

Tobacco and Alcohol: Understanding Co-Use to Reduce Cancer Incidence and Mortality



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Executive Brief

NCI Monograph 24
Tobacco and Alcohol: Understanding Co-Use to Reduce Cancer Incidence and Mortality

Executive Brief

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About the National Cancer Institute Tobacco Control Monograph Series

The National Cancer Institute established the Tobacco Control Monograph series (formerly the Smoking and Tobacco Control Monograph series) in 1991. The series provides comprehensive scientific reviews of tobacco use, treatment, and prevention topics to inform the work of researchers, clinicians, and public health practitioners working to reduce cancer morbidity and mortality. All 24 Tobacco Control Monographs and their supplemental materials can be downloaded from cancercontrol.cancer.gov/monographs.

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This monograph and its supplemental materials may be found electronically at cancercontrol.cancer.gov/monograph24 or by scanning the QR code.



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Foreword

Tobacco and alcohol are two of the most commonly used addictive substances in the United States. Whether consumed individually or together, their negative toll on health is substantial. Tobacco use is the leading risk factor for cancer, accounting for nearly 20% of cancer incidence, while alcohol is the third leading cause. In addition to cancer, tobacco and alcohol cause many other chronic diseases; adverse reproductive outcomes; and, especially for alcohol, increased risk of accidents and injury. As this monograph describes, use of both tobacco and alcohol products—known as “co-use”—is also common, and there is strong correlation between dependence on tobacco and alcohol. In the United States, an estimated 11.8% of adults (approximately 30 million people) report both smoking cigarettes and drinking alcohol in the past month. Initiation of tobacco and alcohol use often begins in adolescence, and early onset of use is a strong predictor of dependence, cancers caused by tobacco, and many other chronic and acute health conditions.

There are strong biological relationships between tobacco and alcohol. Nicotine (the primary addictive constituent of tobacco) and ethanol (the primary addictive constituent of alcohol-containing beverages) each affect the three major neurobiological circuits implicated in dependence and addiction (i.e., the basal ganglia, the extended amygdala, and the prefrontal cortex). Tobacco use increases the risk of cancer through numerous carcinogens, including those formed from combustion. Alcohol use causes cancer via the effects of ethanol and its metabolic product, acetaldehyde (which is also found in tobacco smoke) and via effects on metabolism, oxidative stress, inflammation, and hormonal pathways. Alcohol may also influence tobacco-related carcinogenesis through its effects on membrane permeability, epigenetic changes, and promotion of tumor growth. In addition to each causing cancer individually, co-use of tobacco and alcohol is associated with synergistically higher risk of head and neck and esophageal cancers, and potentially with cancer at other sites.

With this background in mind, the publication of a National Cancer Institute (NCI) Tobacco Control Monograph is a critical step to increase attention on the importance of addressing co-use of tobacco and alcohol for cancer prevention and health promotion. A key goal of the monograph is to examine how tobacco control, including prevention and cessation of tobacco use, can be improved by addressing alcohol use. As the monograph explains, the co-use of tobacco and alcohol is driven by complex biological and genetic factors, including the neurobiology of addiction, the physiological effects of tobacco and alcohol exposures, behavioral genetics, carcinogenesis, and psychological processes. Tobacco and alcohol co-use is also influenced by an intricate and interconnected landscape of social, economic, and policy factors. The monograph emphasizes each of these important factors by summarizing the literature, highlighting research needs, and drawing conclusions relevant to diverse audiences.

Research focused on tobacco and alcohol has long been funded and conducted by the National Institute on Drug Abuse (NIDA), the National Institute on Alcohol Abuse and Alcoholism (NIAAA), and NCI. The work of these three institutes spans neuroscience and behavior, epidemiology, public health interventions, clinical treatment, and medication development, to name just a few scientific domains. In 2013, the National Institutes of Health (NIH) formed the Collaborative Research on Addiction at NIH (CRAN) initiative, an NIH-wide initiative to enhance integration of the work of these three NIH Institutes in better understanding

and addressing morbidity and mortality from alcohol, tobacco, and other addictive substances. The signature project of CRAN is the Adolescent Brain Cognitive Development (ABCD) Study, launched in 2015. This long-term study of brain development and child health enrolled nearly 12,000 children ages 9–10 who are being followed for at least a decade using structural and functional brain imaging together with genetic, neuropsychological, behavioral, and other health assessments to understand brain development in adolescents. Among the questions to be addressed by ABCD is how the use of tobacco and alcohol affects the structure and function of the adolescent brain. This volume clearly highlights the importance of this question because both tobacco and alcohol use typically begins during adolescence, and early onset of substance use is linked to greater dependence and higher risk of disease. By disseminating the latest evidence and effective practices related to addressing tobacco and alcohol co-use, this monograph makes an important contribution to the enhanced integration that was envisioned when CRAN was formed.

This monograph describes numerous research needs that may inform scientists in these fields. A few are highlighted here:

1. Improved measurement and epidemiological surveillance of tobacco and alcohol use is frequently identified as an important area for improvement. Many studies would benefit from assessing both tobacco and alcohol use and co-use in greater depth, including considering the evolving marketplace of both tobacco and alcohol products.
2. A better understanding of the cancer risks of tobacco and alcohol co-use, especially for cancers in addition to those of the head and neck and esophagus (for which synergistic risk is already known). Attention is needed to the potential for synergistic risks, along with a better understanding of the biological mechanisms underlying these risks.
3. Although there are effective treatments for tobacco use and alcohol use and/or use disorder individually, few interventions have been developed to treat co-use. Given the large number of people who use both substances, this is an important area of continued study.
4. Better evidence concerning integrated interventions (e.g., program, policy, public education, clinical) to prevent tobacco and alcohol use and co-use among adolescents and young adults is urgently needed to advance cancer prevention and public health.

The monograph's key findings and conclusions will also inform public health practitioners, clinicians, and the public. For example, because alcohol use, especially heavy alcohol use, is a barrier to successful smoking cessation, people trying to quit smoking should be advised and assisted to reduce or stop their alcohol use. Additionally, providing smoking cessation treatment during treatment for alcohol use disorder does not threaten sobriety outcomes; this is important because a high percentage of people entering treatment for alcohol use disorder or substance abuse disorder also smoke cigarettes. However, many substance use treatment facilities have yet to incorporate tobacco cessation services into their program offerings, and there are many opportunities, including smokefree policies and integrated treatment systems, to implement these systems of care.

NIDA, NIAAA, and NCI have supported research to reduce the morbidity and mortality caused by tobacco and alcohol products for many decades, and success in tobacco control has dramatically reduced the burden of cancer caused by tobacco. However, more work is still needed to achieve comprehensive tobacco control and relatively less progress has been made in

addressing tobacco and alcohol co-use or addressing alcohol alone as a target for cancer prevention and control. Notably, more effort is needed to address barriers between the fields—both with regards to individual substances and to research domains—to better understand the complex patterns and determinants of substance use among both youth and adults. This monograph is an important step to better integrate work to address tobacco and alcohol use, which are among the nation’s most commonly used hazardous and addictive substances. Advancing research on the co-use of tobacco and alcohol will help shape effective interventions to mitigate the combined impact of these addictive products on cancer incidence and mortality.

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Scope

The Executive Brief is a synopsis of the full monograph volume. It describes the monograph's purpose, provides an overview of the major conclusions and chapter summaries, and discusses future research directions. Readers are encouraged to access the full report for in-depth synthesis of the scientific evidence regarding tobacco and alcohol co-use and their effects on cancer. Supporting references and other documentation are also available in the full report.

Introduction

The use of tobacco products remains the leading modifiable risk factor for cancer incidence and mortality.¹ It is well-established that cigarette smoke contains at least 80 known carcinogens.² In 2020, the *Smoking Cessation: A Report of the Surgeon General* reaffirmed the cancer risks of smoking and highlighted the benefits of cessation on cancer and other health outcomes.³

Alcohol use is the third-ranked modifiable risk factor attributed to cancer morbidity and mortality.¹ Evidence on the effects of alcohol consumption on cancer incidence and health outcomes has increased in recent years. In 2025, the U.S. Surgeon General released an advisory that highlighted the link between alcohol use and cancer and called for measures to increase awareness of alcohol's contribution to cancer incidence and outcomes.⁴

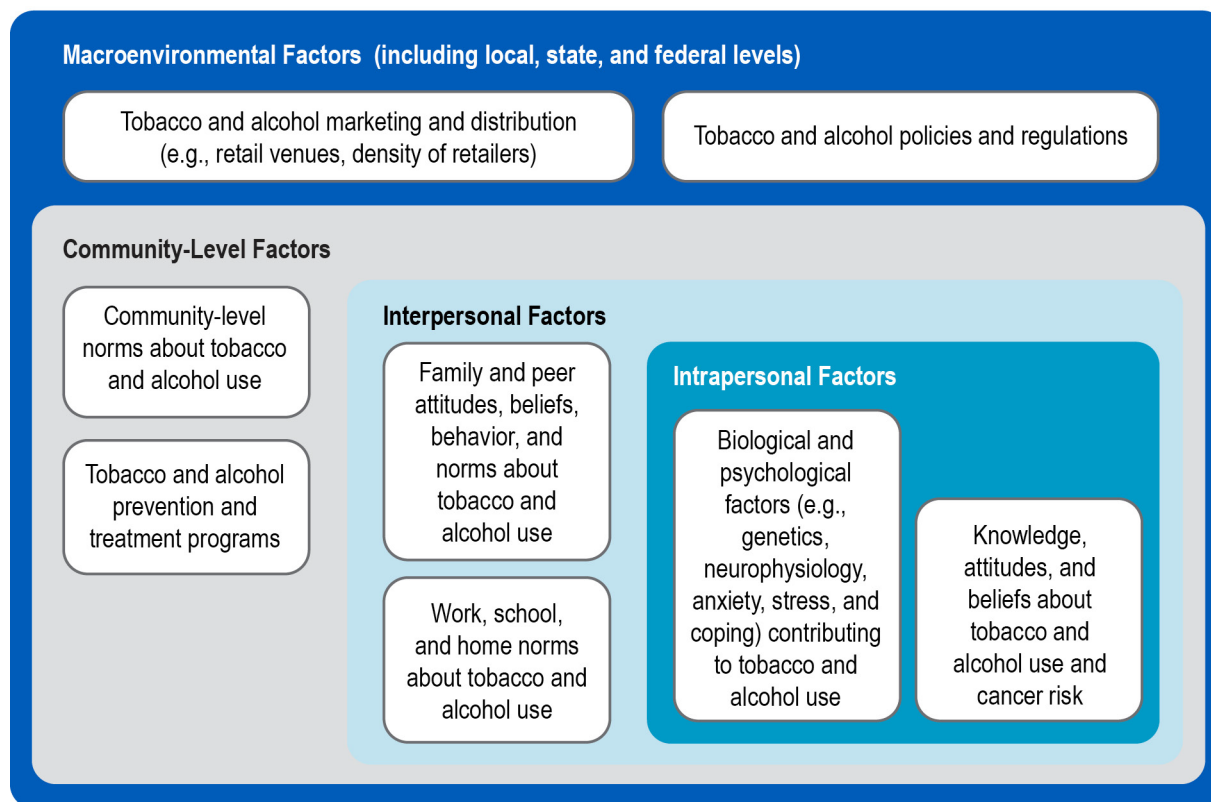
Together, tobacco and alcohol account for almost 25% of cancer cases in the United States and more than one-half of all cancer cases attributed to modifiable risk factors,¹ making their use—and the factors influencing their use—primary targets to reduce cancer incidence and mortality. Co-use of tobacco and alcohol also contributes to synergistic risk for head and neck cancers.⁵⁻⁷ Tobacco and alcohol exposure independently and jointly cause multiple types of cancer through a wide variety of distinct and overlapping mechanisms. The carcinogenic mechanisms associated with tobacco use vary by the type of tobacco product used, with combusted tobacco products generally resulting in greater exposure to toxicants than other tobacco products. Alcohol acts as a carcinogen through multiple mechanisms.^{4,8} All alcoholic beverages contain ethanol, the major cause of cancer associated with alcohol use through its direct physiological effects and via its primary metabolite, acetaldehyde, a potent carcinogen.⁴ For both tobacco and alcohol, the risk of cancer increases as the amount consumed increases.

In addition to cancer risk, tobacco and alcohol co-use may influence the probability of continued use and present a barrier to successful tobacco cessation and reduction in harmful drinking.^{9,10} There is a strong correlation between alcohol use and nicotine dependence. Individuals who are alcohol dependent are three times more likely to have nicotine dependence than the general population, and individuals who are dependent on tobacco are nearly four times more likely to be alcohol dependent than people without nicotine dependence.¹¹ People who smoke and drink alcohol represent a significant subpopulation for whom intervention is an important, but often overlooked, goal.

The use and co-use patterns of tobacco and alcohol are influenced by numerous intersecting factors (see Figure 1), including intrapersonal (biological and psychological), interpersonal (family, peer), and social, (community), as well as macro-environmental factors such as the policies, systems, and environments that shape accessibility, affordability, and marketing of these substances. Adding to this complex landscape, during the past 20 years there have been

considerable changes in both the tobacco and alcohol marketplaces, with many new products being added to the market. New products may contribute to additional cancer risk, indicating that continued investment in research and public health measures focused on tobacco and alcohol co-use is needed.

Figure 1 Multilevel Factors Affecting Tobacco and Alcohol Co-Use



Despite dramatic reductions in overall tobacco use¹² and declines in drinking among adults and adolescents,^{13,14} the burden of cancer and other chronic diseases caused by tobacco and alcohol use and co-use remains extremely high.^{1,15} Increased awareness of the cancer-related risks of tobacco and alcohol co-use along with investments in prevention interventions, treatment interventions, and policy approaches, will achieve reductions in prevalence.

About This Monograph

This monograph is the 24th volume in the series of monographs on tobacco control produced by the National Cancer Institute (NCI) of the National Institutes of Health, an agency of the U.S. Department of Health and Human Services. The primary goal of this monograph is to synthesize research to provide insight into the state of the science concerning tobacco and alcohol co-use. Specifically, the monograph is intended to advance cancer prevention efforts by summarizing the evidence on tobacco and alcohol co-use and identifying research needs. The monograph is primarily aimed at informing researchers. However, others seeking to understand and reduce the harms of tobacco and alcohol use and improve cancer control will find this volume useful. Diverse entities, including health departments, funding agencies,

community-based organizations, those working with adolescents and young adults, substance use treatment specialists, health care providers, and health systems, will also be able to use the volume to inform their work and point them towards promising new directions for tobacco and alcohol co-use interventions.

Accomplishments of the Monograph

This monograph:

- Confirms the evidence that the co-use of tobacco and alcohol is common and consequential. Nearly 25% of cancer cases in the United States can be attributed to tobacco and alcohol use.
- Reviews the evidence that tobacco and alcohol exposures independently and jointly cause multiple types of cancer through a wide variety of distinct and overlapping mechanisms.
- Confirms the synergistic effect of tobacco and alcohol use on the risk for squamous cell head and neck and esophageal cancers.
- Analyzes the relationship between tobacco and alcohol from prevention and treatment perspectives to better address the first- and third-ranked modifiable risk factors for new cancer cases in the United States.
- Addresses the need for coordinated treatment of tobacco and alcohol co-use and demonstrates that smoking cessation interventions are effective for people who smoke and have an alcohol use disorder.

Major Conclusions

1. **Tobacco and alcohol are addictive and carcinogenic substances that are commonly used together.** Approximately 12% of adults in the 2015–2019 National Survey on Drug Use and Health reported co-use of cigarettes and alcohol in the past month, representing nearly 30 million people. Adults who use tobacco (e.g., cigarettes, smokeless tobacco, cigars) are more likely to engage in alcohol use, binge drinking, and risky weekly alcohol use than those who do not use tobacco.
2. **Co-use of tobacco and alcohol occurs from the earliest ages of substance use initiation, and its prevalence is substantially higher among certain population subgroups.** Tobacco and alcohol use often begins in adolescence, and long-term use of these two substances makes it more difficult to quit or reduce their use. Adults who report nondaily use of tobacco report the highest prevalence of alcohol use, binge drinking, and risky weekly alcohol use compared with other tobacco use groups. Tobacco use is positively associated with alcohol use across all racial and/or ethnic groups. Compared with the U.S. adult population overall, tobacco and alcohol co-use is elevated in a number of subgroups, including veterans, people living in rural areas, people who are part of a sexual minority group, and people with some types of mental health conditions.
3. **Tobacco use and alcohol consumption individually increase the risk for numerous types of cancer, even at low levels of use, and there is a synergistic increase in risk of squamous cell cancers of the head and neck and esophagus caused by tobacco and alcohol co-use.** In 2019, an estimated 19.3% of incident cancer cases and 28.5% of cancer deaths in the United States were attributable to cigarette smoking. Smoking one or

fewer cigarettes per day increases the risk of numerous cancers. Further, an estimated 5.4% of incident cases of cancer and 4.1% of cancer deaths in the United States in 2019 were attributable to alcohol consumption. The risk for head and neck cancers increases with one drink per day and possibly at lower levels of consumption, and the risk of breast cancer increases at one or fewer drinks per day. Strong evidence from multiple countries demonstrates a synergistic relationship between tobacco and alcohol use and risk for squamous cell cancers of the head and neck and esophagus.

4. **Tobacco and alcohol co-use results in substantially increased acetaldehyde exposure.** Acetaldehyde is a potent carcinogen which damages DNA in multiple ways; it is both a component of tobacco smoke and an important metabolite of ethanol. Acetaldehyde plays a crucial role in the synergistic increases in risk observed for squamous cell head and neck and esophageal cancers in response to tobacco and alcohol co-use.
5. **People with genetic variants that reduce the rate of metabolism of acetaldehyde are at significantly increased risk of cancer if they consume alcohol.** An estimated 540 million people worldwide have genetic variants that reduce the rate of metabolism of acetaldehyde by aldehyde dehydrogenase 2 (ALDH2); these genetic variants are most common in East Asian populations. People with this variant who drink alcohol are at increased risk of squamous cell head and neck and esophageal cancers. Addressing alcohol use and tobacco and alcohol co-use represents important education and intervention opportunities to reduce the burden of cancer in this population.
6. **Tobacco and alcohol use affect multiple, complex neurophysiological processes in the brain.** Networks of brain regions influence how people respond to nicotine and ethanol. Shared biologic pathways in the brain, including those involved in risk-taking and impulsivity, interact and drive use of substances including tobacco and alcohol and substance use disorders.
7. **Studies have identified a substantial number of genetic variants that are associated with both alcohol use and tobacco use across populations, providing evidence for shared underlying mechanisms.** A better understanding of the shared biological mechanisms from additional genetic studies will inform efforts to prevent use disorders and develop pharmacotherapies for tobacco and alcohol co-use and polyuse with other substances.
8. **Smoking cessation interventions are effective for people who smoke and have an alcohol use disorder.** Engaging in smoking cessation treatment during treatment for alcohol use disorder does not jeopardize sobriety outcomes. However, many people in treatment for alcohol use disorder who smoke do not receive smoking cessation treatment. This is a missed opportunity to reduce the burden of cancer in this population.
9. **Addressing alcohol use as a part of smoking cessation treatment is highly likely to advance tobacco cessation goals.** Alcohol use, especially heavy alcohol use, is a barrier to quitting smoking. For this reason, people trying to quit smoking should be advised and assisted to reduce or stop their alcohol use. Integrated tobacco use treatments that address both tobacco and alcohol use may increase reach and effectiveness across multiple settings, including inpatient and outpatient clinical settings and community settings.

10. **Ensuring broad access to, and use of, evidence-based therapies for tobacco and alcohol treatment will help reduce cancer incidence and mortality.** Pharmacological and behavioral therapies for both tobacco and alcohol treatment are underutilized, especially the combined use of both types of therapies, which is the most effective treatment approach for both substances. Moreover, increased understanding of individual genetic variation may inform precision medicine approaches to addressing tobacco and alcohol use.
11. **Prevention programs and interventions that address both tobacco and alcohol may be effective to prevent initiation and ongoing use of both substances.** Effective interventions to prevent tobacco and alcohol use, especially among adolescents and young adults, exist at multiple levels, including the individual, group, community, mass media, and policy levels. Evidence suggests that prevention programs that address both tobacco and alcohol use are feasible. Integrated interventions are needed to prevent both tobacco and alcohol use early in life and across different population subgroups. In addition, intervention studies that focus on either tobacco or alcohol but measure effects on both substances will be highly informative.
12. **Factors pertaining to the marketing, sale, and distribution of tobacco and alcohol products (and the policies to address them) influence patterns and prevalence of tobacco and alcohol use individually and may also influence co-use.** Co-exposure to tobacco and alcohol product marketing and retail availability in the same outlets is common, suggesting the potential for cross-product effects. Greater retail availability of tobacco is associated with greater tobacco use among adults, and some evidence shows that greater availability of alcohol is positively associated with alcohol use among adults. In addition, both tobacco and alcohol retail outlets tend to be concentrated in neighborhoods characterized by greater socioeconomic disadvantage. Assessing how tobacco and alcohol industries' strategies for marketing and distribution of their products influence the marketplace and contribute to tobacco and alcohol co-use is important. Improved understanding of such influences can inform policy approaches to reduce the harms caused by tobacco, alcohol, and their co-use.
13. **Addressing the co-use of tobacco and alcohol has the potential to strengthen tobacco control and reduce cancer incidence and mortality.** Further research on tobacco and alcohol co-use will accelerate progress in preventing tobacco use initiation, improving rates of cessation, and avoiding smoking cessation lapses.
14. **Increased public awareness of both tobacco and alcohol as modifiable risk factors for cancer is an important step towards reducing the cancer burden.** Cancer prevention efforts have primarily focused on smoking and heavy alcohol use. The complex marketplace of available products, the high prevalence of co-use of tobacco and alcohol, and the fact that even moderate alcohol consumption and low levels of tobacco use increase cancer risk, pose challenges to researchers and clinicians. Increased public awareness of the cancer risks associated with tobacco and alcohol co-use will help reduce cancer incidence and mortality.

Monograph Chapters

The monograph comprises the following chapters:

Surveillance and Behavioral Epidemiology of Tobacco and Alcohol Use Among Adolescents and Adults in the United States. Chapter 2 describes measures of tobacco and alcohol co-use in the United States and provides details on patterns of co-use from the literature and from new analyses of National Alcohol Surveys (NAS) and National Survey on Drug Use and Health (NSDUH) data. This chapter also considers the most appropriate measures of tobacco and alcohol co-use for public health surveillance.

Surveillance and Behavioral Epidemiology of Tobacco and Alcohol Use Among Population Subgroups in the United States. Chapter 3 provides a summary of tobacco and alcohol co-use in specific population subgroups of adults based on a review of the literature and new analyses of NAS and NSDUH data. The chapter reviews tobacco and alcohol co-use among groups by race and/or ethnicity, educational attainment, income, geographic location, sexual minority status, veteran status, and presence of comorbidities including cancer, chronic health conditions, HIV, mental health conditions, and pregnancy.

Cancer Epidemiology of Tobacco and Alcohol Co-Use. Chapter 4 summarizes the epidemiologic research examining associations between cancer risk and use of tobacco and alcohol products independently, as well as the synergistic risk of cancer with use of both types of products resulting in a higher risk of cancer in specific sites. This chapter also evaluates available data on the synergistic effects of tobacco and alcohol use on cancer risk by demographic subgroups and efforts to examine the type of tobacco and alcohol product used to better understand their individual and joint effects on cancer risk.

Physiological, Cellular, Molecular, and Genetic Basis of the Combined Effects of Tobacco and Alcohol Use on Carcinogenesis. Chapter 5 provides an overview of mechanistic interactions between tobacco and alcohol exposures, focusing on how alcohol may influence the main mechanisms of tobacco carcinogenesis. It reviews the evidence for genetic susceptibility to tobacco and alcohol use and co-use and describes how this influences mechanisms for carcinogenesis. Other topics include the limited literature on interaction of nicotine and alcohol as carcinogens and evidence supporting the reversibility of these mechanisms for carcinogenesis and, consequently, the beneficial effects of tobacco use cessation and alcohol use reduction or cessation.

Shared Physiological and Genetic Factors Contributing to Tobacco and Alcohol Co-Use. Chapter 6 describes overlapping genetic factors and neurophysiology contributing to co-use of tobacco and alcohol. The topics reviewed in the chapter highlight the need to understand both environmental and genetic factors that contribute to the development of dependence and disease.

Treatment Approaches for Tobacco and Alcohol Use. Chapter 7 reviews the evidence on approaches to treating tobacco and alcohol use concurrently and the effectiveness of pharmacological and behavioral treatments for concurrent cigarette smoking and alcohol use. Topics reviewed include the neurobiological and behavioral overlap between smoking and

alcohol consumption, highlighting key mechanisms that drive co-use and could inform treatment targets, and the use of individual and combined pharmacological and behavioral therapies to treat tobacco and alcohol co-use.

Prevention of Tobacco Use in Relation to Alcohol. Chapter 8 summarizes the evidence regarding the extent to which alcohol-focused and more general substance use prevention programs are effective in preventing tobacco use among adolescents and young adults. It also evaluates the extent to which tobacco-focused and more general substance use preventions are effective in preventing alcohol use. Topics include psychosocial prevention programs and policies delivered at the individual level (e.g., text-based programs), group level (e.g., school-based and family-based programs), and population level (e.g., minimum legal sales age laws, mass media, and social media) that focus on tobacco, alcohol, and multisubstance use prevention where tobacco use is a measured outcome.

Economic, Environmental, and Policy Factors Related to Tobacco and Alcohol Use.

Chapter 9 reviews the evidence on the influence of economic, environmental, and policy factors for tobacco and alcohol use on tobacco initiation, use, and cessation. The chapter describes how the retail environment for tobacco and alcohol (which includes quantity, type, and location of tobacco and alcohol retailers), and the marketing environment for tobacco and alcohol may interact to influence tobacco use and tobacco and alcohol co-use. It also reviews the evidence related to tobacco and alcohol policy effects on co-use, such as (1) the interaction of tobacco and alcohol taxes on tobacco and alcohol use behavior, (2) the influence of restricting alcohol availability on tobacco use, (3) the effect of smokefree bar policies on alcohol use.

Future Research Directions. Chapter 10 summarizes the key findings from this report and identifies priority areas for future research. The chapter highlights the challenges and opportunities in understanding and addressing how alcohol use influences tobacco use, initiation and progression, and the resulting increased cancer risk.

Research Opportunities

This monograph emphasizes the importance of understanding the effects of tobacco and alcohol co-use and reviews the state of the science pertaining to co-use as of 2026. Throughout the monograph, each chapter details opportunities for future research efforts. These research needs serve as a starting point to develop informed hypotheses and future tobacco and alcohol co-use research projects.

Improving Measurement and Surveillance

Although co-use of tobacco and alcohol is common, there remains a lack of complete and consistent measurement of tobacco and alcohol co-use in many nationally representative health surveys and large cohort studies. Studies are needed that focus on the duration of co-use patterns over the life course to assess cumulative exposures, which is especially relevant to understanding the risk of cancer. In addition, better measurement of the interpersonal and contextual factors (i.e., social norms and settings) that contribute to patterns of use of tobacco and alcohol is critical for informing prevention and treatment approaches. As the tobacco product landscape has changed and continues to change over time, it is important to measure the use of tobacco products with varying characteristics and modes of delivery (e.g., e-cigarettes, heated tobacco

products, nicotine pouches) and their co-use with alcohol. Similarly, new alcohol products continue to enter the marketplace, and efforts to measure the use of products, such as ready-to-drink alcoholic beverages, are needed. For emerging tobacco and alcohol products, there is a paucity of research on patterns of use and health risks, including dependence, associated with each type of product and their co-use.

For both tobacco and alcohol use, reliance on self-report for accurate measurement of lifetime exposure is more difficult than discrete timepoints due to both potential recall bias and stigma related to disclosing use patterns, especially for heavy tobacco and alcohol use. Improved assessment of co-use, including development of biomarkers to account for cumulative exposures, may provide new insights into the behaviors and risks associated with tobacco and alcohol co-use.

More attention to demographic subgroups known to have increased risk for co-use or its health effects and who are not always well-sampled in nationally representative surveys (e.g., American Indian or Alaska Native individuals, sexual minority individuals, individuals who live in low-income communities, and individuals in rural communities) could elucidate unique concerns that could make interventions more effective.^{16,17} Innovative approaches to overcome challenges in sampling and engagement with underrepresented populations could enhance the inclusivity and relevance of co-use research, ultimately helping to achieve better health outcomes.

Assessing Shared Mechanisms of Tobacco and Alcohol Use and Cancer Risks

The genetic studies presented in this monograph have identified the thousands of genes associated with tobacco and alcohol use that may help inform future treatments.¹⁸ Substantial research is needed to determine the functional significance of genetic variants shown to be associated with tobacco and alcohol exposures¹⁹ and whether research on these variants can help inform more effective use of existing therapies and contribute to the development of new ones.

More research about the effects of co-use on the risk of other cancers is needed, especially for less common cancers where sample sizes have not always been sufficient and for cancers where associations with tobacco and alcohol have a more modest strength. Further, research is needed to assess the combined cancer risks for co-use of specific product types beyond cigarettes (e.g., cigars, e-cigarettes, smokeless tobacco) with alcohol. Risk assessments of different patterns of tobacco and alcohol use (e.g., nondaily smoking or episodic drinking) are also incomplete.

Many studies assess alcohol use and its health effects only in individuals with alcohol use disorders, and additional research is needed on the health effects, including cancer risk, of less frequent and intermittent alcohol use and tobacco and alcohol co-use.

Research is also needed on factors modifying cancer risk reduction related to cessation of tobacco and alcohol use and especially co-use. Additional studies are warranted to better understand the effect of reducing or stopping drinking for cancer risk in several organ sites, particularly for female breast cancer.²⁰

Assessing Shared Genetic and Neurophysiological Mechanisms Associated with Trajectories of Tobacco and Alcohol Use and Co-Use

A growing body of genetic and neurophysiological studies, along with cohorts and birth cohorts addressing substance use initiation, dependence, and cessation, are providing new targets for prevention of initiation and the potential development of new pharmacotherapies for cessation. These targets are based on genetic differences and on the identification and validation of additional phenotypes and endophenotypes associated with tobacco and alcohol use and co-use. Clinical trials incorporating genetic information may improve the effectiveness of treatments for tobacco cessation and alcohol use disorder. However, effective precision prevention and treatment approaches have yet to be developed.

Developing Interventions to Address Tobacco and Alcohol Use Concurrently

This monograph concludes that providing tobacco cessation treatment concurrent with alcohol treatment does not hinder the success of alcohol use disorder treatment. However, more research is needed to develop effective treatments for co-use of tobacco and alcohol for all levels of alcohol use. Further studies could focus on determining how best to intervene with people who use tobacco and have low to moderate levels of alcohol consumption. More research is also needed on the efficacy of integrating treatment for both behaviors and how to best leverage behavioral support into treatment among people who co-use tobacco and alcohol.

Standardizing methods and reporting protocols for clinical trials focused on the integrated treatment of smoking and alcohol use is crucial, where definitions of co-use and inclusion criteria are reported. Including a broader range of reported levels of drinking in smoking cessation studies will increase the generalizability of findings and could yield increased treatment success outcomes.

Improving Prevention Interventions for Tobacco and Alcohol Use

Despite shared contexts for use and shared determinants of use, tobacco prevention programs typically focus on measuring effects on tobacco use without specifically examining effects on alcohol use. Future research to evaluate the effectiveness of tobacco prevention programs would benefit from examining the effects of the programs on alcohol use and vice versa. Additional research is needed to achieve an optimal balance between providing tailored prevention programs that address both tobacco and alcohol use for individual population subgroups (e.g., American Indian or Alaska Native individuals, sexual minority individuals, individuals who live in low-income communities, and individuals in rural communities), and providing general programs that are effective for the overall population.

Among youth and young adults, preventing initiation and escalation to regular use and co-use of tobacco and alcohol are important goals for reducing cancer risk. In addition, because the marketplaces for tobacco and alcohol are constantly evolving, prevention interventions for the various noncigarette tobacco products used by young people (e.g., e-cigarettes) and co-use with alcohol are needed. In addition, the effects of these co-use patterns on cancer risk are not well understood.

Conducting Policy Research Related to Tobacco and Alcohol Co-Use

Despite existing in the same marketplace and social environment, few studies have investigated the cross-substance effects of tobacco- and alcohol-related economic, environmental, and policy factors. For example, additional studies on how the retail environments for tobacco and alcohol interact and the effects of price promotions and other marketing strategies in shared retail environments on use patterns are needed.

As of 2026, there is a small body of literature regarding how alcohol pricing policies, such as taxation, influence tobacco use. There is a significant gap in research on other alcohol policies, such as minimum age of purchase or warning labels, on tobacco use and co-use.

More research, with attention to study design and quality, is needed to ascertain whether higher alcohol taxes or prices reduce or increase tobacco consumption. To better understand how alcohol-related economic factors affect tobacco use, future studies should leverage recent data that reflect the evolving landscape of tobacco and alcohol products. Also, given changes in policies and use patterns related to cannabis, studies may benefit from also including cannabis products in their analyses. Such studies may inform policy strategies to address use of multiple substances.

Additional research is needed to determine whether greater retail availability of alcohol products increases the likelihood of tobacco use and co-use. Further analysis of the spatial distribution of tobacco and alcohol retailers in relation to neighborhood demographics, such as socioeconomic status and race and/or ethnicity, is critical to addressing health disparities caused by tobacco.

Addressing Risk Perception of Tobacco and Alcohol Co-Use

Addressing tobacco and alcohol co-use is complicated by the fact that researchers, clinicians, practitioners, and people who use tobacco and alcohol may have differing perceptions of the risk that tobacco and alcohol co-use poses related to cancer. Although guidelines exist to advise people about the harms of both tobacco and alcohol use (e.g., the 2008 Public Health Service Clinical Practice Guideline²¹ and the 2020–2025²² and 2025–2030²³ Dietary Guidelines for Americans), these guidelines are distinct for each substance and do not reflect the synergistic risk of co-use specifically. A stronger and more consistent focus on the cancer risk posed by tobacco and alcohol co-use is needed to change clinical practice and improve health outcomes. Further research to understand optimal dissemination of guidelines to improve screening and counseling by clinicians for tobacco and alcohol use and co-use is clearly needed, as is further research on how to equip health professionals to provide treatment, or refer people to treatment, for tobacco and alcohol co-use.

Conclusion

This monograph is an important step to understand the state of the science on tobacco and alcohol use—the nation’s most used hazardous and addictive substances—and their relationship to cancer incidence and mortality. The evidence presented in this volume focuses on the relationships and synergies between tobacco and alcohol co-use from a health, treatment, and prevention perspective. Alongside efforts to reduce use of tobacco and alcohol separately,

reducing co-use of tobacco and alcohol is a critical and underdeveloped tool to lower cancer risk and improve health outcomes.

Throughout this volume, opportunities to broaden and deepen the evidence base concerning tobacco and alcohol co-use are examined. The volume concludes that further research on tobacco and alcohol co-use will accelerate progress in preventing tobacco use initiation, improving rates of cessation, and avoiding relapse to smoking, and may contribute to the reduction of alcohol use. Advancing research on tobacco and alcohol co-use will help shape effective interventions, clinical practice, and policies to mitigate the combined impact of these addictive products on cancer incidence and mortality.

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