past smoking, and current smoking; and allowed respondents to identify as either heterosexual, gay, bisexual, or lesbian. Among female cancer survivors, heterosexual women were significantly less likely to have ever smoked 100 cigarettes in their lifetime (47.7%) than lesbian (54.6%) or bisexual women (65.3%). Heterosexual women were also less likely to be currently smoking (15.8%) than were lesbian (21.1%) or bisexual women (37.4%). Among male cancer survivors, heterosexual men were significantly less likely to be currently smoking (12.0%) than were gay (23.0%) or bisexual (22.8%) men. In addition, in a study using 2010 BRFSS data, Kamen and colleagues analyzed cigarette smoking among cancer survivors in five states (Alaska, California, Massachusetts, New Mexico, and Wisconsin).[225] The analysis, which included 248 heterosexual respondents and 124 lesbian, gay, or bisexual

respondents, found a higher lifetime history of smoking (57.7% vs. 51.2%), as well as a higher prevalence of current smoking (17.2% vs. 10.7%) among sexual minority cancer survivors than among heterosexual cancer survivors. These findings suggest higher prevalence of current smoking among sexual minority cancer populations, but the small size of the sexual minority samples limits interpretation and generalizability.

Smoking Cessation

Only one study has examined quitting behavior among a sexual minority cancer population. In the previously discussed study by Kamen and colleagues (the five-state sample of BRFSS respondents who were cancer survivors in 2010), there was no statistically significant difference in past-year quit attempts when comparing sexual minority and heterosexual cancer survivors.[225] Additional information on cessation must be derived from noncancer SGM groups. Observational studies have reported fairly high quit rates (e.g., nearly 40% at 6 months) when SGM individuals have undergone smoking cessation treatment.[226–228] Most of this research has involved interventions that targeted the needs of a specific SGM population. One challenge in evaluating interventions designed for SGM populations is that such interventions differ meaningfully regarding the SGM subpopulation and in the nature of the content.[226–228] Interventions have been targeted or adapted based on smoking characteristics in these communities,[229,230] including SGM-specific health concerns, bar culture and smoking,[230] tobacco company targeted marketing, coping with chronic stressors related to factors such as prejudice and discrimination,[231,232] and strategies to increase social support.[230]

Targeted interventions are intended to increase the effectiveness of smoking cessation treatment in the focal populations.[231] As noted above, these studies have generally led to fairly high smoking quit rates,[226,229] but they include few randomized control conditions and have other methodologic limitations, such as small samples and substantial attrition, and often lack biochemical confirmation.[226] Such features limit inferences that can be made about the utility of targeting and the effectiveness of the smoking interventions.

SGM populations can also benefit from smoking interventions designed for the general population (i.e., nontargeted interventions).[233,234] For example, Vogel and colleagues examined the effectiveness of a Facebook intervention with general population content and found very similar 12-month quit rates among SGM and heterosexual/cisgender individuals (i.e., 20.0% and 21.6%, respectively).[231] In addition, Matthews and colleagues conducted a randomized controlled trial that evaluated the effectiveness of culturally targeted smoking cessation treatment compared with a standard control condition in 345 SGM individuals who smoked.[235] The study randomly assigned participants to six sessions of targeted counseling plus NRT or a standard (i.e., general population) intervention based upon recommendations of the Public Health Service (PHS) Clinical Practice Guideline, *Treating Tobacco Use and Dependence: 2008 Update*.[176] There were no differences in cessation between conditions through the 12-month follow-up period, with overall cessation rates ranging from 31.9% at 1 month to 22.3% at 12 months.[235] Finally, in a randomized controlled trial of two web-based cessation interventions, Heffner and colleagues also found no difference in 12-month smoking cessation outcomes between sexual minority and heterosexual participants (24% vs. 25%, respectively).[236] Such studies suggest that generally available smoking cessation treatments are similarly effective in SGM and

heterosexual and cisgender individuals; use of such widely available treatments could enhance the reach of smoking cessation treatment in SGM populations.

There is virtually no information on the level of benefit that SGM populations derive from evidence-based smoking cessation treatment compared with placebo or inactive control conditions. Therefore, meaningful estimates of the amount of benefit produced by active treatment are unavailable. However, there is evidence that SGM groups achieve quit rates that are similar to those of non-SGM populations when both use nontargeted, evidence-based smoking interventions.[227]

Barriers to Smoking Cessation

Systematic reviews indicate that SGM individuals report high levels of discriminatory experiences in health care settings.[19,237] Perceived discrimination has been found to be negatively correlated with both attempts to quit smoking and smoking cessation success among transgender women in San Francisco.[21] Also, the HINTS 5 (cycle 1) revealed that, compared with other respondents, sexual minority respondents were less likely to seek medical information from a physician as their first choice of a health information resource.[238]

Further, compared with heterosexual individuals, sexual minority individuals tend to report higher levels of depression and mental distress and to have especially high levels of health risk factors such as obesity, chronic medical conditions, binge drinking, and overall poor physical health.[236,239] Such challenges might reduce the likelihood that SGM individuals with cancer would seek smoking cessation treatment. One study with sexual minority individuals in the general population showed that they reported being much less likely to call a tobacco quitline than were other individuals who smoked.[240]

Inadequate clinician training or biases could reduce SGM populations' access to high-quality health care. A survey of medical clinicians, including oncologists, found that only 54% reported competence to provide care for SGM patients, and oncology clinicians reported lower competence to care for this population than did primary care clinicians.[241] Among oncology clinicians at an NCI-Designated Cancer Center (N = 108), only 26% assessed patients' sexual orientation and only 28% reported knowledge of SGM health concerns.[242] A survey of 149 oncologists from 45 NCI-Designated Cancer Centers reported that many oncologists reported positive experiences working with SGM patients (e.g., positive communication, compassion) but also identified several barriers to providing care to SGM patients: lack of experience with transgender patients and knowledge of their needs, and fear of offending patients in asking for sexual orientation and gender identity information.[243] More than two-thirds of respondents (70.4%) indicated interest in receiving education regarding the health needs of SGM patients, and 43.7% agreed there should be mandatory education about SGM patients' health needs.[244]

It is important that oncology clinicians gain knowledge about the needs of SGM patients, as clinician discomfort and bias can impede patient care.[241] In fact, clinicians rarely receive formal education in the health risks and disparities experienced by SGM people.[241,245] In-depth clinician training and continuing education in cultural competence have the potential to increase equitable cancer care to SGM people,[246] including their engagement in smoking cessation treatments. Moreover, greater adoption of enhanced EHR-based health care system improvements, such as

those that have increased smoking cessation treatment reach among racial and ethnic minority groups,[196,197] might similarly increase smoking cessation treatment reach in SGM populations.

Summary: Smoking Among SGM Populations With Cancer

Data from the general and cancer survivor populations show that SGM groups have especially high smoking prevalence compared with heterosexual and cisgender individuals. Other evidence from the general population shows that when SGM individuals receive evidence-based smoking cessation treatment, they are as likely to quit smoking as are those who are not members of an SGM group. While targeted smoking interventions have been developed for SGM populations, there is insufficient evidence to determine their effectiveness relative to nontargeted interventions. Barriers to smoking cessation success in some segments of the SGM population include high rates of discrimination, lack of access to treatment resources, high levels of depression and negative affect, mistrust of clinicians, and health care systems and personnel that are not trained to deliver high-quality care to them.

Smoking Among People With Co-Occurring Substance Use Disorders and Cancer

People who use tobacco and who have co-occurring substance use disorders are a medically underserved and vulnerable population; they tend not to receive evidence-based smoking cessation treatment as part of their substance use disorder treatment,[247] and they are at elevated risk for cancer and its harms.[248] People with substance use disorders also tend to differ from those without substance use disorders in that they smoke more cigarettes per day and are more likely to begin smoking earlier in life,[249–254] possibly amplifying the negative health effects of substance use.

This section discusses evidence on the use of alcohol, cannabis, and/or opioids along with smoking among cancer populations. Most of the research on patients with cancer focuses on the use of both tobacco and alcohol, with a small number of studies focusing on tobacco use together with opioid and cannabis use. However, many studies provide little information on the types of substances used or do not distinguish the use of illicit substances from the use of prescription drugs or alcohol.[255] Thus, it is often difficult to identify the particular substances being studied. Also, while studies on alcohol often describe the amount of alcohol use of participants (albeit often via broad, imprecise categories), the use of other substances is typically characterized only in terms of presence or absence of use disorder. When possible, this section attempts to characterize the population in each study by the substances being used and by the heaviness or frequency of use.

Cannabis, Tobacco, and Cancer

The National Institute on Drug Abuse (NIDA) explains that "marijuana [also referred to as cannabis] is the most commonly used addictive drug after tobacco and alcohol."[375] In 2020, 17.9% of people aged 12 or older (49.6 million) reported use of marijuana in the past year.[376] Use of cannabis is more common among people who smoke cigarettes than among those who do not. For example, an analysis of 2013–2014 data from the Population Assessment of Tobacco and Health (PATH) study found that, compared with noncurrent tobacco use, the current use of any tobacco product was associated with far higher likelihood (AOR = 4.4, 95% CI = 4.0–4.9) of past-year marijuana

use; the study also found higher levels of marijuana use among users of cigars, pipes, waterpipe, ENDS, and smokeless tobacco products.[377]

Studies have shown that marijuana use could have a negative influence on tobacco cessation. Tobacco users who also use cannabis could be less motivated to quit using tobacco,[378] less likely to try to quit,[378,379] less likely to successfully quit,[380,381] and could score higher on cigarette dependence measures than tobacco users who do not also use cannabis.[382]

Over the past decade, there have been rapid changes in state and local-level laws regulating cannabis sales and marketing.[383] These laws have increased access to cannabis in many jurisdictions, as well as the types of cannabis products available for sale. These changes could influence cannabis-use patterns in the general population, as well as among cancer patients and survivors.

Few studies have examined the patterns of cannabis and tobacco use in patients with cancer. An analysis of 2013–2018 data from the PATH study reported that 8% of cancer survivors reported past-year cannabis use, compared with 15% of respondents without a history of cancer.[384] Some evidence suggests that medicinal cannabis could provide relief (e.g., antiemetic effects, appetite stimulation, pain relief, and improved sleep) from some common symptoms of cancer treatment.[385,386] However, whether used for symptom relief or for non-medicinal use, cannabis use is likely to make quitting tobacco more difficult for cancer populations.

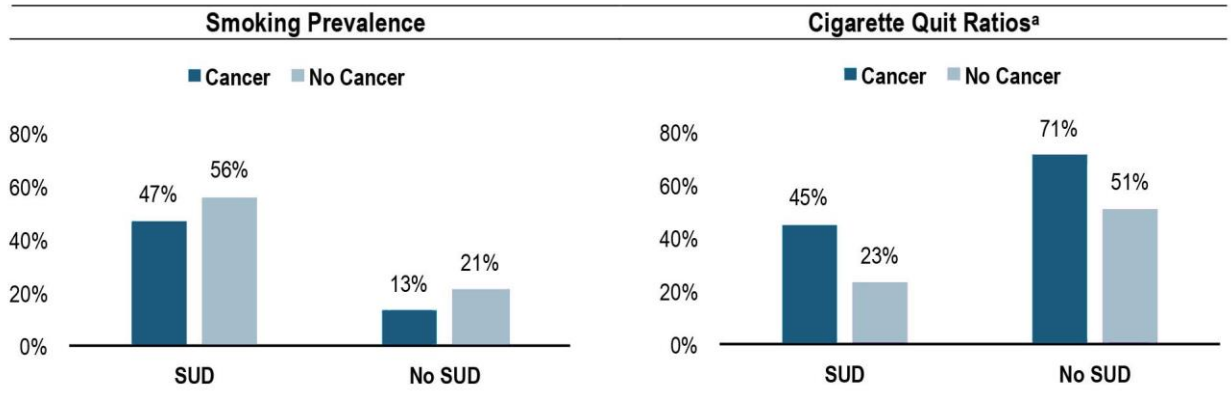
This monograph recognizes that the use of cannabis is common among people who smoke cigarettes, and that cannabis use is likely to have implications for cessation among patients with cancer who use tobacco. However, in the absence of a robust body of evidence, this topic is not addressed further in the monograph. Studies of patterns of cannabis use among oncology patients and subsequent health effects, including the potential to interfere with tobacco cessation treatment, are urgently needed. Research is also needed to guide clinical management of oncology patients who smoke and also use cannabis products, including counseling patients on the efficacy and harms of cannabis for symptom management.

Epidemiology

Smoking and Any Substance Use. Estimates of substance use (other than tobacco) among cancer populations range from 2% to 35%.[255] Data from the National Survey on Drug Use and Health (NSDUH) gathered during 2015–2018 show that adults with substance use disorders, both with and without cancer, have higher prevalence of cigarette smoking than do adults without substance use disorders.[256] In this population-based research, adults reporting a past-year cancer diagnosis (N = 1,571) and those without a past-year cancer diagnosis (N =168,540) were categorized according to current (past month) smoking and past-year substance use, which included use of alcohol, cannabis, methamphetamines, hallucinogens, inhalants, tranquilizers, cocaine, heroin, prescription pain relievers, simulants, and sedatives. Current smoking was more common among those without a past-year cancer diagnosis (24%) than in those with a past-year cancer diagnosis (15%), which the study authors attribute to smoking cessation in response to a cancer diagnosis. Current (past-year) substance use was also more common among those without a past-year cancer diagnosis (7.9%) than in those with a past-year cancer diagnosis (4.6%). Further, among those with a past-year cancer diagnosis, individuals with a current substance use

disorder were more likely to smoke (47%) than were those who did not report current substance use (13%, $p < .001$ across survey years: Figure 5.1). A similar pattern was observed in those without a past-year cancer diagnosis (56% compared with 21% across years, $p < .001$).

Figure 5.1 Current Cigarette Smoking Prevalence and Quitting by Past-Year Substance Use Disorder Status and Past-Year Cancer Diagnosis Among U.S. Adults Aged 18 and Older, 2015–2018



[a]Cigarette quit ratios were defined as the ratio of those with former smoking to those with ever smoking at each survey year.
Source: Adapted from Streck et al. 2020,[256] based on data from the National Survey on Drug Use and Health, 2015–2018.

As shown in Table 5.2, individuals with a past-year cancer diagnosis were more likely to use alcohol than other substances (excluding tobacco use). They were also significantly less likely to use alcohol, cannabis, or stimulants than were individuals without a past-year cancer diagnosis. It is important to note that this study could have underestimated substance use among the respondents because substance abuse and/or dependence within the past year was required in order to be characterized as having a substance use disorder.

Table 5.2 Substance Use Disorders Among U.S. Adults Aged 18 and Older With and Without a Past-Year Cancer Diagnosis, 2015–2018

Substance use disorder (SUD)[a]	Cancer (unweighted *N* = 1,571)	No cancer (unweighted *N* = 168,540)	*p* value[b]
Any past-year SUD	4.6%	7.9%	<.001
1 SUD	4.0%	6.6%	
2+ SUDs	0.4%	1.2%	
Alcohol use disorder	3.4%	6.0%	.001
Cannabis use disorder	0.2%	1.4%	<.001
Opioid use disorder	0.8%	0.8%	.87
Stimulant use disorder[c]	0.2%	0.5%	.01
Other use disorder[d]	0.4%	0.7%	.11
Past-month cigarette smoking	5.0%	24.0%	<.001

Note: Percentages are weighted and unadjusted for demographic characteristics. Percentages may not sum to 100% due to rounding. [a]Nontobacco substance use disorders were defined as diagnosis of abuse and/or dependence within the past year. [b]*p* values compare characteristic values for respondents with a past-year cancer diagnosis with those without a past-year cancer diagnosis. [c]Includes prescription stimulant and cocaine use disorder. [d]Includes hallucinogen, inhalant, methamphetamine, tranquilizer, or sedative use disorder.
Source: Adapted from Streck et al. 2020,[256] based on data from the National Survey on Drug Use and Health, 2015–2018.

A study based on 2007–2016 data from the Canadian Community Health Survey examined the co-occurrence of smoking and both alcohol and illicit drug use among 15,168 adults with cancer.[257] This study found significant associations between current smoking and heavy alcohol use (no heavy drinking compared with heavy drinking: OR = 0.41, 95% CI = 0.29–0.58) and the use of illicit drugs (OR = 2.42, 95% CI = 1.96–2.98). These associations are consistent with data from the 2020 NSDUH showing high prevalence of comorbid substance use disorders in the general population.[258] Thus, among patients with cancer, as well as in the general population, smoking is highly associated with greater likelihood of use of a variety of other substances, including alcohol and illicit drugs.

Other observational studies of patients with cancer have also demonstrated a positive association among smoking, alcohol, and/or illicit drug use.[259–262] For example, a retrospective chart review of patients with advanced cancers (*N* = 300) found that those who currently smoked were more likely to report a history of alcoholism and illicit substance use compared with those who never smoked.[262]

Smoking and Opioid Use. Opioids include illicit drugs, such as heroin, as well as prescription pain relievers such as oxycodone, hydrocodone, codeine, fentanyl, and morphine. Opioids are often used to reduce pain related to cancer or its treatment. Several studies have focused on the use of both tobacco and opioids among patients with cancer. A 2021 meta-analysis of seven studies examining chronic opioid use after treatment for head and neck cancer found that 35% of patients who smoked later developed chronic opioid use disorder.[263] In a separate study of patients being treated for cancer-related pain (*N* = 486) at a cancer pain management center, those currently smoking (*N* = 94) did not differ from nonsmokers (*N* = 392) in terms of opioid use (measured by morphine equivalency daily dose).[264] However, individuals who currently

smoked had more risk factors for opioid misuse (as measured by the short form of the Screener and Opioid Assessment for Patients with Pain) compared with nonsmokers, including more frequent mood swings, taking medications in a nonindicated manner, history of illegal drug use, and history of legal problems. Patients who smoked also reported greater pain during a 6-month follow-up after their initial pain center visit than those who did not smoke.

Another study examined differences in opioid self-administration by smoking status among patients diagnosed with gastric cancer, following distal gastrectomy with gastroduodenostomy (N = 236).[265] Results demonstrated that patients who smoked administered a greater quantity of patient-controlled intravenous analgesic for postoperative pain compared with patients who were nonsmokers. This greater rate of analgesia self-administration could be due to the association of smoking status with pain sensitivity. A cross-sectional study examined associations between smoking status and several pain-related outcomes in patients with cancer (N = 224) about to begin chemotherapy.[266] This study found that patients who continued to smoke after their cancer diagnosis reported more severe pain than those who never smoked. Those who continued to smoke after diagnosis also reported that pain interfered more with their daily routine than those who had never smoked or who had smoked in the past. The authors of this research acknowledge that the directionality of the pain-smoking association in patients with cancer is unclear; greater pain could motivate smoking or continued smoking could increase pain.

Data from the general population also show an association of smoking with opioid use. Nearly half of people with prescription opioid use disorder also have nicotine dependence (NIDA 2020).[267] A meta-analysis of 10 observational studies published through 2017 found increased odds of opioid use disorder among people who smoked compared with nonsmokers (OR = 8.23, 95% CI = 3.07–22.09).[268]

Smoking and Alcohol. Sanford and colleagues used NHIS data from 2000 to 2017 to examine alcohol use patterns among adults reporting a cancer diagnosis.[269] The sample included 34,080 respondents with a cancer diagnosis; 56.5% of respondents reported current drinking, including 34.9% who reported heavy drinking (defined as more than 1 drink per day for women and 2 drinks per day for men). Further, 21.0% reported a history of binge drinking (defined as consuming ≥5 drinks on at least 1 day during the past year, for both men and women). Heavy drinking was more common among those who currently smoked; for example, binge drinking was reported by 8.0% of people who never smoked compared with 23.6% of those currently smoking.

These findings by Sanford and colleagues[269] show a high prevalence of heavy drinking compared with previously discussed research by Streck and colleagues,[256] which found a 6% prevalence of past-year alcohol use disorder among individuals with a past-year cancer history. The study by Streck and colleagues restricted its examination to recent (past-year) cancer occurrence, which could explain the discrepancy. Additionally, Streck and colleagues used DSM-IV criteria for diagnosis of substance use disorder in the past year, whereas the study by Sanford and colleagues examined the number of drinks per day.

One study showed that, among survivors of childhood cancers, those who reported current smoking at the time of the survey were significantly more likely to report current drinking than were those without a smoking history.[86] Similar findings were reported among patients

diagnosed with non-B, non-C hepatocellular carcinoma who underwent curative surgical treatment.[270]

Smoking Cessation

Substance Use and Smoking Cessation. The analysis of NSDUH data by Streck and colleagues, discussed previously, examined quit rates of individuals with a cancer diagnosis in the past year in relation to past-year substance use disorder.[256] The quit rate outcome was based on the ratio of those who reported former smoking relative to ever-smoking in each survey year. The data showed that among those with a past-year cancer diagnosis, individuals who smoked had a lower quit ratio if they also had a substance use disorder (45%) than if they did not (71%, $p = .002$: Figure 5.1). A similar pattern was seen for those without cancer (23% compared with 51% across years, $p < .001$). The quit ratio was higher for adults with a past-year cancer diagnosis than in those without such a history, regardless of substance use disorder, perhaps reflecting the teachable moment provided by a cancer diagnosis.

Other research among the general population suggests that the use of illicit drugs is associated with reduced cessation likelihood. Data from the 1997 National Household Survey on Drug Abuse ($N = 16,661$) found that adult illicit drug users had a history of successful quitting that was half that of nonuser respondents (23% compared with 56%).[253] Further, a structured review of 29 epidemiologic studies of the general population concluded that, among people who smoke, those with alcohol or substance use disorders had lower smoking quit rates, greater withdrawal symptoms, and greater nicotine dependence than did those without alcohol or substance use disorders.[271] Thus, multiple studies have found that substance use is associated with a lower likelihood of smoking cessation.

Alcohol Use and Smoking Cessation. Studies conducted in the United States,[272,273] Canada,[274] and Australia[275] have found that alcohol consumption is negatively associated with smoking cessation among cancer populations. One study in Korea found that alcohol dependence was associated with continued smoking compared with cessation in adult cancer survivors who smoked at the time of their cancer diagnosis.[276] As noted previously, a study using data from the Detroit Research on Cancer Survivors Study identified factors associated with continued smoking in Black or African-American cancer survivors at about 18 months post cancer diagnosis.[198] This study identified a higher prevalence of any alcohol use in the past month (57.4%) among survivors who continued smoking compared with those who quit. In sum, most research suggests that current or proximal alcohol use is associated with continued smoking versus successful quitting in patients with cancer.

Research with the general population yields a pattern of findings similar to that obtained with cancer populations. That is, current alcohol use is associated with a reduced likelihood of smoking cessation with either aided or unaided quit attempts.[271,277–281]

In contrast, a considerable body of evidence suggests that past alcohol use or even past alcohol dependence often does not significantly reduce the likelihood of later cessation, especially when evidence-based smoking cessation treatments are used.[282,283]

Evidence-Based Smoking Cessation Treatment. Research with the general population shows that evidence-based treatment can significantly increase quit rates among those with a variety of substance use disorders.[283–286] A Cochrane Review examined the effectiveness of smoking cessation treatment in people in treatment or in recovery for substance use disorders.[284] This research, which included 35 randomized controlled trials, showed that 2 treatments significantly increased the likelihood of long-term abstinence from tobacco: smoking cessation pharmacotherapy and the combination of smoking cessation pharmacotherapy and counseling. This research showed that smoking cessation treatment significantly increased smoking quit rates for both people with alcohol use disorders as well as other substance use disorders. Another systematic review of smoking cessation interventions for individuals in substance use disorder treatment or recovery similarly found that pharmacotherapy and combination pharmacotherapy and counseling were effective for this population.[287] The review also concluded that contingency management, along with counseling and relapse prevention or counseling and pharmacotherapy, was effective in increasing smoking abstinence.

The effectiveness of smoking cessation treatment among individuals with substance use disorders could apply to cancer populations, as well. In the Smokefree Support Study, a randomized controlled trial that compared intensive (N = 153) and standard treatment (N = 150) for smoking cessation in newly diagnosed patients with cancer, problematic alcohol use (defined as binge drinking or a score of two or greater on the Cut-down, Annoyed, Guilty, Eye-opener [CAGE] questionnaire) did not have a statistically significant effect on biochemically confirmed 6-month abstinence, although participants in the study frequently identified the use of alcohol, drugs, or other substances as barriers to quitting smoking.[288]

In sum, research among populations with and without cancer shows that current drinking and substance use are associated with reduced likelihood of quitting smoking. However, there is strong evidence that individuals who drink heavily or engage in other forms of substance use can benefit from the receipt of evidence-based smoking cessation treatment. Thus, the evidence supports the recommendation of the PHS Clinical Practice Guideline, *Treating Tobacco Use and Dependence: 2008 Update*,[176] that patients who use alcohol or who have other substance use disorders be provided evidence-based smoking cessation treatment. This recommendation is also supported by the available evidence for cessation success among patients with cancer who have current or past substance use disorders.

Barriers to Smoking Cessation

Research conducted among the general population suggests that those with substance use disorders face unique barriers to quitting smoking. Such populations are typically exposed to multiple factors that could undermine smoking cessation: high prevalence of smoking in the social network, high levels of life stress due to social and vocational upheaval, decreased cognitive control and self-regulation due to intoxication, and psychiatric comorbidities.[289–291] These challenges suggest that individuals with substance use disorders need intensive smoking cessation treatment and, ideally, treatment for their comorbid drinking or other substance use[284,287] to maximize the likelihood of smoking cessation.

There has been a long-standing supposition that people with substance use disorders are uninterested in trying to quit smoking.[283] However, research on noncancer populations shows

that more than 60% of individuals with alcohol or other substance use disorders are interested in quitting tobacco use.[254,292,293] This is similar to the general population of those in the United States who smoke, where about 70% of individuals express interest in quitting,[162,176] and reflects a clinically significant opportunity to intervene. Also, clinicians might increase the percentage of those willing to try to quit smoking by clearly articulating the benefits of smoking cessation with regard to cancer treatment and outcomes.

Although evidence suggests that treatment for smoking does not worsen patterns of alcohol or substance use or reduce recovery from such disorders among the general population,[283,284] some clinicians have assumed that an attempt to quit smoking might exacerbate a substance use disorder and interfere with recovery from it. In a survey of 2,067 substance use treatment counselors, 16% believed that smoking cessation interventions would have a negative effect on clients' chances of achieving sobriety.[294] Smoking cessation treatment is often not provided in substance use disorder treatment settings; less than half of substance use treatment programs provide counseling for smoking cessation, and only about one-quarter provide pharmacotherapy.[247] For example, the 2016 National Survey of Substance Abuse Treatment Services indicated that, although 64% of substance use treatment facilities screened patients for tobacco, just 47% offered cessation counseling, 26% offered NRT, and 20% offered varenicline or bupropion.[295]

The available research therefore strongly supports the assessment of alcohol and substance use because people with such disorders may need additional encouragement and may benefit from more intense treatment in order to quit successfully.[283] The use of alcohol and other substances could also be a target of treatment because their use could precipitate relapse back to smoking. Finally, there is substantial evidence that people who use alcohol and other substances can quit smoking successfully when given evidence-based treatment, which supports strong efforts to provide such treatment to these individuals within the context of cancer care.

Summary: Smoking Among People With Co-Occurring Substance Use Disorders and Cancer

Data on people with substance use disorders are often difficult to interpret because relevant studies sometimes do not provide information on the specific type of substance or amounts used, and the diagnostic codes used in this area have changed over time. In populations with and without a cancer diagnosis, data show that those who use alcohol or other substances tend to have higher smoking prevalence than those who do not use such substances. Further, current alcohol use is associated with reduced smoking cessation success when making unaided cessation attempts in studies of general and cancer populations. Data from the general population show that individuals using illicit drugs also have a lower likelihood of quitting successfully in unaided quit attempts. However, evidence-based smoking cessation treatment can significantly increase smoking cessation success among both alcohol- and substance-abusing individuals in the general population. Such treatment does not appear to jeopardize their status regarding recovery from their alcohol or drug use condition. Barriers to successful smoking cessation include a high level of smoking in social networks, stress due to social and vocational upheaval, low rates of provision of smoking cessation treatment in substance use treatment programs, and psychiatric comorbidities.

Smoking Among Individuals With Serious Mental Illness (SMI) and Cancer

This section discusses patients with a variety of psychiatric disorders but will focus particularly on bipolar and schizophrenia spectrum disorders, given their serious health and social consequences,[296] the availability of extant research, and the high cancer burden. Depression and anxiety disorders and their associated symptoms are discussed in more detail in chapter 3.

Epidemiology

Little evidence is available on smoking prevalence as a function of psychiatric condition among cancer populations and most of the extant data arise from populations outside the United States. Some of this evidence suggests similar levels of mental health problems or disorders in cancer populations and whole-population prevalence rates,[297] while other data from Australia indicate higher rates among cancer populations relative to the respective whole-population prevalence.[298] However, it is difficult to draw firm conclusions from these data because the studies differ not only on geographical region but also on definitions of mental health problems and means of defining cancer status.

Research in the general population shows that the prevalence of smoking is higher in virtually all psychiatric populations.[5] Based on pooled data from the 2009–2011 NSDUH, Gfroerer and colleagues estimated that individuals with any mental illness account for 30.9% of all cigarettes smoked by adults.[299] Individuals who currently smoked and had mental illness also smoked more cigarettes in the past month (mean = 331) compared with those without mental illness (mean = 310). Estimates are that as many as 46%–70% of people with bipolar disorder smoke.[300–302] The smoking prevalence of individuals with schizophrenia is estimated to be between 60% and 90%.[83,296,301,303] A meta-analysis of 42 studies found higher odds of current smoking in people with schizophrenia compared with those without schizophrenia (OR = 5.9, 95% CI = 4.9–5.7), with the odds of current smoking being substantially higher among men with schizophrenia (OR = 7.2, 95% CI = 6.1–8.3) than among women (OR= 3.3, 95% CI = 3.0–3.6).[83] Moreover, individuals living with schizophrenia tend to smoke especially heavily, puffing with greater frequency and intensity than other individuals who smoke.[302,304–306]

Data from the 2009–2011 NSDUH were used to estimate the past-year prevalence of cigarette smoking among adults who had any mental illness based on distress and disability assessments; developmental and substance use disorders were not included in this estimate.[40] Results showed that an average of 19.9% of adults had a past-year diagnosis; among these respondents, 36.1% were currently smoking, compared with 21.4% of adults with no mental illness.

In summary, evidence demonstrates that individuals with SMI are much more likely to smoke and smoke heavily than those without such disorders.

Smoking Cessation

There is abundant evidence that smoking cessation rates tend to be lower for those with psychiatric diagnoses than for those without psychiatric diagnoses.[5,85,307] This pattern has been observed across individuals with depression, bipolar disorder, post-traumatic stress disorder, and schizophrenia spectrum disorders.[5,307]

Among adults in the general population who have ever smoked daily in the 2012–2014 NSDUH, about 50% of individuals with no mental illness have quit smoking, compared with about 40% among people with any past-year mental illness.[39] Evidence from population-based studies suggests that individuals with SMI are more likely to become heavily nicotine dependent and to have particularly low quitting rates,[308–311] although there is clear evidence that they can be aided by evidence-based smoking cessation treatment.[312–314]

Kalkhoran and colleagues analyzed data from adults sampled in the nationally representative 2014 Health Center Patient Survey (*N* = 5,592), which includes data on patients seen at health centers funded by any of four types of Health Resources and Services Administration (HRSA) grant programs: Community Health Center Programs, Migrant Health Center Programs, Health Care for the Homeless Programs, and Public Housing Primary Care Programs.[315] They examined prevalence of current and ever smoking in those with and without SMI diagnoses and calculated quit ratios (current-smoking prevalence divided by ever-smoking prevalence) for both. In the SMI sample (*N* = 1,376), the prevalence of ever smoking was 68%; the comparable rate for individuals without an SMI diagnosis was 41%. The prevalence of current smoking was 48% and 22% for participants with and without an SMI diagnosis, while the quit ratios were 30% and 46%, respectively. This disparity in quitting success occurred despite people with and without an SMI diagnosis not differing in number of quit attempts.

Evidence-based treatments significantly increase smoking cessation rates among individuals with psychiatric diagnoses, including anxiety and mood disorders, among others.[289,316,317] For example, multiple randomized controlled trials have shown that evidence-based treatment can significantly increase smoking cessation rates among individuals with depression.[318–321]

As noted above, individuals diagnosed with schizophrenia can also quit smoking successfully with evidence-based treatment.[296] Multiple studies using combined counseling and medication for smoking cessation suggest positive effects when used with populations with schizophrenia and other SMI diagnoses.[322–326]

As discussed in chapter 3, varenicline appears to be an especially effective smoking cessation intervention in the general population.[85,176,327,328] There is substantial evidence that supports both the safety and efficacy of this agent in the treatment of smoking among individuals with SMI diagnoses,[323–325,329–331] with the EAGLES trial (Evaluating Adverse Events in a Global Smoking Cessation Study) producing the strongest evidence to date. The EAGLES trial included individuals with psychotic disorders who smoked (*N* = 390) and compared several FDA-approved cessation medications with placebo; all subjects received counseling in addition to pharmacotherapy. The 4-week continuous abstinence rate at the end of treatment was 23.2% for varenicline, 13.1% for the nicotine patch, 11.2% for bupropion, and 4.1% for placebo.[296,330]

Significant concerns were once raised about the safety of varenicline, especially for those with psychiatric disorders, which resulted in an FDA black box warning related to such use. The FDA removed that warning in December 2016 based on the EAGLES trial in addition to other evidence.[331]

While the evidence of efficacy is strongest for varenicline, there is positive evidence for the effectiveness of both bupropion and the nicotine patch in SMI populations as well.[296,331,333–337]

However, in interpreting this information, it is important to note that most trials included only participants who were motivated to quit and whose psychiatric disorder was stable.

Virtually all of the evidence attesting to the effectiveness of smoking cessation medications comes from studies that included adjuvant counseling: often repeated, multisession, high-intensity counseling visits. While such counseling likely contributed to the effectiveness of the pharmacotherapies, there is evidence that brief advice or minimal counseling alone is not meaningfully effective with individuals experiencing SMI.[296,331] This evidence is consistent with the results from the EAGLES trial, which found that participants with SMI had very low cessation rates when given placebo (all arms received minimal counseling). Thus, it is important that patients with SMI diagnoses be encouraged to use pharmacotherapy in their smoking cessation attempts and perhaps relatively intensive counseling support.

Finally, most of the data reviewed above were derived from formal randomized controlled efficacy trials that do not resemble real world clinical practice (e.g., in that efficacy trials typically employ specially trained counselors, provide intense counseling, and include highly motivated participants). However, a 2019 pragmatic, randomized controlled trial conducted in the United Kingdom suggests that smoking cessation treatment for SMI populations can be effectively implemented in real world settings.[338] In this study, intensive smoking cessation treatment, which included pharmacotherapy and counseling, was delivered to individuals with SMI diagnoses (schizophrenia, schizoaffective disorder, bipolar disorder, and other psychotic disorders) in primary care clinics or community-based mental health centers. Compared with usual care, individuals who received the relatively intense smoking cessation treatment had significantly higher smoking cessation rates at 6 months (6% in usual care group vs. 14% in intervention group), although there was no difference in smoking cessation at 12 months.

Barriers to Smoking Cessation

Information on barriers to smoking cessation treatment engagement and success in SMI populations comes almost exclusively from the general population, rather than from studies of cancer populations. People diagnosed with SMI, and to some extent other psychiatric disorders, face numerous barriers to quitting smoking successfully and to receiving treatment. Important barriers to quitting smoking include a high level of nicotine dependence, socioeconomic disadvantage, unemployment, and social isolation.[339–343] There is clear evidence that these factors are associated with an increased likelihood of smoking or a reduced likelihood of quitting smoking in the general population.[85,98,344,345]

Some people with psychiatric disorders could be less motivated to quit smoking than those without psychiatric disorders who smoke. While some psychiatric populations show evidence of quitting motivation that is comparable to levels seen in those without psychiatric disorders,[283,289,346] there is evidence of lower motivation in individuals with SMI diagnoses.[347–349] Some evidence suggests that motivational interventions can enhance the motivation to quit smoking among SMI-diagnosed individuals.[350]

Weinstein and colleagues noted additional characteristics of psychiatric populations that might interfere with smoking cessation success and possibly treatment engagement.[351] These include exposure to chronic stressors, medication side effects, and lack of financial and health care

resources. Systemic barriers in the U.S. health care system prevent many SMI-diagnosed individuals from getting the evidence-based tobacco cessation treatment that they need. Weinstein and colleagues noted that much of the disparity in mortality associated with psychiatric illness is due to disparities in health insurance coverage, health care access, and utilization. Such disparities also occur regarding smoking cessation treatment.[351] While some evidence shows that individuals with schizophrenia are as likely as other individuals to receive physician advice to quit smoking,[315,352] advice alone could be ineffective.[353] There is evidence that those with SMI diagnoses are unlikely to receive evidence-based smoking cessation treatment in the course of normal psychiatric or health care contacts,[283,354–356] although Srivastava and colleagues found that, among hospitalized patients, psychiatric patients were more likely to be prescribed pharmacotherapy than patients hospitalized for other reasons.[357] Clinicians in cancer care settings cannot expect that clinicians in other settings will address smoking with patients with SMI or other psychiatric diagnoses.

Insufficient efforts to engage patients in smoking cessation treatment are just one manifestation of SMI patients' inadequate receipt of health care. In the context of cancer care, SMI patients are relatively unlikely to undergo surgical resection and they tend to receive fewer chemotherapy treatments.[351,358] In short, SMI patients receive an inadequate level of health care across a wide range of health domains. This emphasizes the need for health care systems and clinicians to examine obstacles that reduce health care delivery for this population, including clinician biases and suboptimal screening and intervention within health care systems.

Summary: Smoking Among Individuals With SMI and Cancer

Data from populations without cancer suggest that individuals with psychiatric disorders, especially those in SMI populations, tend to have especially high smoking prevalence relative to those without such disorders. Data from the general population also show that individuals with psychiatric diagnoses tend to be less successful at quitting smoking when making unaided quit attempts than are non-SMI diagnosed individuals who smoke. However, evidence-based smoking cessation treatments significantly increase the likelihood of successful cessation among individuals with psychiatric disorders, including SMIs. There is also evidence that smoking cessation pharmacotherapy, varenicline in particular, is especially effective for the SMI population. This complements evidence that varenicline is an especially effective pharmacotherapy for the general population. Barriers to successful smoking cessation among the SMI population include high levels of physical dependence on cigarettes, socioeconomic disadvantage, and inadequate referral or access to evidence-based smoking cessation treatment. The provision of relatively intense treatment that includes smoking cessation pharmacotherapy is likely to be extremely important for SMI populations given their low rates of quitting success and the many barriers this population faces that reduce the chances of quitting. The relatively high rates of cancer and cancer-related mortality in the SMI population buttress this recommendation.

Smokeless Tobacco and Medically Underserved and Vulnerable Populations

Although smokeless tobacco products, such as chewing tobacco, dip, snuff, or snus, are not as widely used as cigarettes, these products are commonly used by some medically underserved and socioeconomically disadvantaged groups. According to data from the 2020 National Health Interview Survey (NHIS), 4.5% of men and 0.3% of women reported using some form of smokeless tobacco "every day" or "some days" during the past month. This indicates that there are approximately 5.7 million smokeless tobacco users aged 18 or older in the United States.[41] Additionally, in 2020, according to the National Youth Tobacco Survey, 3.1% of high school students (4.8% of male students and 1.4% of female students) reported current use of smokeless tobacco.[387] Data from the Population Assessment of Tobacco and Health (PATH) study indicate that 1.6% of cancer survivors reported using smokeless tobacco in 2013–2014, and 4.7% of cancer survivors who currently smoked cigarettes also reported smokeless tobacco use.[159] In general, trends in smokeless tobacco use have shown little change over the past 20 years.[388]

Smokeless tobacco products contain nicotine and are addictive, and their use is causally associated with oral cancer, esophageal cancer, and pancreatic cancer. At least 28 carcinogens have been identified in smokeless tobacco products.[389] An expert group convened by the International Agency for Research on Cancer concluded that there is sufficient evidence that smokeless tobacco, along with two tobacco-specific nitrosamines present in smokeless tobacco (NNN and NNK), are carcinogenic to humans (Group 1).[390,391] A study using nationally representative data from the National Health and Nutrition Examination Survey (NHANES) from 1999 to 2012 found higher concentrations of serum cotinine and urinary NNAL, a tobacco-specific nitrosamine, among smokeless tobacco users, compared with cigarette smokers.[392]

Higher prevalence of smokeless tobacco use is associated with younger age, White race, living in rural areas, residence in the South, lower education, and unemployment.[393] Smokeless tobacco use, and dual use with cigarettes, have also been reported to be high among Alaska Native individuals.[394] According to the 2020 National Survey on Drug Use and Health (NSDUH), adults living in a large or small metropolitan area (2.2% and 4.2%, respectively) were less likely to report past-year smokeless tobacco use than adults living in a nonmetropolitan area (6.7%).[38] NHIS data from 2020 show that adults with lower educational attainment, including those with a GED (3.8%) or high school diploma (3.3%) were more likely to use smokeless tobacco than those with higher levels of education, such as those with undergraduate or graduate degrees (1.3% and 0.8%, respectively).[41] Smokeless tobacco use is also associated with blue-collar employment; for example, one study reported a prevalence of 35% among construction workers.[395]

Smokeless tobacco also warrants concern because of its association with cigarette smoking and other tobacco use behaviors. National surveys have shown that nondaily use of smokeless tobacco is strongly associated with cigarette smoking among male adolescents and young adults.[396,397] Dual users of smokeless tobacco and cigarettes also exhibit higher levels of nicotine dependence compared with those who use only cigarettes.[397]

People who use smokeless tobacco are less likely to try to quit than people who smoke cigarettes.[398] At the same time, current evidence-based interventions for smoking cessation have had limited success among smokeless tobacco users. Clinical trials provide some evidence that behavioral interventions in particular settings, such as cessation counseling in dental offices, could increase abstinence rates among users of smokeless tobacco.[399] However, trials of

pharmacotherapies in users of smokeless tobacco have shown limited impact on long-term (i.e., longer than 6 months) rates of abstinence.[399,400] There is also a lack of interventions targeted at smokeless tobacco use among patients with cancer. However, a large, randomized trial conducted in India found a reduction in oral cancer mortality from repeated visual screening in tobacco and alcohol users.[401]

In summary, smokeless tobacco products pose novel challenges to public health and tobacco control, are a cause of several types of cancers, and contribute to tobacco-related health disparities. In addition to presenting a significant challenge for cancer prevention and control in the U.S., smokeless tobacco is also a global health problem; worldwide, more than 300 million people across 127 countries consume smokeless tobacco products.[402]

Effectiveness of Smoking Cessation Treatment

The literature reviewed above shows that many members of medically underserved and vulnerable populations face significant challenges in terms of generally high smoking prevalence, reduced likelihood of smoking cessation, and barriers to receiving smoking cessation treatment and its benefits. However, research suggests that evidence-based smoking cessation treatment is effective across a wide variety of populations.[5,85,176,359] There is evidence supporting smoking cessation treatment for medically underserved and vulnerable populations, such as individuals with psychotic disorders,[296,330] socioeconomically disadvantaged individuals,[360] and those with substance use disorders.[283] Based on such evidence, the PHS Clinical Practice Guideline, *Treating Tobacco Use and Dependence: 2008 Update,* concluded that evidence-based treatment was effective for men and women, racial and ethnic minority groups, and those who are socioeconomically disadvantaged.[176] In sum, the weight of this evidence strongly supports the provision of evidence-based smoking cessation treatment for all individuals who smoke, regardless of their membership in a medically underserved and vulnerable population (see also chapter 3 for additional supporting evidence).

Although smoking cessation treatments are generally effective for medically underserved and vulnerable populations overall, quit rates achieved could be lower among specific sub-groups. For example, there is evidence that socioeconomically disadvantaged populations and Black or African-American adults tend to have lower quit rates than other smoking populations.[166,171,361] In addition, smoking populations with comorbid substance use disorders could be more prone to relapse after achieving initial smoking cessation than are other smoking populations.[283]

While evidence-based smoking cessation treatments are effective across diverse populations of individuals who smoke, some targeted interventions have been developed for especially vulnerable smoking populations. While some of these have produced promising effects on short-term abstinence (at the end of treatment and at 3 months),[178] at present, experimental evaluations of targeted smoking interventions have not shown that they consistently increase long-term smoking abstinence over and above evidence-based smoking interventions (pharmacotherapy and counseling) shown to be effective in the general population.[227] However, it is possible that targeted interventions could be more attractive to members of some populations and thereby increase treatment reach and engagement. Importantly, to the extent that nontargeted evidence-based smoking cessation treatment is effective in medically underserved and vulnerable

populations, it could increase the efficiency, cost-effectiveness, and reach of smoking cessation treatment in such populations.

A notable limitation is that the great majority of studies on smoking cessation treatment in medically underserved and vulnerable populations were conducted in the general population and not in patients with cancer.

Summary

This chapter shows that diverse, medically underserved, and vulnerable populations face both shared and unique challenges that affect the likelihood that such individuals will smoke and have greater difficulty in quitting. For many of these populations, inadequate reach of evidence-based smoking cessation treatment is a major impediment to smoking cessation in cancer care settings. Some evidence suggests that smoking cessation treatment reach could be improved by embracing EHR-based smoking assessment and referral strategies. In addition, medically underserved and vulnerable populations commonly report distrust or concern about how they are perceived or treated by clinicians, and clinicians report a lack of knowledge or training about working with some populations. Efforts to explore each patient's concerns or views regarding their health care could uncover such concerns and allow clinicians to build rapport with these patients. Also, prior research suggests an interest in further training and educational experiences that could allow oncology clinicians to better address such issues.

Each medically underserved and vulnerable population experiences multiple factors at the individual, community, institutional or health care system, and societal levels that can serve as obstacles to both treatment access and cessation success. There is considerable overlap of these factors across populations (e.g., high levels of stress, discrimination, lack of access) and individuals in these populations will differ in the extent to which such factors apply to them. Therefore, knowledge about the obstacles facing medically underserved and vulnerable populations with regard to smoking cessation success should not encourage generalizations and broad assumptions about individuals. Rather, such knowledge is intended to raise awareness of the challenges that individuals in these populations could face and underscores the need for focused efforts to engage them in effective smoking cessation treatment. Moreover, this chapter emphasizes that members of every medically underserved and vulnerable population can benefit from evidence-based smoking cessation treatment. This underscores the need to provide smoking cessation treatment to cancer patients from medically underserved and vulnerable populations who smoke, given the strong association between smoking cessation and improved health outcomes for these patients.

Conclusions

1. Medically underserved and vulnerable populations face challenges at the individual, community, health care system, and societal levels that affect the likelihood that individuals will smoke, that they will develop cancer, and/or that they will receive effective smoking cessation treatment.
2. Challenges shared by many medically underserved and vulnerable individuals who smoke, including those with cancer, include poverty, high levels of stress, discrimination, lack of health insurance coverage, competing priorities, inadequate access to health care

and smoking cessation treatment, and frequent exposure to smoking in their social networks and to tobacco industry marketing.

3. Patients with cancer who are also members of medically underserved and vulnerable populations are motivated to quit smoking but some of these groups tend to be less likely to be successful in their attempts to quit smoking than are cancer patients from the general population. More research is needed regarding the effectiveness of smoking cessation treatment among medically underserved and vulnerable groups of cancer patients who smoke and regarding strategies for increasing the reach and cost-effectiveness of such treatment.

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