

NCI Monograph 24

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

Chapter 7

Treatment Approaches for Tobacco and Alcohol Use

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Chapter 7

Treatment Approaches for Tobacco and Alcohol Use

Introduction

Previous research has identified the co-use of tobacco and alcohol as a major public health problem in need of innovative and combined treatment modalities.¹⁻⁴ Studies have shown that people who smoke are more likely to drink heavily and meet criteria for alcohol use disorder (AUD) than people who do not smoke, and those with AUD are less likely to quit smoking than those without AUD.⁵⁻⁸

This chapter reviews the evidence for treating cigarette smoking and alcohol use concurrently and for therapies specifically designed to address their use and co-use. People with alcohol or substance use disorder (SUD) are more likely to die from illnesses caused by smoking, including cancer caused by smoking, than the general population.⁹ In addition, evidence indicates that people who smoke and have an SUD are more likely to die from a disease caused by tobacco than as a result of their SUD.¹⁰ Together this underscores the need for integrated strategies to address both behaviors.

The evidence supports treating smoking concurrent with alcohol use treatment to enhance a person's ability to both quit smoking and achieve or sustain alcohol and substance use abstinence or reduced use.¹¹⁻¹³ With integrated treatment, people who smoke and have a co-occurring AUD can attain the same level of smoking cessation success¹² as people who smoke and do not have a co-occurring AUD.¹⁴ Additionally, alcohol consumption can make quitting smoking more difficult and a relapse to cigarette smoking more likely, especially when alcohol use is heavy or meets criteria for AUD.^{8,15-17} Providing smoking cessation treatment to people who smoke and are in treatment for alcohol and/or other substance use (1) does not harm the success of the alcohol and substance use treatment and (2) may improve the chance of success.¹¹⁻¹³ Analysis of longitudinal data from the Population Assessment of Tobacco and Health (PATH) study found that quitting smoking was associated with a 30% increase in the odds of recovery from substance use disorder.¹⁸ Therefore, treating co-use of tobacco and alcohol may improve outcomes for both behaviors versus treating one substance at a time or focusing on treating one versus the other.

State of the Science

Quitting smoking usually takes several attempts to achieve long-term abstinence.¹⁹ Reducing or quitting drinking can be challenging as well, especially for people with AUD; people seeking treatment for AUD often relapse within 6 months of treatment.²⁰⁻²² Tobacco and alcohol can exert mutually reinforcing effects, both behaviorally and neurobiologically (detailed in the section “Understanding and Leveraging Neurobiological and Neurobehavioral Connections” and in chapter 6), and therefore generate a unique need for integrated treatments.²³⁻³⁰ There has been substantial progress in smoking cessation research since the mid-20th century, including development of novel behavioral treatments (e.g., quitline counseling) and pharmacotherapies

(e.g., nicotine replacement therapy [NRT], varenicline) and repurposed pharmacotherapies (e.g., bupropion).³¹ The 2020 Surgeon General's report, *Smoking Cessation: A Report of the Surgeon General*, concluded that "the evidence is sufficient to infer that behavioral counseling and cessation medication interventions increase smoking cessation compared with self-help materials or no treatment."^{31,p.10} In addition, as of 2021, more than three out of five U.S. adults who have ever smoked cigarettes have quit.³² Although a majority of people who smoke cigarettes make a quit attempt each year, fewer than one-third use cessation medications approved by the U.S. Food and Drug Administration (FDA) or behavioral counseling to support their quit attempt.³¹ The 2008 Public Health Service (PHS) Clinical Practice Guideline concludes that individual, group, and telephone counseling should be combined with first-line FDA approved medication (i.e., varenicline, NRT, and bupropion).¹⁴ This recommendation applies to all people who smoke, including those with psychiatric disorders, such as AUDs and other SUDs, unless there is a medical contraindication or insufficient evidence for specific populations (pregnant women, people who use smokeless tobacco, people who smoke occasionally or lightly, and adolescents).¹⁴ Further, the PHS Clinical Practice Guideline states, that "because alcohol is associated with relapse, the patient should consider limiting/abstaining from alcohol while quitting."^{14,p.42} The U.S. Preventive Services Task Force (USPSTF) Recommendation Statement on smoking cessation concurs with the recommendation of combined pharmacotherapy and behavioral treatment, but does not make specific treatment recommendations for people who smoke and have an AUD and/or SUD.³³

Smoking remains the leading cause of preventable death in the United States^{34,35} and globally.³⁶ As discussed in chapter 2, more than half of adults who smoke or use tobacco also use alcohol. Although alcohol and substance use treatment programs often recognize the need to incorporate treatment for polysubstance use, tobacco use is a consistent exception.^{37,38} Many people with AUDs express concern about their smoking or are interested in quitting smoking³⁹⁻⁴⁴; however, tobacco treatment is not consistently integrated into substance use treatment.^{38,45} People with a past AUD are often not prompted by substance use treatment providers to make a quit attempt due to concerns about reducing AUD treatment success or because they are not advised and assisted to quit by alcohol treatment counselors, demonstrating another way that alcohol use can present a challenge to quitting smoking.⁴⁶ The Substance Abuse and Mental Health Services Administration (SAMHSA) has developed resources to aid providers in integrating tobacco cessation services into SUD treatment programs.⁴⁷⁻⁴⁹ However, adoption of tobacco cessation services by SUD treatment facilities remains incomplete. For example, SAMHSA's 2024 National Substance Use and Mental Health Services Survey found that around two-thirds (72.6%) of U.S. substance use treatment facilities offered smoking/tobacco cessation counseling, and fewer than one-half offered NRT (43.2%) or nonnicotine smoking/tobacco cessation pharmacotherapies (39.1%).⁵⁰

Chapter Structure

Conducting a literature review of combined treatment approaches for people who smoke cigarettes and use alcohol at different levels is challenging, due in large part to the heterogeneity observed from trial to trial regarding the many decision points (e.g., product types, outcome specification, candidate therapies, treatment setting, participant inclusion, and exclusion criteria). However, as this chapter will discuss, evidence is emerging on efficacious treatments for tobacco

and alcohol co-use. The primary goal of this chapter is to review and synthesize the evidence for treating tobacco use in the context of alcohol use, including among those with AUD. Conclusions are drawn from the existing evidence, while acknowledging limitations and identifying research needed to advance the field.

This chapter encompasses two major themes. The first theme addresses the neurobiological and behavioral mechanisms underlying tobacco smoking and alcohol consumption. This is not meant to duplicate material covered in chapter 6, but rather to highlight key mechanisms that drive co-use and could inform treatment targets. The second theme is a review of existing treatments for tobacco and alcohol use that have been evaluated in the literature, such as pharmacological monotherapies, combination pharmacotherapies, behavioral therapies, and combination behavioral and pharmacological therapies. People who have AUD may participate in mutual support groups, such as 12-step programs, to help them achieve and maintain abstinence from alcohol.⁵¹ While many people with AUD have benefitted from these groups, this chapter focuses on the evidence-based treatments that have been used to treat tobacco and alcohol co-use, and no studies regarding the use of mutual support groups to treat co-use were found. Also, this chapter does not address forms of tobacco use other than cigarette smoking, as few studies have addressed concurrent treatment of tobacco products other than cigarettes with alcohol.

Understanding and Leveraging Neurobiological and Neurobehavioral Connections

Basic Underpinnings of Tobacco and Alcohol Dependence and Co-Use

Understanding the basic neurobiology and neurobehavioral connections between nicotine and ethanol is useful before discussing the literature on treatment implications. Preclinical data, and some clinical data, have established cross-tolerance between nicotine and ethanol, suggesting that as dosing escalates for ethanol, so it does for nicotine, and vice versa.⁵²⁻⁵⁶

This cross-tolerance leads to increasing self-administration of each substance in order to obtain the same rewarding effects. When coadministered in rats, nicotine and ethanol cause changes in dopamine and acetylcholine levels throughout the nucleus accumbens and ventral tegmental area, and the nicotinic acetylcholine receptor system is activated via the mesolimbic system which expedites a path to dependence for both nicotine and ethanol.^{28,57}

The nicotinic acetylcholine receptor system plays a critical role in the initiation, development, and maintenance of dependence to nicotine and alcohol.²⁸ For example, alcohol enhances the pleasurable effects of nicotine by increasing dopamine release in the brain's reward center, the nucleus accumbens, and by heightening the brain's sensitivity to nicotine through the activation of neuronal nicotinic acetylcholine receptors (nAChRs).^{28,58} Conversely, nicotine may reduce some of the acute effects of alcohol consumption. Concurrent self-administration of the two substances has been described as a "pharmacological balancing act."⁵⁹ This may help explain why individuals may begin drinking alcohol, experience its depressant effects after a few drinks, and then smoke a cigarette to feel stimulated and counteract some of the sedative effects of alcohol consumption.^{28,58} The primacy of the nicotinic acetylcholine receptor system when examining tobacco and alcohol co-use will come into focus further as the evidence for existing therapies is described in the section "Pharmacotherapy-Focused Approaches to Treat Tobacco and Alcohol Use."

Shared Genetic Vulnerability

Genetic evidence and growing specificity of neurobiological pathways and genetic markers could lead to further breakthroughs in developing personalized therapies to benefit individuals at disproportionate risk for smoking and alcohol drinking (described further in chapter 6). For example, genetic biomarkers can be used to distinguish between “fast” versus “slow” metabolizers of nicotine, and as a result, may enable healthcare providers to select a better suited pharmacotherapy based on the individual’s rate of nicotine metabolism.⁶⁰ This type of research could advance personalized therapies among people who co-use tobacco and alcohol as well. However, as discussed in chapter 6, many of the genetic correlations identified as of 2026 concerning both tobacco and alcohol are not very strong. Further research is needed to determine whether there are suitable potential targets for interventions addressing tobacco and alcohol co-use based on genetic information and/or shared mechanistic pathways of initiation and maintenance.

Neurobehavioral Overlap

Several behavioral patterns emerge when an individual is smoking cigarettes and drinking alcohol that are critical to understanding the evaluation of treatment options. Alcohol use can escalate smoking by decreasing inhibition.⁶¹ Using tobacco and alcohol together causes complementary rewarding effects; specifically, the use of alcohol acutely escalates tobacco smoking, while tobacco smoking increases consumption of alcohol.⁶² Over time, this overlap leads to neurobiological changes that reinforce chronic use of these mutually reinforcing substances.⁶³ More specifically, these neurobiological changes and their underlying mechanisms are probably partially responsible for the bi-directional and complementary reinforcing effects of these substances (i.e., the use of one will increase the reinforcing effect of the other). Alcohol acutely enhances the subjective effects of nicotine, including pleasure and satisfaction.^{64,65} Among people who drink heavily and smoke, alcohol use increases the urge to smoke and the rewarding effects of smoking, as well as acutely escalating tobacco smoking,^{26,62,66-69} whereas tobacco smoking increases alcohol craving, decreases the subjective effects of alcohol, and increases alcohol consumption.^{62,67,70} In fact, even individuals who are given a single, “priming” alcoholic beverage in a controlled setting find it more difficult to abstain from smoking after an episode of drinking has begun, compared to trying to abstain from smoking when not drinking.²⁶ In sum, tobacco and alcohol co-use may mitigate short-term negative effects and expedite a path to dependence on both substances.

Treatment Implications

Critical clinical outcomes of chronic tobacco and alcohol co-use are withdrawal and craving; these outcomes can drive a return to use and are the oft-cited targets for treatment development.^{17,28,71} Return to use, or relapse, can often present as impulsive, driven by a need for immediate gratification, or compulsive, driven by a need to perform ritualistic behaviors. Once behavioral patterns develop and key neural circuits adapt to these new patterns, an inability to self-administer nicotine and alcohol is experienced as craving and withdrawal.⁷² If the decision to use nicotine and/or alcohol is not deliberate but compulsive, it is often driven by environmental cues or external sources of stressors.⁷³ Compulsive tobacco and alcohol use behaviors are also often driven by heightened anxiety and stress and can lead to feelings of

relief from such negative emotional states during acute administration.^{72,73} In part, impaired decision-making and compulsive self-administration make it very difficult for the individual to accurately assess the risk of tobacco and alcohol consumption.⁷³⁻⁷⁵ Moreover, the compulsive nature of the substance use behavior makes it significantly more difficult to learn from the many negative consequences that result from intoxication.⁷⁶ Described succinctly by Nocente and colleagues (2013), “addiction to alcohol and tobacco is caused by pathologic brain neuroplasticity, in which drug seeking and compulsive intake are overlearned behaviors and relapse is due to unconscious working memory stimulated by impaired neural transmission.”^{28,p.454}

This bi-directional interaction poses various challenges for treating populations that co-use tobacco and alcohol because untreated dependence of one type can worsen the long-term outcomes of another untreated dependence.^{7,8,77,78} Even moderate drinking can reduce smoking cessation success,⁸ but the effects of heavier drinking appear stronger. Several studies on smoking cessation point to heavy episodic drinking (e.g., ≥ 4 drinks per day for women; ≥ 5 drinks per day for men) as a common predictor of poor smoking outcomes,⁷⁹⁻⁸³ with more than 40% of all smoking lapses occurring concomitant to drinking.⁸⁴ Among individuals with a history of AUD or undergoing treatment for AUD, smoking is associated with greater urge to drink,^{85,86} increased risk of relapse,^{7,87} and greater consumption of drinks upon relapse.^{86,88} Although the interplay between the use of tobacco and alcohol can create challenges for individuals trying to quit smoking or reduce their drinking, this relationship can also be leveraged to support their success in treatment, as quitting one substance might help with abstaining from the other.

Evidence Base for Smoking Cessation Therapies in the Presence of Alcohol Use

This section reviews clinical practice guidelines along with systematic reviews conducted as of 2026 on how available therapies for smoking cessation are moderated by alcohol use or whether these therapies have any specific guidelines or recommendations for treating co-use.

Clinical Practice Guidelines as of 2026

The PHS Clinical Practice Guideline, *Treating Tobacco Use and Dependence: 2008 Update*, states that smoking is a chronic disease that often requires multiple interventions and multiple cessation attempts, and existing therapies can significantly increase the odds of achieving and maintaining smoking abstinence.¹⁴ The PHS Clinical Practice Guideline is consistent with the 2021 recommendations of USPSTF, which recommends that clinicians advise adults to stop using tobacco and provide behavioral interventions and FDA-approved pharmacotherapy for cessation to nonpregnant adults who use tobacco.³³ The PHS Clinical Practice Guideline emphasizes that health care providers and systems should incorporate screening for tobacco use, taking care to consistently document current tobacco use status and treating or referring individuals to treatment accordingly.¹⁴ The Guideline also states that, across a broad range of populations, counseling combined with pharmacotherapy is more effective than either approach alone. Furthermore, even brief interventions can be effective for many individuals. Key elements of behavioral smoking cessation counseling include skills training, problem-solving, and social support, which are integral to individual and group counseling. These counseling approaches can be delivered in person and via telephone or digital tools (e.g., spoken conversation, text

messaging, smartphone applications). The Guideline recommends the use of FDA-approved medications to support cessation efforts unless medically contraindicated; these have been found to significantly improve long-term quit rates.¹⁴ FDA-approved medications that should be considered are several NRTs (i.e., gum, lozenge, nasal spray, and patch) and two oral medications, varenicline and bupropion sustained-release. Neither the PHS Clinical Practice Guideline nor USPSTF makes specific recommendations for people who consume alcohol in low, moderate, or heavy amounts or for people who have AUD or other SUDs. However, their recommendations for treating tobacco use apply to individuals who consume alcohol, regardless of the amount or frequency consumed or the presence of AUD. Moreover, the PHS Clinical Practice Guideline notes that alcohol use is associated with relapse and thus patients who are trying to quit tobacco “should consider limiting/abstaining from alcohol while quitting.” Guidelines from PHS, USPSTF, and other organizations related to treatment of tobacco and alcohol use are summarized in Table 7.1.

Table 7.1 Recommendations for Addressing Tobacco Use and Alcohol Use Disorder or Alcohol Use

Organization and recommendation	Year	Recommendations (excerpts): Screening	Recommendations (excerpts): Pharmacological and behavioral interventions	Recommendations (excerpts): Addressing co-use
Recommendations for treatment of alcohol use				
American Psychiatric Association (APA), Practice Guideline for the Pharmacological Treatment of Patients with Alcohol Use Disorder ⁸⁹	2018	The initial psychiatric evaluation of a patient with suspected AUD should include a quantitative behavioral measure to detect the presence of alcohol misuse and assess its severity.	Patients with AUD should have a documented, comprehensive, and person-centered treatment plan that includes evidence-based nonpharmacological and pharmacological treatments. Evidence-based psychotherapeutic treatments for AUD, including CBT, TSF, and MET play a major role in the treatment of AUD. APA recommends that naltrexone or acamprosate be offered to patients with moderate to severe AUD. APA suggests that disulfiram be offered to patients with moderate to severe AUD who meet certain criteria. APA suggests that topiramate or gabapentin be offered to patients with moderate to severe AUD who meet certain criteria.	The initial psychiatric evaluation of a patient with suspected AUD should include assessment of current and past use of tobacco and alcohol as well as any misuse of other substances, including prescribed or over-the-counter medications or supplements.
Department of Veterans Affairs (VA) and Department of Defense (DoD), Clinical Practice Guideline for the Management of Substance Use Disorders ⁹⁰	2021	For patients in general medical and mental health care settings, screen for unhealthy alcohol use periodically using the three-item AUDIT-C or single item SASQ.	For patients without documented AUD who screen positive for unhealthy alcohol use, provide a single initial brief intervention regarding alcohol-related risks and advising to abstain or drink within established limits for daily and weekly consumption. For patients with moderate to severe AUD, offer naltrexone or topiramate. For patients with moderate to severe AUD, offer acamprosate or disulfiram. For patients with moderate to severe AUD for whom first-line pharmacotherapy is contraindicated or ineffective, offer gabapentin. For patients with AUD, provide one or more of the following interventions, considering patient preference and availability: behavioral couples therapy, CBT, community reinforcement approach, MET, TSF.	Quitting tobacco use has clear benefits for improving health and decreasing mortality and is strongly encouraged for all patients with SUD. Consistently offering tobacco use disorder treatment throughout SUD treatment supports the principles of patient-centered care, shared decision-making, and recovery
Substance Abuse and Mental Health Services Administration (SAMHSA), Medication for the Treatment of Alcohol Use Disorder: A Brief Guide ⁹¹	2015	Clinicians should routinely screen their patients for at-risk drinking, provide brief interventions as needed, and assess for AUD when indicated.	Clinicians should consider prescribing an FDA-approved medication (acamprosate calcium, disulfiram, oral naltrexone, extended-release injectable naltrexone) when treating a patient who is dependent on alcohol or who has stopped drinking but is experiencing problems including cravings or relapse. Medications should be prescribed as part of a comprehensive treatment approach that includes counseling and other psychosocial therapies (through referral to a psychiatrist, psychologist, or professional counselor) and social supports (through participation in Alcoholics Anonymous and other mutual-help programs).	The treatment plan for individuals with AUD should include a plan for treating co-occurring medical or psychiatric conditions and other SUDs, including smoking.

Table 7.1 (continued)

Organization and recommendation	Year	Recommendations (excerpts): Screening	Recommendations (excerpts): Pharmacological and behavioral interventions	Recommendations (excerpts): Addressing co-use
U.S. Preventive Services Task Force (USPSTF), Unhealthy Alcohol Use in Adolescents and Adults: Screening and Behavioral Counseling Interventions ⁹²	2018	All adults: Screen for unhealthy alcohol use in primary care settings in adults 18 years or older, including pregnant women.	All adults: Provide people engaged in risky or hazardous drinking with brief behavioral counseling interventions to reduce unhealthy alcohol use.	N/A
Recommendations for treatment of tobacco use				
American Society of Addiction Medicine (ASAM), Integrating Tobacco Use Disorder Intervention in Addiction Treatment ⁹³	2022	Screen all patients for tobacco use disorder. Patients entering addiction treatment should be screened for nicotine and tobacco use.	Offer evidence-based treatment to all patients with tobacco use disorder. • Address tobacco-related problems and goals in treatment planning. • Provide barrier-free access to evidence-based tobacco cessation interventions. Use motivational and harm reduction strategies for patients ambivalent about quitting. • Motivational interviewing should be used to support patients that are ambivalent about stopping nicotine or tobacco use. • Utilize harm reduction principles to reduce harms associated with tobacco use.	Correct misconceptions about tobacco use disorder and addiction treatment. Patients might be concerned that quitting tobacco could disrupt their efforts to stop other substance use. These beliefs are not supported by evidence, which demonstrates that tobacco cessation can help, not hinder, addiction treatment interventions. Clinicians should educate patients on the effectiveness of concurrent treatment for tobacco use disorder and other SUDs. Implement organizational policies to support tobacco cessation. • Implement tobacco-free policies in addiction treatment settings. • Educate and train staff to support tobacco-free policies.
National Comprehensive Cancer Network (NCCN), NCCN Clinical Practice Guidelines in Oncology, Smoking Cessation ⁹⁴	2022	Smoking status should be documented in the patient health record. Patient health records should be updated at regular intervals to indicate changes in smoking status, quit attempts made, and interventions utilized.	Treatment plans should be offered for all patients with cancer who smoke, regardless of cancer stage, site, prognosis, or treatment modalities. Treatment plans should include: evidence-based motivational strategies and behavior therapy (counseling), evidence-based pharmacotherapy, and close follow-up with retreatment as needed. Combining pharmacologic therapy and behavior therapy is the most effective approach for achieving and maintaining abstinence from smoking, or smoking reduction for those not ready to quit.	Providers should evaluate and document the risk of relapse for patients with more than 30 days' abstinence. Drug or alcohol use is a risk factor for relapse.

Table 7.1 (continued)

Organization and recommendation	Year	Recommendations (excerpts): Screening	Recommendations (excerpts): Pharmacological and behavioral interventions	Recommendations (excerpts): Addressing co-use
Public Health Service (PHS) Clinical Practice Guideline, Treating Tobacco Use and Dependence: 2008 Update ¹⁴	2008	It is essential that clinicians and health care delivery systems consistently identify and document tobacco use status and treat every tobacco user seen in a health care setting.	Brief tobacco dependence treatment is effective. Clinicians should offer every patient who uses tobacco at least the brief treatments shown to be effective. Numerous effective medications are available for tobacco dependence, and clinicians should encourage their use by all patients attempting to quit smoking—except when medically contraindicated or with specific populations for which there is insufficient evidence of effectiveness (i.e., pregnant women, smokeless tobacco users, light smokers, and adolescents). Counseling and medication are effective when used by themselves for treating tobacco dependence. The combination of counseling and medication, however, is more effective than either alone. Thus, clinicians should encourage all individuals making a quit attempt to use both counseling and medication. If a tobacco user currently is unwilling to make a quit attempt, clinicians should use the motivational treatments shown to be effective in increasing future quit attempts.	Because alcohol is associated with relapse, the patient should consider limiting/abstaining from alcohol while quitting.
U.S. Preventive Services Task Force (USPSTF), Tobacco Smoking Cessation in Adults, Including Pregnant Persons: Interventions ⁹⁵	2021	Nonpregnant adults: Clinicians should ask all adults about tobacco use. Pregnant adults: Clinicians should ask all pregnant people about tobacco use.	Nonpregnant adults: Clinicians should advise adults to stop using tobacco and provide behavioral interventions and FDA-approved pharmacotherapy for cessation to nonpregnant adults who use tobacco. Pregnant adults: Clinicians should advise pregnant people to stop using tobacco and provide behavioral interventions for cessation to pregnant people who use tobacco.	N/A

Note. Table content is paraphrased from cited sources. APA = American Psychiatric Association, AUD = alcohol use disorder, AUDIT-C = Alcohol Use Disorders Identification Test-Concise, CBT = cognitive-behavioral therapy, FDA = Food and Drug Administration, MET = motivational enhancement therapy, N/A = Not applicable, SASQ = Single Item Alcohol Screening Questionnaire, SUD = substance use disorder, TSF = twelve-step facilitation.

Systematic Review Evidence as of 2026

Available systematic reviews contribute up-to-date evidence pertaining to how the use of alcohol affects smoking cessation outcomes, as well as how smoking cessation treatments delivered in the context of alcohol use treatment affect both smoking and alcohol use outcomes.

Understanding smoking cessation in the context of alcohol use at various levels and frequencies, including among those who engage in heavy drinking or are in treatment for AUD, is an area of active research. This section summarizes the systematic reviews conducted as of 2026 that are relevant to the central questions of this chapter: (1) the extent to which smoking cessation interventions are affected by concurrent alcohol use and (2) whether addressing co-use of smoking and alcohol or AUD improves smoking cessation outcomes. The effect of providing smoking cessation treatment in the context of treatment for alcohol use on the alcohol use behavior is also addressed in some reviews and discussed in this chapter. Systematic reviews are summarized in Table 7.2.

Table 7.2 Treatment Approaches to Tobacco and Alcohol Cessation: Systematic Review Findings

Study Publication type Number of studies included	Dates of studies included	Purpose	Inclusion criteria	Exclusion criteria	Main findings
Apollonio, Philipps, & Bero 2016 ¹¹ Meta-analysis 34 studies	January 1970–August 2016	Assess the impact of tobacco cessation interventions in the context of SUD treatment	Language: No restriction Publication: Peer reviewed and grey literature Population: Adults ages 15 and older undergoing inpatient or outpatient treatment for alcohol or other drug dependence, or in recovery from alcohol and other drug dependence Study Design: RCTs, cluster RCTs Intervention: Tobacco cessation interventions, including counseling, pharmacotherapy, and combination of both Outcomes: Point prevalence tobacco abstinence	Outcomes: Studies that did not report tobacco abstinence; studies that reported reduced smoking rather than abstinence	<u>Point prevalence tobacco abstinence</u> (intervention compared to placebo or usual care) <i>Pharmacotherapy alone:</i> RR = 1.88, 95% CI = 1.37–2.57 <i>Counseling alone:</i> RR = 1.33, 95% CI = 0.90–1.95 <i>Combined pharmacotherapy and counseling:</i> RR = 1.74, 95% CI = 1.39–2.18 <i>Interventions among people in SUD treatment:</i> RR = 1.99, 95% CI = 1.59–2.50 <i>Interventions among people in AUD treatment:</i> RR = 1.47, 95% CI = 1.20–1.81 <i>Interventions among people in other substance use treatment:</i> RR = 1.85, 95% CI = 1.43–2.40 <i>Interventions among people in SUD recovery:</i> RR = 1.33, 95% CI = 1.06–1.67 <u>Point prevalence abstinence from alcohol and other drugs</u> (intervention compared to placebo or usual care): RR = 0.97, 95% CI = 0.91–1.03

Table 7.2 (continued)

Study Publication type Number of studies included	Dates of studies included	Purpose	Inclusion criteria	Exclusion criteria	Main findings
McCambridge & Jenkins 2008 ⁹⁶ Systematic review and meta-analysis 41 studies, 7 in meta-analysis	1995–2005	Examine the secondary effects of brief alcohol interventions on cigarette smoking	Language: English Publication: Peer-reviewed publications Population: Adults ages 18 and older Study Design: RCT or quasi-experimental Intervention: Brief alcohol interventions Outcomes: Smoking cessation	Studies not meeting inclusion criteria	Smoking cessation rate <i>Among 7 studies:</i> 9.4% (95% CI, 6.4%–12.3%) in intervention group; 10.3% (95% CI, 8.2%–12.3%) in control group, $p = .042$ <i>Among 6 studies (randomized studies only):</i> 10.5% (95% CI, 7.3%–13.7%) in intervention group; 10.4% (95% CI, 8.2%–12.6%) in control group, $p = .42$

Table 7.2 (continued)

Study Publication type Number of studies included	Dates of studies included	Purpose	Inclusion criteria	Exclusion criteria	Main findings
Prochaska et al. 2004 ¹² Meta-analysis 19 studies (12 of individuals in treatment, 7 of individuals in recovery)	January 1966–September 2003	Examine outcomes of smoking cessation interventions among individuals in current treatment or recovery for substance use (alcohol or drug use)	Language: Not specified Publication: Peer-reviewed articles, dissertations, and conference abstracts Population: Adults older than age 18 in treatment or recovery for substance use Study Design: RCTs Intervention: Smoking cessation interventions (pharmaceutical or behavioral) Outcomes: Quantitative assessment of smoking cessation	Publication: Multiple publications related to the same study Study Design: Quasi-experimental or single group design Outcomes: Outcomes other than smoking cessation (e.g., smoking reduction)	<u>Smoking abstinence (intervention compared to control)</u> <i>Post-treatment, participants in current substance use treatment:</i> RR = 2.03, 95% CI = 1.21–3.39 <i>Post-treatment, participants in recovery:</i> RR = 1.77, 95% CI = 1.37–2.30 <i>Post-treatment, all participants:</i> RR = 1.82, 95% CI = 1.45–2.29 <i>Long-term follow-up (≥6 months, participants in current substance use treatment):</i> RR = 1.00, 95% CI = 0.64–1.57 <i>Long-term follow-up (≥6 months, participants in recovery):</i> RR = 1.31, 95% CI = 0.92–1.86 <i>Long-term follow-up (all participants):</i> RR = 1.18, 95% CI = 0.89–1.56 <u>Abstinence from drugs and alcohol (intervention compared to control)</u> <i>Post-treatment, participants in current substance use treatment:</i> RR = 1.10, 95% CI = 0.93–1.29 <i>Long-term follow-up (≥6 months, participants in current substance use treatment):</i> RR = 1.25, 95% CI = 1.07–1.46

Table 7.2 (continued)

Study Publication type Number of studies included	Dates of studies included	Purpose	Inclusion criteria	Exclusion criteria	Main findings
Thurgood et al. 2016 ¹³ Systematic review 17 studies	January 1990–August 2014	Evaluate smoking cessation interventions during SUD treatment and recovery	Language: Not specified Publication: Peer reviewed and grey literature Population: Adults older than 18 who smoked and who had recently completed or were receiving inpatient or outpatient treatment for a SUD (drugs or alcohol) Study Design: RCTs Intervention: Pharmacological or nonpharmacological smoking cessation interventions Outcomes: Biochemically verified continuous smoking abstinence and 7-day point prevalence smoking abstinence at 6 or 12 months	Study Design: Trials comparing different timings, such as concurrent versus delayed implementation of the same intervention Outcomes: Studies with <6 months follow-up	A total of 5 out of 17 studies reported significant effects on smoking cessation at 6 or 12 months. Compared to placebo or usual care: • Nicotine patches improved continuous smoking abstinence at 6 months. • Nicotine gum improved continuous smoking abstinence at 12 months. • Counseling, contingency management, and relapse prevention improved continuous smoking abstinence at 6 and 12 months. • CBT + NRT improved point prevalence abstinence at 6 months. • Bupropion, NRT, counseling, and contingency management improved point prevalence abstinence at 6 months. Out of 10 studies that reported substance use outcomes, 2 observed differences in substance use outcomes between conditions, and 8 reported no difference between conditions. No study observed a negative effect of smoking cessation interventions on substance use outcomes.

Table 7.2 (continued)

Study Publication type Number of studies included	Dates of studies included	Purpose	Inclusion criteria	Exclusion criteria	Main findings
van Amsterdam & van den Brink 2022 ⁷ Systematic review 43 studies	1990–January 25, 2022	Investigate the potential moderating effect of smoking on behavioral and pharmacological treatment for AUD	Language: English, German, French, Dutch Publication: Studies available in PubMed Population: People diagnosed with AUD Study Design: Longitudinal studies, cohort studies, RCTs Intervention: Behavioral or pharmacological treatment of AUD; smoking cessation interventions for people with AUD Outcomes: Studies with information available on smoking status; studies that measured changes in drinking behaviors or relapse to drinking at follow-up in association with smoking status or changed smoking behavior	Population: People with comorbid psychiatric disorders or other SUDs (except tobacco or nicotine use); studies with a sample size of <40	Smoking cessation or decreased smoking frequency was associated with improved alcohol use outcomes in 16 out of 30 studies. Of 15 studies of behavioral treatment for AUD, smoking was associated with worse drinking outcomes in 10 studies. Of 15 studies of pharmacological treatment for AUD, smoking was associated with increased risk of relapse in 6 studies, and had no significant effect on alcohol use outcomes in 6 studies. A total of 13 studies included treatment for smoking cessation along with treatment for AUD. Only 1 study resulted in both reduced drinking and smoking; 6 other studies resulted in reduced smoking, but this was not associated with reduced drinking.

Table 7.2 (continued)

Study Publication type Number of studies included	Dates of studies included	Purpose	Inclusion criteria	Exclusion criteria	Main findings
van Amsterdam & van den Brink 2023 ⁸ Systematic review 27 studies	Through August 19, 2022	Investigate the impact of alcohol consumption on smoking cessation	Language: Not specified Publication: Peer-reviewed literature Population: People who smoke Study Design: RCTs, naturalistic studies, and experimental laboratory studies Intervention: Smoking cessation Outcomes: Studies that recorded drinking status and changes in alcohol consumption among people who smoked tobacco	Study Design: Case reports, reviews Population: Studies in those who smoked and had other comorbid SUDs (except AUD) or other mental disorders; studies of specific groups like pregnant, unhoused, or incarcerated people or people with cancer; studies with a sample size of <40	Alcohol use was associated with less successful smoking cessation in 20 out of 27 studies about effects of alcohol use during attempts to quit smoking. In 19 out of 20 naturalistic studies with long-term follow-up, the duration of smoking abstinence was shorter among people with higher levels of alcohol consumption. In 12 out of 13 experimental studies about the effect of exposure to alcohol on smoking urges and craving, exposure to alcohol or alcohol cues among those who smoked induced a strong propensity to smoke.

Note. AUD = alcohol use disorder; CBT = cognitive-behavioral therapy; CI = confidence interval; NRT = nicotine replacement therapy; RCT = randomized controlled trial; RR = risk ratio; SUD = substance use disorder.

Smoking Cessation Therapies Delivered During Alcohol and Substance Use Treatment

Prochaska and colleagues (2004)¹² investigated whether smoking cessation treatment is effective when delivered during treatment for addiction or recovery, including AUD. The meta-analysis focused on randomized controlled trials (RCTs) of smoking cessation interventions in substance using populations published from January 1966 through September 2003. The analysis included 19 RCTs; 12 focused on adults in treatment for current addiction and 7 focused on smoking cessation in individuals in recovery from addiction (the authors note that they included studies of individuals with alcohol and/or other drug dependencies because of the frequency of comorbidity between substances and because treatment often addresses numerous addictions). The findings demonstrated that those who received smoking cessation interventions delivered during current addictions treatment were twice as likely to be abstinent from smoking at short-term follow-up as those in the control condition (pooled risk ratio [RR] = 2.03, 95% confidence interval [CI] = 1.21–3.39). Those in recovery who received smoking cessation treatment were 77% more likely to be abstinent from smoking at short-term follow-up as those in the control condition (pooled risk ratio [RR] = 1.77, 95% confidence interval [CI] = 1.37–2.30). When combining studies of participants in both addiction treatment and recovery, the summary RR was 1.82 (95% CI, 1.45–2.29).¹² The smoking cessation effect during treatment was more pronounced in the five studies that provided NRT as part of the smoking cessation intervention, compared with the six studies that provided only counseling. This finding is consistent with the 2008 PHS Clinical Practice Guideline, which recommends the provision of both an FDA-approved smoking medication that supports cessation and behavioral counseling.¹⁴ However, at long term follow-up, the significant differences between intervention and control conditions was not sustained. The studies that focused on addictions treatment and recovery included participants with a history of any alcohol use problems; however, the authors did not present a subgroup analysis for those with alcohol and substance use compared with those with AUD alone. Additionally, a major conclusion of the review is that the provision of smoking cessation in the context of alcohol and SUD treatment or recovery did not compromise alcohol and substance use outcomes; rather, it appeared to enhance treatment and recovery outcomes. The authors note “the current findings suggest smoking cessation interventions may help with long-term sobriety even if long-term smoking cessation is not achieved.”^{12,p.1152}

Two systematic reviews published in 2016 also focused on the effectiveness of smoking cessation interventions delivered in the context of SUD treatment and recovery.^{11,13} The first review, by Thurgood and colleagues (2016),¹³ examined 17 studies conducted between 1990 and August 2014. This review included only RCTs of smoking cessation interventions with at least 6 months follow-up, involving adults (18 years or older) who smoked and who had recently completed or were currently receiving inpatient or outpatient treatment for a SUD. Five of the 17 studies reported significant effects on smoking cessation at follow-up of 6 or 12 months, specifically: (1) at 6 months, nicotine patches had a positive impact on continuous smoking abstinence; (2) at 12 months, nicotine gum had a positive impact on continuous smoking abstinence; (3) at 6 and 12 months, relapse prevention, counseling, and contingency management had a positive impact on continuous smoking abstinence; (4) at 6 months, NRT combined with cognitive behavioral therapy (CBT) had a positive impact on 7-day point prevalence smoking abstinence; and (5) at 6 months, bupropion, NRT, counseling, and contingency management had a positive impact on 7-day point prevalence smoking abstinence. Among the five RCTs that reported significant effects on smoking, four were focused on treatment of AUD and in some,

the primary outcome was alcohol and other substance use. Notably, no study found that treating smoking led to a deleterious impact on the other substance use outcomes, including those for alcohol. The authors characterized the evidence as tentative, noting that few studies reported sufficient detail to assess quality, and that additional studies are needed to strengthen the evidence base.

The second review, a meta-analysis conducted for the Cochrane Database of Systematic Reviews by Apollonio and colleagues (2016),¹¹ included 34 RCTs published between 1970 and August 2016. These studies were inclusive of both inpatient and outpatient settings, and both patients in treatment and in recovery from SUDs, including AUDs. The studies included 3 types of smoking cessation interventions: counseling only (11 studies), pharmacotherapy only (11 studies), and combination of counseling and pharmacotherapy (12 studies). Each study compared these treatment approaches with usual care or no intervention. Although counseling alone did not demonstrate a significant impact on smoking cessation (RR = 1.33, 95% CI = 0.90–1.95), pharmacotherapy alone significantly increased smoking cessation (RR = 1.88, 95% CI = 1.37–2.57), as did pharmacotherapy plus counseling (RR = 1.74, 95% CI = 1.39–2.18). Providing smoking cessation interventions increased the likelihood of smoking abstinence among both people currently in SUD treatment (RR = 1.99, 95% CI = 1.59–2.50) and those in recovery (RR = 1.33, 95% CI = 1.06–1.67). When the studies were divided by type of SUD being treated, both those treated for AUD (RR = 1.47, 95% CI = 1.20–1.81) and other SUD (RR = 1.85, 95% CI = 1.43–2.40) demonstrated significant effects regarding smoking cessation. Another important finding of this review is that the delivery of smoking cessation therapies to people in treatment for or recovery from AUD and/or SUD did not statistically significantly affect their alcohol and substance use treatment outcomes (RR = 0.97, 95% CI = 0.91–1.03).

Finally, a 2022 review by van Amsterdam and van den Brink⁷ focused on smoking as an outcome moderator in the treatment of AUDs and concluded that smoking while in treatment predicts poorer alcohol treatment outcomes. Smoking cessation or decreased smoking frequency was associated with improved alcohol use outcomes (e.g., increased alcohol abstinence, reduced drinking, later relapse) in 16 out of 30 studies of behavioral or pharmacological treatment for AUD.

These four publications are the most up-to-date systematic reviews addressing the impact of smoking cessation delivered alongside alcohol and substance use treatment available as of 2026. Together, they provide strong evidence that (1) smoking cessation pharmacotherapies and counseling are effective for people in treatment for or recovery from AUD and (2) providing smoking cessation treatment does not harm alcohol use outcomes; conversely, the evidence suggests it may improve them. Collectively, these reviews provide foundational knowledge for developing future therapies targeting smoking and alcohol co-use.

Impact of Brief Interventions for Alcohol on Smoking Behavior

The development of brief interventions for alcohol use raises the question of whether these interventions may have a more generalized health promotion effect or influence related but nontargeted behaviors (e.g., also increase or decrease cigarette smoking). For example, because alcohol use can be a barrier to quitting smoking, if someone who is motivated to quit smoking also receives a brief intervention for their alcohol use and they successfully reduce or quit their

alcohol use, they could be more likely to quit smoking. In this regard, a 2008 systematic review and meta-analysis examined the potential secondary effects of brief interventions focused solely on alcohol use on smoking behavior outcomes in seven studies for which data were available on smoking status both at baseline and at follow-up.⁹⁶ This review found no secondary impact of brief interventions for alcohol use on smoking outcomes, including no difference in smoking cessation rates or frequency of smoking (mean cigarettes per day). The overall smoking cessation rate was 10.5%, regardless of treatment arm. However, this number should be interpreted with caution, as there was considerable heterogeneity in the efficacy of the interventions on reducing or changing smoking behavior across studies, and other factors may have contributed to the cessation rates observed in both study arms (which were higher than typical unassisted cessation rates). This review's primary conclusion was that providing a brief intervention for alcohol use will not also reduce smoking or increase cessation rates unless smoking is also actively targeted.

The Effects of Alcohol Use on Smoking Cessation Treatment

A 2023 systematic review⁸ examined a related, but distinct question: What is the impact of alcohol consumption (without regard to alcohol treatment or recovery setting) on smoking cessation outcomes? The review identified 27 experimental or naturalistic studies published before August 19, 2022, that focused on smoking cessation which also measured alcohol use (e.g., nondrinking, heavy drinking, AUD).⁸ In 20 of the 27 studies, alcohol use was associated with lower rates of smoking cessation. In 19 of 20 long-term follow-up studies, the duration of smoking abstinence was shorter among people with higher alcohol consumption compared with those who consumed less or no alcohol at all. Furthermore, 12 of 13 experimental studies demonstrated that consuming alcohol or even being exposed to a cue for alcohol was significantly associated with a propensity for smoking cigarettes. This review also found evidence that even moderate drinking was associated with greater difficulty resisting the opportunity to smoke cigarettes when consuming alcohol (compared with drinking a placebo beverage). These findings are consistent with robust evidence demonstrating the link between smoking and alcohol use neurobiologically and neurobehaviorally. The difficulty in resisting smoking after drinking alcohol is largely attributed to the disinhibiting and rewarding effects of alcohol, which can hinder attempts to quit smoking. The authors concluded that individuals interested in smoking cessation who drink alcohol should stop or substantially reduce their alcohol use before and during a quit attempt or consider an integrated approach to cease alcohol consumption and cigarette smoking.⁸ These findings highlight the need for the investigation of integrated therapies.

Summary of Systematic Review Evidence

There is consistent evidence that engaging in smoking cessation treatment while in treatment for alcohol or SUD is effective for helping people quit smoking and does not jeopardize efficacious alcohol or substance use outcomes. Additionally, providing evidence-based smoking cessation treatment appears to be similarly effective for people who smoke who are receiving treatment for AUD and for people who are in recovery from AUD. People with a past diagnosis of AUD who try to quit smoking are just as likely to be successful as those with no history of AUD. A challenge remains that people in AUD treatment are often not prompted to make a smoking cessation attempt or offered smoking cessation treatment due to providers' concerns about interfering with alcohol treatment success. Still, a promising pattern has emerged from the

literature—that is, coordinated treatment of both tobacco and alcohol use can improve smoking cessation outcomes and does not harm the success of alcohol treatment outcomes. Indeed, coordinated treatment of both substances may enhance alcohol treatment outcomes.

Additionally, studies have found that alcohol consumption interferes with successful smoking cessation. This is an important finding considering that most people who smoke also drink: more than three-quarters of adult participants in the 2014–2015 and 2019–2020 National Alcohol Surveys who reported past-year tobacco use also reported past-year alcohol use, and more than one-half of participants in the 2015–2019 National Survey on Drug Use and Health who reported past-month cigarette smoking also reported past-month alcohol use (see chapter 2). The prevalence of alcohol use among people who smoke highlights the importance of advising people trying to quit smoking of the benefits of avoiding alcohol use during their quit attempt and the need for the investigation of integrated therapies for both tobacco and alcohol use.

Integrated Therapies for Smoking and Alcohol Use

This section focuses on two domains of treatment research—pharmacotherapy and behaviorally focused studies—for the concurrent treatment of smoking and alcohol use. This section builds on the systematic reviews, particularly the meta-analysis conducted by Apollonio and colleagues (2016)¹¹ and therefore describes results from some of the same studies and ones published after that review. As described earlier in this chapter, Apollonio and colleagues found that providing smoking cessation treatment to people with AUD in treatment or recovery is effective and does not undermine AUD treatment success.

The first part of this section summarizes pharmacotherapy approaches to treating smoking and alcohol co-use at various levels, often including heavy drinking or diagnosis of AUD. Although these trials always included a behavioral or psychosocial therapy in addition to pharmacotherapy, the focus of these trials was on testing a pharmacotherapy. Following that, this section then reviews and summarizes the findings of trials that primarily are designed to test the efficacy of a behavioral treatment. Although some of the trials also included medications, the focus of these trials was squarely on testing a behavioral or psychosocial intervention. Any exceptions are noted in the text. The search strategy and search strings used to identify relevant studies are described in Appendix 7A.

Pharmacotherapy-Focused Approaches to Treat Tobacco and Alcohol Use

This section provides an overview of findings from RCTs (Table 7.3A) and human laboratory experiments (Table 7.3B) published in or after 2002 that investigated the effectiveness of pharmacotherapies for treating tobacco and alcohol use concurrently. These studies typically included a behavioral or psychosocial adjunct that was held constant in all trial arms.

When considering the existing literature on testing pharmacotherapies (alongside behavioral interventions) to treat smoking and alcohol use, studies can be largely divided by the type of pharmacotherapy delivered. All studies were conducted in the United States, and virtually all are phase 2 clinical trials conducted in outpatient treatment research settings where the type of pharmacotherapy was the primary distinguishing factor across the trials. The types of pharmacotherapies delivered in the reviewed studies were FDA-approved medications for

smoking cessation (NRT, varenicline, and bupropion) and/or naltrexone, an FDA-approved medication for treating AUD. Although acamprosate is also an FDA-approved medication for treating AUD, no studies were identified that focused on acamprosate and reported both smoking and alcohol use outcomes. The primary outcome measures in these studies differed between smoking and alcohol use, with primary outcomes for smoking typically being complete abstinence, and primary outcomes for alcohol typically being reduction in alcohol use, such as reduction in number of drinks consumed or reduction in number of heavy drinking days.

Table 7.3A Selected Pharmacotherapy-Focused Treatment Studies Addressing Smoking and Alcohol Use Discussed in This Chapter

Study N (intervention [i] vs. control [c]) Setting	Sample	Pharmacological intervention and control condition	Assessment points	Results
Nicotine replacement therapy				
Cooney et al. 2009 ⁹⁷ N = 96 (45i, 51c) Outpatient alcohol treatment; Veterans Administration	Adults with a diagnosis of alcohol abuse or dependence and who smoked 15 or more cigarettes per day (at least a 3-year smoking history)	<i>All participants:</i> Received a behavioral alcohol and smoking treatment delivered in 3 months of weekly outpatient sessions followed by 3 monthly booster sessions. Alcohol treatment was based on CBT. <i>Intervention:</i> Open-label transdermal nicotine patch for 12 weeks (21 mg daily for 8 weeks, 14 mg daily for 2 weeks, 7 mg daily for 2 weeks) plus 2 mg nicotine gum for 24 weeks (ad libitum, 6-20 pieces per day) <i>Control:</i> Nicotine patch + placebo gum	3, 6, and 12 months	<u>Smoking</u> Prolonged smoking abstinence, verified by breath carbon monoxide <10 ppm (intervention vs. control): 3 months: 40% vs. 35% 6 months: 20% vs. 12% 12 months: 13% vs. 0%, $p < .01$ <u>Alcohol use</u> Alcohol abstinence (intervention vs. control): 3 months: 45% vs. 28% 6 months: 38% vs. 32% 12 months: 43% vs. 32% (Differences not statistically significant)
Varenicline				
King et al. 2022 ⁹⁸ N = 122 (61i, 61c) Outpatient clinics	Adults who smoked between 5 and 30 cigarettes per day and drank heavily (>14 drinks per week for men or >7 drinks per week for women, and 1 or more heavy drinking days per month [≥ 5 drinks per occasion for men, ≥ 4 drinks per occasion for women])	<i>All participants:</i> Received nicotine patch at manufacturer-recommended doses for 10 weeks (<10 cigarettes per day: 14 mg/day for 6 weeks, 7 mg/day for 4 weeks; 10+ cigarettes per day: 21 mg/day for 6 weeks, 14 mg/day for 2 weeks, 7 mg/day for 2 weeks) <i>Intervention:</i> Varenicline 2 mg/day for 12 weeks (starting at 0.5 mg once daily for 3 days, 0.5 mg twice daily for 4 days, and 1 mg twice daily starting on the quit date through 12 weeks) <i>Control:</i> Placebo pills twice daily for 12 weeks	Weeks 9–12	<u>Smoking</u> Continuous cigarette abstinence (self-reported abstinence through weeks 9 to 12, verified by breath carbon monoxide ≤ 10 ppm [intervention vs. control] at week 12): 44.3% vs. 27.9%, $p = .047$ <u>Alcohol use</u> <i>Weekly drinking days:</i> Among both groups, weekly drinking days decreased by 25%. There was no significant difference in weekly drinking days ($p = .81$) by group. <i>Weekly heavy drinking days (≥ 5 drinks per occasion for men, ≥ 4 drinks per occasion for women):</i> Among both groups, weekly heavy drinking days decreased by 54%. There was no significant difference in weekly heavy drinking days ($p = .57$) by group.

Table 7.3A (continued)

Study N (intervention [i] vs. control [c]) Setting	Sample	Pharmacological intervention and control condition	Assessment points	Results
Litten et al. 2013 ⁹⁹ N = 200 (99i, 101c) Outpatient clinics	Adults with DSM-IV diagnosis of alcohol dependence in the past year and who consumed ≥ 28 alcoholic drinks/week for women or ≥ 35 alcoholic drinks/week for men in the 5 weeks prior to randomization	<i>All participants:</i> Viewed 1 of 6 computerized modules for alcohol cessation at each of 5 clinic visits. <i>Intervention:</i> Varenicline 2 mg per day (0.5 mg once per day on days 1–3, 0.5 mg twice per day on days 4–7, 1 mg twice per day during weeks 2–13) <i>Control:</i> Placebo	Weeks 2–13 (alcohol); Weeks 6, 10, 14 (smoking)	<u>Smoking</u> <i>Cigarettes per day among participants who at baseline smoked ≥ 1 cigarettes per day in the last week (n = 78), averaged over Weeks 6, 10, 14 (intervention vs. control): 7.4 vs. 11.7, p = .002; d = 0.73</i> <u>Alcohol use</u> <i>Weekly percent heavy drinking days (≥ 5 drinks/day for men, ≥ 4 drinks/day for women), Weeks 2–13 (intervention vs. control): 37.9% vs. 48.4%, p = .03; d = 0.31</i>
O'Malley et al. 2018 ¹⁰⁰ N = 131 (64i, 67c) Outpatient substance abuse treatment facilities in New York and Connecticut	Adults who smoked (daily smoking of ≥ 5 cigarettes or nondaily smoking at least 2 days per week) and who met DSM-IV criteria for alcohol dependence and reported heavy drinking 2 or more times a week for the previous 90 days and 7 or fewer consecutive days of abstinence	<i>Intervention:</i> Varenicline (0.5 mg once per day on days 1–3, 0.5 mg twice per day on days 4–7, 1 mg twice per day weeks 2–16) <i>Control:</i> Placebo	Last 8 weeks of treatment	<u>Smoking</u> <i>Self-reported abstinence in the last 28 days, verified by plasma cotinine levels of < 6 ng/ml (intervention vs. control): 13% vs. 0%, p = .003, h = .72</i> <u>Alcohol use</u> <i>Least-square mean difference in percent heavy drinking days (≥ 5 drinks/day for men, ≥ 4 drinks/day for women; intervention vs. control): 1.69 vs. 1.77, p = .80</i> There was a significant medication by sex-by-time interaction (p = .03) such that varenicline, compared to placebo, resulted in a greater decrease in percent heavy drinking days in men (d = 0.45) than in women (d = -0.53).

Table 7.3A (continued)

Study N (intervention [i] vs. control [c]) Setting	Sample	Pharmacological intervention and control condition	Assessment points	Results
Bupropion				
Grant et al. 2007 ¹⁰¹ N = 58 (28i, 30c) Substance use disorder treatment programs in Eastern Nebraska	Adults with DSM-IV criteria for alcohol dependence/abuse, attending SUD treatment programs, who smoked at least 20 cigarettes per day	<i>Intervention:</i> Nicotine patches+ bupropion (150 mg once per day for 3 days, then 150 mg twice per day for 60 days) <i>Control:</i> Nicotine patches + placebo	Week 4 Week 9 Month 6 (Week 26)	<u>Smoking</u> <i>7-day point prevalence abstinence (intervention vs. control)</i> Respondents: Week 4: 36% vs. 21%, $p = .24$ Week 9: 23% vs. 30%, $p = .74$ Month 6 (Week 26): 28% vs. 36%, $p = .74$ ITT (includes nonrespondents): Week 4: 30% vs. 18%, $p = .36$ Week 9: 17% vs. 25%, $p = .52$ Month 6 (Week 26): 17% vs. 29%, $p = .35$ <u>Alcohol use</u> <i>Continuous abstinence in past 30 days (intervention vs. control):</i> Week 4: 80% vs. 100%, $p = .050$ Week 9: 73% vs. 91%, $p = .13$ Month 6: 67% vs. 82%, $p = .30$ <i>Mean drinks per day in past 30 days (intervention vs. control):</i> Week 4: 1.3 vs. 0.04, $p = .051$ Week 9: 0.84 vs. 0.89, $p = .12$ Month 6: 1.4 vs. 0.91, $p = .076$ <i>Mean drinks per drinking day in past 30 days (intervention vs. control):</i> Week 4: 7.6 vs. 8.0, $p = .80$ Week 9: 5.1 vs. 8.5, $p = .19$ Month 6: 6.9 vs. 5.4, $p = 1.0$ <i>Mean percent days abstinent in past 30 days (intervention vs. control):</i> Week 4: 83% vs. 99%, $p = .051$ Week 9: 86% vs. 89%, $p = .13$ Month 6: 80% vs. 86%, $p = .083$

Table 7.3A (continued)

Study N (intervention [i] vs. control [c]) Setting	Sample	Pharmacological intervention and control condition	Assessment points	Results
Hays et al. 2009 ¹⁰² N = 110 (56i, 54c) Outpatient clinic	Adults who smoked ≥20 cigarettes per day in the previous year who met DSM-IV criteria for alcohol abuse/dependence and who had at least 1 year of continuous abstinence from alcohol and substance use	<i>Intervention:</i> 8 weeks of tailored nicotine patch therapy; after confirmed smoking abstinence during week 8, bupropion sustained release 150 mg per day for 3 days, followed by 150 mg twice per day through week 52; brief behavioral counseling <i>Control:</i> 8 weeks of tailored nicotine patch therapy; after 8 weeks, placebo through week 52; brief behavioral counseling	Weeks 9–12, Week 16, Week 20, Week 24, Week 28, Week 32, Week 36, Week 40, Week 44, Week 48, Week 52, Week 53, Week 64, Week 76	<u>Smoking</u> <i>7-day point prevalence abstinence, verified by breath carbon monoxide <8 ppm (intervention vs. control):</i> Week 52: 39.3% vs. 40.7%, <i>p</i> = 1.0 Week 76: 35.7% vs. 37.0%, <i>p</i> = 1.0 <i>Continuous smoking abstinence (intervention vs. control):</i> Week 52: 41.1% vs. 40.7%, <i>p</i> = 1.0 Week 76: 37.5% vs. 38.9%, <i>p</i> = 1.0 <u>Alcohol use</u> <i>Relapse to alcohol:</i> 2 participants in the placebo group and 2 in the bupropion group relapsed to alcohol.
Oral naltrexone				
Fridberg et al. 2014 ¹⁰³ N = 315 (161i, 154c) Outpatient clinics in Chicago	Adults with smoking history of 10–40 cigarettes per day for at least 2 years Participants were categorized into 3 subgroups: heavy drinking and smoking (average of ≥2 heavy drinking episodes/month); moderate to light drinking and smoking (1 drink to <2 heavy drinking episodes/month on average), and those who smoked but did not drink.	<i>Intervention:</i> Naltrexone (50 mg titrated; 12.5 mg on day 1, 25 mg on days 2 and 3, and then 50 mg daily) + NRT (patch) + behavioral therapy <i>Control:</i> Placebo + NRT (patch) + behavioral therapy	12 weeks, 6 months, 12 months	<u>Smoking</u> <i>Prolonged abstinence, verified by breath carbon monoxide <10 ppm (intervention vs. control):</i> People who heavily drank and smoked: 32% vs. 14%, <i>p</i> = .023 People who moderately drank and smoked: 25% vs. 24%, <i>p</i> = .60 People who smoked but did not drink: 10% vs. 32%, <i>p</i> = .24 Among those assigned to the naltrexone intervention, the participants who drank heavily significantly increased smoking abstinence at 12 weeks compared to participants who did not drink heavily. The intervention effects on quit rates at 6 months or 12 months did not differ by drinking subgroup, <i>ps</i> > .39. <u>Alcohol use</u> <i>Drinks per week (intervention vs. control):</i> Compared to placebo, naltrexone significantly reduced weekly alcohol consumption among people who drank heavily and smoked (<i>p</i> = .005), but not among people who drank moderately to lightly (<i>p</i> = .26).

Table 7.3A (continued)

Study N (intervention [i] vs. control [c]) Setting	Sample	Pharmacological intervention and control condition	Assessment points	Results
Kahler et al. 2017 ⁴ N = 150 (75i, 75c) Outpatient setting in Rhode Island	Adults who smoked cigarettes regularly for ≥1 year and smoked ≥5 cigarettes per day and currently reported drinking heavily at least once per month (≥4 drinks for women, ≥5 drinks for men)	<i>All participants:</i> Received 6 weeks of transdermal nicotine patch (14–21 mg for 2 weeks, 14 mg for 2 weeks, 7 mg for 2 weeks); 6 sessions of counseling on smoking and heavy alcohol use <i>Intervention:</i> 50 mg naltrexone (titrated from initial doses of 12.5 mg and 25 mg) for 10 weeks <i>Control:</i> Placebo	Weeks 2, 8, 16, 26	<u>Smoking</u> <i>7-day point prevalence abstinence, verified by breath carbon monoxide ≤4 ppm and salivary cotinine ≤15 ng/ml (intervention vs. control)</i> Week 2: 37.3% vs. 28.0% Week 8: 20.0% vs. 22.7% Week 16: 16.0% vs. 18.7% Week 26: 12.0% vs. 12.0% There was no significant difference in 7-day point prevalence abstinence between treatment groups at any point (intervention vs. control). <u>Alcohol use</u> <i>Percent heavy drinking days (≥5 drinks/day for men, ≥4 drinks/day for women) (intervention vs. control):</i> Weeks 1 to 8: 15.3% vs. 12.4% Weeks 9 to 16: 18.7% vs. 18.7% Weeks 17 to 26: 17.0% vs. 16.0% There was no significant difference in mean percent heavy drinking days between treatment groups at any time point.

Table 7.3A (continued)

Study N (intervention [i] vs. control [c]) Setting	Sample	Pharmacological intervention and control condition	Assessment points	Results
King et al. 2009 ¹⁰⁴ N = 78 (34i, 44c) Outpatient setting in Chicago	Adults who smoked, did not currently or previously meet criteria of alcohol dependence, and who reported drinking at least 1 alcoholic drink in the 2 weeks prior to study enrollment. Participants were further classified as heavy drinkers if they consumed ≥ 4 alcoholic drinks for women or ≥ 5 alcoholic drinks for men on 1 or more occasions in 2-week baseline period ($n = 36$).	<i>All participants:</i> Received 1 month of nicotine patch (NicoDerm CQ) 21 mg daily for 2 weeks, 14 mg daily for week 3, and 7 mg daily for week 4; all participants received 6 individual weekly behavioral counseling sessions <i>Intervention:</i> 25 mg naltrexone 3 days prior to quit date, 50 mg naltrexone beginning on quit date and for the remaining 8 weeks <i>Control:</i> Placebo tablets on the same schedule	Weeks 1–4	<u>Smoking</u> <i>Smoking quit rates at Week 4, verified by breath carbon monoxide ≤ 10 ppm (intervention vs. control):</i> Overall sample: 71% vs. 66%, $p = .66$ Heavy drinkers only: 80% vs. 52%, $p = .09$ Among heavy drinkers, heavy drinking days significantly mediated the relationship between medication and smoking quit rates ($p < .05$). <u>Alcohol use</u> <i>Mean total drinks per week at Week 2 (intervention vs. control):</i> 3.6 vs. 6.3 <i>Weekly heavy drinking, reporting 1 or more heavy drinking episodes (≥ 5 drinks on 1 occasion for men, ≥ 4 drinks on 1 occasion for women) at Week 2 (intervention vs. control):</i> 10% vs. 40%
King et al. 2013 ¹⁰⁵ N = 315 (161i, 154c) Outpatient clinics in Chicago	Adults who smoked 12–40 cigarettes daily for at least 2 years and reported a desire to quit smoking.	<i>All participants:</i> Received once weekly behavioral counseling for 4 weeks and open-label nicotine patch for 4 weeks starting on the quit date <i>Intervention:</i> 12.5 mg naltrexone 6 days prior to quit date, 25 mg for subsequent 2 days, 50 mg daily continuing through quit date and subsequent 12 weeks <i>Control:</i> Placebo tablets on the same schedule	1 week pre-quit, 4 weeks after quit date, 12 weeks after quit date	<u>Smoking</u> <i>Reduction in number of cigarettes smoked daily during pre-quit phase (intervention vs. control):</i> 4.21 fewer cigarettes daily vs. 2.93 fewer cigarettes daily ($p = .02$) <i>Mean number of cigarettes smoked per week 4 weeks after quit date (intervention vs. control):</i> 2.6 vs. 5.2 <u>Alcohol use</u> <i>Mean total number of alcoholic drinks consumed (intervention vs. control):</i> Through week 4: 19.2 vs. 25.5 Through week 12: 53.1 vs. 68.4

Table 7.3A (continued)

Study N (intervention [i] vs. control [c]) Setting	Sample	Pharmacological intervention and control condition	Assessment points	Results
Varenicline and oral naltrexone				
Ray et al. 2021 ¹⁰⁶ N = 165 (83i, 82c) Outpatient research facility in Los Angeles	Adults who smoked daily (≥5 cigarettes/day) and drank heavily (for men: >14 drinks/week or ≥5 drinks per occasion at least once per month over the past 12 months; for women: >7 drinks/week or ≥4 drinks per occasion at least once per month over the past 12 months)	<i>All participants:</i> Received varenicline at 2 mg daily (titration schedule: 0.5 mg once daily for 3 days, 0.5 mg twice daily for 4 days, 1 mg twice daily for remainder of 12 weeks) and received a 30–45-minute counseling session. <i>Intervention:</i> Varenicline (schedule described above) + naltrexone at 50 mg daily (titration schedule: 25 mg once daily for 5 days, 50 mg once daily for remainder of 12 weeks). <i>Control:</i> Varenicline + placebo	12-week treatment phase with follow-up at 16 weeks and 26 weeks	<u>Smoking</u> <i>7-day point prevalence abstinence at week 26, verified by breath carbon monoxide ≤5 ppm:</i> Significantly higher in the varenicline plus placebo condition (<i>n</i> = 37 [45.1%]) compared to the varenicline plus naltrexone condition (<i>n</i> = 22 [26.5%]), <i>p</i> = .015 <u>Alcohol use</u> <i>Drinks per drinking day:</i> Trend toward a main effect favoring the combination of varenicline plus naltrexone over varenicline alone ($\beta = 0.82$, <i>SE</i> = 0.47, <i>t</i> (1,484) = 1.76, <i>p</i> = .080)

Note. CBT = cognitive behavioral therapy. DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; mg = milligrams; ml = milliliter; ng = nanogram; NRT = nicotine replacement therapy; ppm = parts per million; SE = standard error.

Table 7.3B Selected Pharmacotherapy-Focused Treatment Studies in a Laboratory Setting Discussed in this Chapter

Study N	Sample	Pharmacological intervention and control condition	Assessment points	Results
Varenicline and oral naltrexone combined				
Ray et al. 2014 ¹⁰⁷ N = 130	Adults (21–55 years old) who smoked daily (10 or more cigarettes per day) and currently reported heavy drinking (for men, >14 drinks per week or ≥5 drinks/occasion at least once per month over the past 12 months; for women, >7 drinks per week or ≥4 drinks/occasion at least once per month over past 12 months)	<i>Intervention Group 1:</i> Varenicline 0.5 mg daily on days 1–2, 1 mg daily on days 3–5, 2 mg (1 mg twice per day) on days 6–9 <i>Intervention Group 2:</i> Naltrexone 25 mg per day for 9 days <i>Intervention Group 3:</i> Varenicline + naltrexone (at titration described above) <i>Control:</i> Placebo	<i>Craving:</i> After 12 hours of cigarette abstinence, after receiving alcohol to reach a target BrAC of 0.060 g/dl, and after receiving the first cigarette of the day Cigarettes and drinks per day: Days 1–9	<u>Smoking</u> <i>Mean cigarette craving:</i> Post alcohol: 8.14 (varenicline alone), 7.93 (naltrexone alone), 6.88 (varenicline + naltrexone), 7.88 (placebo); significant difference between combination group vs. varenicline alone, combination group vs. naltrexone alone, and combination group vs. placebo ($p < .05$) Post cigarette: 3.00 (varenicline alone), 3.52 (naltrexone alone), 3.65 (varenicline + naltrexone), 3.91 (placebo); significant difference between combination group and placebo ($p < .05$) <i>Mean cigarettes per day:</i> Compared to placebo or naltrexone alone, the varenicline + naltrexone group had significantly fewer cigarettes per day ($p < .05$). <u>Alcohol use</u> <i>Mean alcohol craving:</i> Post alcohol: 17.31 (varenicline alone), 15.95 (naltrexone alone), 15.65 (varenicline + naltrexone), 15.71 (placebo); no significant difference between groups Post cigarette: 14.68 (varenicline alone), 13.44 (naltrexone alone), 14.44 (varenicline + naltrexone), 16.34 (placebo); no significant difference between groups <i>Mean drinks per drinking day:</i> Compared to placebo, the varenicline + naltrexone group and naltrexone alone group had significantly fewer drinks per drinking day ($p < .05$).

Table 7.3B (continued)

Study N	Sample	Pharmacological intervention and control condition	Assessment points	Results
Roberts et al. 2018 ¹⁰⁸ N = 30 (9 varenicline alone; 11 varenicline + naltrexone; 10 placebo)	Adults who smoked 10 or more cigarettes per day and drank heavily (≥14 drinks/week for men, ≥7 drinks/week for women, with at least 1 weekly binge drinking episode [≥5 drinks for men, ≥4 drinks for men] in past 30 days) and did not meet DSM-IV criteria for alcohol dependence	<i>Intervention Group 1:</i> Varenicline 2 mg daily for 7 days (0.5 mg once daily on days 1–2, 0.5 mg twice daily on days 3–5, 1 mg twice daily on days 6–7) <i>Intervention Group 2:</i> Varenicline 2 mg daily (same titration as above) + naltrexone 25 mg daily (0 mg daily for days 1–3, 12.5 mg daily on day 4, 25 mg daily on days 5–7) for 7 days <i>Control:</i> Placebo	Day 8 after alcohol dose to achieve blood alcohol level of 0.03 g/dL	<u>Smoking</u> <i>Smoking delay: Time to smoking after alcohol dose:</i> Varenicline vs. placebo: aHR = 0.13 (95% CI, 0.02–0.75), $p = .023$ Varenicline + naltrexone vs. placebo: aHR = 0.40 (95% CI, 0.12–1.37), $p = .145$ Varenicline + naltrexone vs. varenicline: aHR = 3.03 (95% CI, 0.72–12.71), $p = .129$ <i>Number of cigarettes smoked ad libitum:</i> Varenicline vs. placebo: aOR = 0.05 (95% CI, 0.01–0.48), $p = .01$ Varenicline + naltrexone vs. placebo: aOR = 0.09 (95% CI, 0.01–0.63), $p = .02$ Varenicline + naltrexone vs. varenicline: aOR = 1.76 (95% CI, 0.31–9.86), $p = .52$ <u>Alcohol use</u> There was no significant difference in alcohol craving (score on the Alcohol Urge Questionnaire) between groups ($p > .11$).

Note. aHR = adjusted hazard ratio; aOR = adjusted odds ratio; BrAC = Breath Alcohol Concentration; CI = confidence Interval; DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; DSM-V = Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition; g/dl = grams per deciliter; mg = milligram.

Nicotine Replacement Therapies

NRT is an evidence-based, FDA-approved treatment for smoking cessation that is available in several different forms (i.e., gum, lozenge, nasal spray, and patch).³¹ The nicotine patch, lozenge, and gum are available over the counter. As of 2026, the nicotine inhaler is no longer available, as its sole manufacturer discontinued it due to shortage of ingredients needed to manufacture the inhaler.¹⁰⁹ Using 2 forms of NRT in combination is a best practice, evidence-based treatment approach. In this approach, a person uses a long-acting form (e.g., nicotine patch which delivers passive, continuous cutaneous dosing for up to 24 hours) and a short-acting form (e.g., nicotine lozenge which delivers the dose buccally over about 20 minutes) to actively manage acute cravings.³¹ This treatment approach appears to also be effective for smoking cessation among people who smoke and have an AUD. An RCT conducted by Cooney and colleagues (2009)⁹⁷ involving 96 people who smoked, were diagnosed with alcohol abuse or dependence (DSM-IV criteria), and in the early stages of their outpatient treatment, found that nicotine gum augmented with a nicotine patch produced better smoking abstinence, but not better alcohol use outcomes, when compared with patch alone. The study specifically targeted individuals in the early stages of their outpatient treatment, providing insights into how NRT might work within this phase of recovery from alcohol dependence.

Varenicline

The introduction of varenicline for smoking cessation has arguably helped shape the science regarding tobacco and alcohol co-use significantly because of interest in the preclinical evidence indicating that it acts on brain pathways that are important for inducing the rewarding effects of both substances.²⁸ Varenicline, a selective $\alpha 4 \beta 2$ nicotinic acetylcholine receptor partial agonist, is a frontline medication to treat nicotine dependence³¹; provision of varenicline with concurrent counseling significantly increases smoking cessation rates.^{14,110-112} The evidence base supports varenicline's viability as a treatment for smoking in those with co-occurring AUD. Although varenicline is not an FDA-approved medication for the treatment of alcohol use, clinical and preclinical studies have shown that varenicline significantly reduces alcohol cravings^{99,113-115} and can concurrently decrease use of tobacco and alcohol, with more moderate treatment effects for alcohol use compared to the stronger treatment effects for tobacco use.^{28,99,113,116-118}

For example, McKee and colleagues (2009)¹¹⁴ found that varenicline significantly reduced self-administration of alcohol and increased alcohol abstinence rates. Varenicline has also been shown to reduce subjective reinforcing effects of alcohol,¹¹⁴ the number of drinks consumed,¹¹⁵ and cue-induced alcohol relapse.^{118,119} In addition, in animal studies, varenicline reduced seeking and consumption of alcohol in a dose-dependent manner,^{118,120} promising signs for further development of the medication for the treatment of alcohol use. These findings confirm the underlying neurobiology and neurobehavioral evidence pointing to the importance of considering the nicotinic acetylcholine receptor system when developing therapies for people who use tobacco and alcohol.

Although varenicline has been shown to reduce alcohol use in some studies, the evidence of its effectiveness is mixed. In a Cochrane meta-analysis and systematic review of 34 studies of interventions for tobacco cessation among people in substance abuse treatment or recovery, Apollonio and colleagues (2016)¹¹ found no evidence to support the efficacy of varenicline for reducing alcohol use and a high level of study heterogeneity. However, this review only included two studies of varenicline. Results of a 2023 meta-analysis of 22 RCTs ($N = 1,421$) investigating

the effectiveness of varenicline for alcohol dependence were mixed.¹¹⁵ Phimarn and colleagues (2023)¹¹⁵ found that varenicline showed improvement compared to placebo in the percentage of abstinent days, drinks per day, drinks per drinking day, and alcohol craving, but not on abstinence rates, percentage of drinking days, or percentage of very heavy drinking days.¹¹⁵

With regard to the use of varenicline among people who use both tobacco and alcohol, in a 2021 systematic review and meta-analysis of 9 RCTs of the effects of pharmacological interventions on smoking cessation, Guo and colleagues (2021)¹²¹ reported that varenicline was effective at promoting smoking cessation among people who had an AUD, while naltrexone and bupropion demonstrated no clear effect among the same population. Further, an RCT by O'Malley and colleagues (2018)¹⁰⁰ also found that varenicline combined with medical management (i.e., intervention that emphasized medication adherence for 4 weeks followed by support for changing drinking) was associated with reductions in drinking compared to placebo for patients who met alcohol dependence criteria (according to the DSM-IV-TR) and had comorbid cigarette smoking. Notably, they also found a sex difference, such that men benefited more than women from varenicline plus medical management.¹⁰⁰ One of the largest varenicline RCTs to demonstrate a reduction in drinking was performed by Litten and colleagues (2013),⁹⁹ with a sample of 200 individuals who were diagnosed with DSM-IV-TR alcohol dependence, 78 of whom also smoked cigarettes. They found that varenicline was associated with moderate—but significant—reductions in percent heavy drinking days (adjusted mean difference = 10.4; $d = 0.31$) while also decreasing cigarettes per day (i.e., 4.3 fewer cigarettes per day; $d = 0.73$) among people who smoked. The effects on smoking were large, while the effects on alcohol were consistent but more modest and similar in magnitude for people who smoked or did not smoke. These results are promising and indicate that varenicline may represent an important tool to leverage for people who smoke and have AUD; moreover, they are also an important signal to further evaluate sex as a variable and consider future therapies that boost quit rates among women. Another double-blind RCT testing the efficacy of varenicline for people who smoked and reported heavy drinking ($N = 122$) found that varenicline plus nicotine patch was more effective for smoking cessation than placebo pills plus nicotine patch at 9–12 weeks post-quit date (odds ratio [OR] = 2.20; 95% CI = 1.01–4.80; $p = .047$).⁹⁸ Participants in both conditions reduced any heavy drinking, with no statistical difference between groups in the amount of reduction. Notably, there were statistically more adverse events (digestive, sleep issues, headache) in the varenicline condition compared to the placebo condition and there were two serious adverse events in the varenicline condition and none in the placebo condition. It is important to note that varenicline can affect alcohol tolerance; extra care and monitoring is likely to be needed for these trials as well as in clinical practice. Additionally, the FDA package insert for varenicline warns of a potential medication interaction with alcohol and advises reducing alcohol use until the patient determines how varenicline affects their alcohol tolerance.¹²²

Bupropion

Bupropion, an antidepressant with multiple pharmacologic effects including blocking the reuptake of dopamine and norepinephrine, has been approved for the treatment of cigarette smoking.³¹ Only two studies were identified that tested the efficacy of bupropion for the reduction of both smoking and alcohol use. Grant and colleagues (2007)¹⁰¹ conducted a small, double-blind, placebo-controlled trial ($N = 58$) of bupropion for the reduction of smoking and alcohol; all participants received nicotine patches and brief counseling. This trial found no

evidence of efficacy for bupropion at improving smoking cessation at 6-month follow-up, and discontinuing use of bupropion was common.¹⁰¹ Participants who quit smoking also reduced their drinking, but this outcome did not vary by randomized group. A second double-blind trial conducted by Hays and colleagues¹⁰² compared bupropion to placebo; all participants ($N = 110$) also received nicotine patches and brief counseling. This study found no statistically significant reductions in smoking and relapse to alcohol use among those who received bupropion compared with placebo. Based on these two studies, bupropion has not been found to be efficacious for the treatment of smoking and heavy drinking among people who engage in both behaviors. Moreover, due to the potential for increased seizure risk, bupropion is contraindicated among individuals undergoing abrupt discontinuation of alcohol use, and patients are encouraged to minimize or avoid alcohol consumption while taking bupropion.¹²³

Oral Naltrexone

Naltrexone, an opioid receptor antagonist originally designed to treat opioid use disorder, has also been used as a therapy with modest efficacy for AUD.¹²⁴ Naltrexone is available both as an oral medication and in an extended-release intramuscular injectable form.¹²⁵ Oral naltrexone has been shown to be effective in reducing heavy drinking days and alcohol craving among people who smoke and are seeking AUD treatment^{126,127} and is more effective than acamprosate, another FDA-approved medication for the treatment of AUD, at reducing alcohol use among people who smoke.¹²⁶ A 2013 Cochrane review and meta-analysis of naltrexone for smoking cessation that included 8 trials and more than 1,200 individuals found no evidence of an effect of naltrexone, either as an adjunct to NRT or as a stand-alone therapy, on long-term smoking abstinence.¹²⁸ Both the point estimate and the CIs suggest that an important clinically meaningful treatment effect is unlikely (naltrexone versus placebo: $RR = 1.00$, 95% $CI = 0.66-1.51$; naltrexone + NRT versus placebo + NRT: $RR = 0.95$, 95% $CI = 0.70-1.30$). However, that Cochrane review focused on naltrexone's utility as a smoking cessation therapy and not as a treatment for smoking and alcohol co-use. This section reviews the evidence for naltrexone as a potential treatment for people who smoke cigarettes and drink alcohol.

Two reviews focused on understanding naltrexone as a treatment for smoking and alcohol co-use have been published since 2013.^{17,121} The Yardley and colleagues review (2015)¹⁷ found evidence to support that using naltrexone, alone or in combination with varenicline or transdermal nicotine patches, is particularly effective in reducing alcohol use among individuals who smoke and are seeking treatment for AUD or who use alcohol heavily. They concluded that the combination of varenicline and oral naltrexone is more promising for treating co-use in people who smoke and drink heavily than NRT plus oral naltrexone. Yardley and colleagues' review¹⁷ examined some naltrexone studies not included in a 2021 review by Guo and colleagues:¹²¹ a study by O'Malley and colleagues (2008)¹²⁹ and a study by King and colleagues (2013).¹⁰⁵ O'Malley and colleagues reported naltrexone monotherapy demonstrated significantly higher total abstinence from alcohol (35%) compared with placebo (12%, $p = .03$) in a sample in which 59% of participants reported current smoking.¹²⁹ King and colleagues found reductions in both alcohol consumption and number of cigarettes smoked when naltrexone was compared to placebo and that naltrexone also reduced the urge to smoke.¹⁰⁵ This is consistent with human laboratory studies that have verified naltrexone's ability to attenuate cigarette craving and reduce smoking urges among people who both smoke and drink heavily.^{130,131} Another double-blind clinical trial reported a similar pattern such that naltrexone reduced smoking among participants

(87% of whom reported current drinking).¹³² A survival analysis revealed that compared with placebo, naltrexone significantly improved lapse-allowed quit rates over the course of the 12 weeks of treatment ($\chi^2_1 = 4.30, p < .05$). Additional evidence exists indicating that, when combined with NRT, naltrexone may be an effective therapy for reducing smoking.^{133,134}

Some evidence suggests that oral naltrexone may be effective in reducing smoking among people who smoke and also drink heavily.^{103,104,135} However, a 2021 review by Guo and colleagues identified three RCTs of people who smoked and had dependence on alcohol that did not find significant reductions in smoking.¹²¹ Included in the review was an RCT conducted by Kahler and colleagues (2017)⁴ which found that among people who smoked and drank heavily, naltrexone did not enhance participants' ability to quit smoking or drinking compared to placebo (all trial participants received the nicotine patch). However, there were significant reductions in both smoking and alcohol use compared to baseline. In an RCT conducted by Fridberg and colleagues (2014),¹⁰³ naltrexone reduced smoking urges and increased smoking abstinence only among people who smoked and drank heavily, but not among people who smoked and drank lightly or moderately, or who smoke and do not drink alcohol. The third study, an exploratory RCT by King and colleagues (2009),¹⁰⁴ found a similar pattern of results where naltrexone appeared to have some effect on increasing quit rates among people who drank heavily, but not among the entire study sample; however, these results were not statistically significant ($p = .09$). The potential greater efficacy of naltrexone in people who smoke and drink heavily, rather than any level of alcohol consumption, is not surprising, as naltrexone is FDA-approved for use in those with AUD. Moreover, although naltrexone did not significantly decrease smoking for the entire sample, the findings among people who smoked and drank heavily warrant further investigation of naltrexone to treat people who smoke and drink heavily or have an AUD. Although the evidence remains mixed for the specific role of naltrexone in the treatment of tobacco and alcohol use, there are promising signs that this medication may be effective.

Varenicline and Oral Naltrexone Combined

Given the separate effects seen for varenicline in treating tobacco use and naltrexone for treating heavy drinking and AUD, studies have also investigated the combination of the two to treat co-use. Varenicline has some level of cross-over effects from treating smoking as the primary target to alcohol consumption, but it has not proven effective enough at significantly reducing alcohol consumption to represent a stand-alone therapy for AUD. An experimental human laboratory study was conducted with 130 people who reported smoking 10 or more cigarettes/day and met the National Institute on Alcohol Abuse and Alcoholism definition of heavy drinking (for men, >14 drinks per week or ≥ 5 drinks per occasion at least once per month over the past 12 months; for women, >7 drinks per week or ≥ 4 drinks per occasion at least once per month).¹⁰⁷ The study found that the combination of varenicline (2 mg daily) and low-dose oral naltrexone (25 mg daily) was more effective than placebo, and at times monotherapy, in attenuating cigarette craving, reducing subjective feeling of "cigarette high" and "alcohol high," and reducing smoking and alcohol use during the 9-day medication period.¹⁰⁷ Roberts and colleagues (2018)¹⁰⁸ conducted a human laboratory study ($N = 30$) that compared placebo,

varenicline (2 mg/day), and varenicline (2 mg/day) plus low-dose naltrexone (25 mg/day) on cigarette smoking outcomes and alcohol craving and other subjective effects. There was a reduction in the number of cigarettes smoked in the two groups that received varenicline compared to placebo, but the administration of low-dose naltrexone did not have a significant effect on number of cigarettes smoked or on alcohol craving.

Ray and colleagues (2021)¹⁰⁶ also examined the use of varenicline and oral naltrexone in an RCT comparing varenicline (2 mg/day) to varenicline (2 mg/day) plus oral naltrexone (50 mg/day) in people who smoke and drink heavily ($N = 165$). They found the combination to be effective in reducing risky drinking levels, with trends toward a lower number of drinks per day during treatment; however, these results were not statistically significant ($p = .80$).¹⁰⁶ However, this study also found that varenicline monotherapy was more effective in promoting smoking cessation at 26-week follow-up than varenicline plus oral naltrexone.¹⁰⁶

Cytisine

Cytisine (also called cytisinicline), a compound derived from the *Cytisus laburnum* plant, is a partial agonist of the $\alpha_4\beta_2$ nicotinic acetylcholine receptor and has been used to treat tobacco dependence in Europe for decades.¹³⁶ Several RCTs conducted outside of the United States (mainly Europe and New Zealand) have found cytisine to be effective for smoking cessation.^{137,138} A 2024 meta-analysis of RCTs comparing cytisine to placebo and/or FDA-approved pharmacotherapies found that cytisine was more effective but had more side effects than placebo and NRT, but was comparable in effectiveness and had fewer side effects than varenicline.¹³⁷ In the last decade, research on cytisine in the United States has increased, and studies have demonstrated efficacy for smoking cessation compared to placebo.¹³⁹⁻¹⁴¹ The RCTs conducted in the United States were funded by Achieve Life Sciences to inform a new drug application to the FDA for approval of cytisinicline medication for smoking cessation.^{142,143} As of 2026, there was one published study investigating the efficacy of cytisine to treat both tobacco and alcohol use. Tindle and colleagues (2022)¹⁴⁴ conducted an RCT to test the effectiveness of varenicline, cytisine, and NRT for treating daily smoking and risky drinking among people with HIV in Russia. In this four-arm trial (active varenicline and placebo NRT, placebo varenicline and active NRT, active cytisine and placebo NRT, and placebo cytisine and active NRT), all of the active medications were equally successful for smoking cessation and alcohol reduction (number of heavy drinking days in the past 30 days and 30-day alcohol abstinence). In post hoc analyses, participants in all arms who quit smoking at all follow-up timepoints reported fewer heavy drinking days compared with those who continued smoking.¹⁴⁴ This finding suggests that further investigation of cytisine as a treatment for tobacco and alcohol co-use may be warranted.

Summary: Pharmacotherapy-Focused Approaches to Treat Tobacco and Alcohol Use

Effective pharmacological treatments exist for treating tobacco use and alcohol dependence separately, and some studies have investigated the effects of pharmacological treatments on both smoking and alcohol outcomes. Both of the FDA-approved medication classes for smoking cessation (i.e., NRT and the oral medications varenicline and bupropion, which do not contain nicotine) have been evaluated for their effects on drinking when treating smoking, with unclear evidence for reducing alcohol use. One of the approved smoking cessation medications,

varenicline, has been independently investigated for treating alcohol use, with some studies finding it reduced alcohol cravings and alcohol use and others finding no effect. Studies have also evaluated the effects of naltrexone, an FDA-approved medication for the treatment of AUD, on smoking and alcohol use outcomes. Some evidence suggests that oral naltrexone may be effective in treating smoking among people who smoke and also drink heavily. In sum, as found in previous reviews, pharmacotherapy and pharmacotherapy with counseling appears to be effective in the context of treatment for AUD and does not negatively affect AUD treatment outcomes.

Behavioral Treatments for Smoking Cessation in the Context of Alcohol Use (With or Without Medications)

This section describes studies focused on testing the efficacy of behavioral smoking cessation interventions delivered in the context of alcohol treatment, and interventions testing integrated tobacco and alcohol treatment, with or without a pharmacological treatment, among RCTs published between 2002 and 2024. As stated above, this section builds on the findings of the systematic reviews, especially the meta-analysis by Apollonio and colleagues (2016)¹¹ that examined smoking cessation efficacy in people with AUD who received treatment. As such, this section includes discussion of some studies that have been included in the previously published systematic reviews and studies published since those reviews (summarized in Table 7.4).^{83,145-162} The search strategy and inclusion criteria are described in Appendix 7A. The studies that tested combined behavioral interventions targeting smoking and alcohol behaviors are categorized by setting: (1) intensive therapy for substance use in inpatient or outpatient clinical settings, and (2) non-substance-use treatment settings.¹¹⁻¹³ Notably, as of 2026 there has not been a review focused on combined tobacco and alcohol behavioral treatment studies that took place in settings outside of substance use and/or other clinical treatment settings

Tobacco and Alcohol Use Treatment in Inpatient and Outpatient Settings

This section summarizes the literature pertaining to smoking cessation interventions in the context of alcohol treatment that are delivered in intensive substance use treatment settings. Since the most recent systematic reviews summarizing the literature on interventions to treat smoking and AUD in substance use treatment settings,^{11,13} two new RCTs were published.^{148,151} Cooney and colleagues (2017)¹⁴⁸ assessed the impact of contingency management (CM) added to a CBT and NRT intervention compared to the intervention without CM. They found that the intervention with the addition of CM was more effective than the intervention alone at the end of treatment (60% vs. 29%, $p = .004$). However, the effect was not sustained at follow-up time points. Das and colleagues (2017)¹⁵¹ examined the efficacy of a smoking cessation intervention with stage-tailored counseling and NRT compared to usual care (brief counseling and NRT) in the context of inpatient intensive alcohol or substance use treatment. They found the stage-tailored intervention was more effective than usual care at 12-month follow-up (RR = 2.01, 95% CI = 1.05–3.83, $p = .03$) with no differences in reported past-30-day alcohol use.¹⁵¹

Smoking cessation in the context of AUD treatment studies have been conducted specifically with people receiving inpatient treatment for SUD,^{151,155,162} alcohol detoxification,¹⁵⁹ or general psychiatric disorders.¹⁵¹ Across studies reviewed here, the smoking cessation treatment approaches provided were motivational interviewing¹⁶² and stage-tailored interventions,^{151,155} brief advice,¹⁶² and CBT.¹⁵⁹ All studies provided participants with NRT.^{151,155,159,162} Across the 4 studies, smoking cessation rates (7-day point prevalence abstinence) at 6 months ranged from 0%¹⁵⁹ to 13.5%.¹⁵¹ The alcohol outcomes assessed varied across all studies. Key findings included: alcohol abstinence at 6 months (47.6% vs. 39.1% in the intervention group and control group, respectively, p value not presented)¹⁵⁹; alcohol abstinence at 12 months (42.9% vs. 52.7% in the intervention group and control group, respectively, difference not statistically significant)¹⁵¹; 6-months sustained abstinence assessed at 6, 12, and 18 months after study enrollment, with concurrent smoking cessation treatment having lower alcohol abstinence at 6 months (41% versus 56% in concurrent versus delayed implementation, respectively), but with statistically equivalent abstinence rates by 12 and 18 months¹⁵⁵; and number of days with any alcohol use (data not presented).¹⁶²

Two trials considered the impact of a concurrent or delayed smoking cessation intervention in the context of AUD treatment; both interventions provided CBT-based counseling and NRT.^{155,160} Joseph and colleagues (2004)¹⁵⁵ found greater engagement with the smoking cessation treatment in the concurrent delivery group compared to delayed group, but no differences between groups in 7-day point prevalence abstinence at 18-month follow-up (12.4% vs 13.7%, respectively, $p > .05$). Nieva and colleagues (2011)¹⁶⁰ also did not find a statistically significant difference in 7-day point prevalence smoking abstinence between the two groups at 6-month follow-up (13.7% vs. 2.4%, $p > .05$). Notably, with regard to the alcohol outcomes assessed, differing definitions make comparisons of the results challenging. Although Nieva and colleagues found no differences in alcohol abstinence at any of the follow-up timepoints,¹⁶⁰ Joseph and colleagues found statistically significantly lower rates of sustained alcohol abstinence at 6-month follow-up ($p = .001$), but the differences were not statistically significant at the 12- and 18-month follow-up timepoints.¹⁵⁵ As noted by Joseph and colleagues, this finding was contrary to the extant literature at that time.¹⁵⁵ Additionally, as noted in systematic reviews,^{11,12} there are only a few studies that used a concurrent vs. delayed intervention delivery design, and the overall literature demonstrates that concurrent delivery of smoking cessation and treatment for AUD does not harm alcohol treatment outcomes.

Studies conducted with military veterans examined smoking cessation treatment in the context of U.S. Department of Veterans Affairs outpatient alcohol and substance use treatment programs. The smoking cessation behavioral treatment approaches tested varied across the studies, from 3-session intensive smoking cessation counseling in accordance with the PHS Clinical Practice Guideline¹⁴⁹ to 5 sessions of group-based counseling,¹⁵⁴ to 16 CBT-based sessions plus contingency management.¹⁴⁷ All interventions included the provision of nicotine patches, with two interventions offering NRT in gum or lozenge form as well.^{147,154} All but one of the four studies biochemically verified smoking abstinence. Three out of the four studies with veterans found that the intervention resulted in significantly higher cigarette smoking abstinence rates overall or early follow-up periods compared to the control group.¹⁴⁷⁻¹⁴⁹ However, at 6-month follow-up, 7-day abstinence rates were not statistically different between the intervention and control groups and ranged from 9.1% to 12% in the intervention groups.^{148,149} Yet, the quit rates these studies observed among veterans in both intervention and control conditions were

comparable to quit rates seen among general populations who receive similar smoking cessation treatment.¹⁴¹ In addition, three of the four studies indicated that alcohol treatment was not affected by the provision of smoking cessation treatment.¹⁴⁷⁻¹⁴⁹ Only one small study ($N = 42$) reported higher alcohol use in the intervention group than in the control group, but these differences were not statistically significant.¹⁵⁴

Overall, among participants in an alcohol/substance use treatment setting reviewed above,^{147-149,151,154,155,159,160,162} the smoking cessation treatment results were somewhat mixed, with several studies finding a positive effect of the behavioral smoking cessation intervention and some finding no effect compared to the comparison condition (often usual care). Notably, among veterans in outpatient treatment settings, the provision of a behavioral smoking cessation treatment (together with NRT) resulted in increased smoking abstinence in the short term but not at longer-term follow-up^{147-149,154}; while in inpatient psychiatric care, abstinence rates were significantly higher for patients who received a behavioral smoking cessation intervention.¹⁵¹ Consistent with previous reviews of the literature,^{11,12} this summary finds that in these treatment settings, incorporating behavioral smoking cessation treatment (with provision of NRT) into alcohol use treatment can be effective for helping people quit smoking and does not negatively affect the success of the alcohol use treatment. As discussed in chapter 9, smokefree policies in substance use treatment settings also do not deter individuals from seeking treatment for their substance use. Moreover, the benefits of concurrent smoking cessation and AUD treatments on alcohol treatment outcomes may be indirect. Although two of the most recently conducted (2017) studies showed no statistically significant difference in alcohol use by condition, participants who did quit smoking during the trials were less likely to report alcohol use at follow-up.^{148,151} Specifically, Das and colleagues (2017),¹⁵¹ found that having quit smoking was associated with past 30-day alcohol abstinence at 12-month follow-up. Cooney and colleagues (2017)¹⁴⁸ found that having quit smoking at the end of treatment mediated the relationship between the treatment (CBT and NRT plus contingency management) and alcohol abstinence at 1-month follow-up.

Table 7.4 Selected Studies of Behavioral Interventions for Smoking Cessation and Alcohol Use Targeting Adults Discussed in This Chapter

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Interventions in inpatient and outpatient substance use treatment settings				
Carmody et al. 2012 ¹⁴⁷ N = 162 (82i, 80c) Outpatient clinic; Veterans Administration In-person USA	Adult veterans who smoked at least 5 cigarettes per day, were abstinent from alcohol for at least 7 days, and were interested in quitting smoking	<i>Theoretical approach:</i> CBT <i>Intervention:</i> NRT + 16 sessions of individual counseling for smoking cessation, incorporating mood management Session 1–5: Focused on the health consequences of smoking and preparation for the quit date Session 6–16: Modules addressing mood management skills, cognitive restructuring, behavioral activation, social support, and weight management <i>Comparison:</i> NRT + Usual care with referral to the medical center's smoking cessation clinic	12 weeks; 26 weeks (end of intervention); 38 weeks; and 52 weeks 16 weeks of nicotine patches 26 weeks of nicotine lozenges	<u>Smoking</u> 7-day point prevalence abstinence, verified by breath carbon monoxide <10 ppm): Exact abstinence rates not presented. <i>p</i> value for condition = .0229, favoring intervention. <u>Alcohol</u> Drinking during past 30 days: Exact abstinence rates not presented. <i>p</i> value for condition = .08

Table 7.4 (continued)

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Cooney et al. 2007 ¹⁴⁹ N = 118 (55i, 63c) Outpatient clinic; Veterans Administration In-person USA	Adults who met DSM-IV criteria for nicotine and alcohol dependence during the past 3 months and smoked at least 10 cigarettes per day	<i>Theoretical approach:</i> CBT <i>All participants:</i> Completed a 3-week intensive outpatient alcohol and substance use treatment program. <i>Intervention:</i> 3 individual counseling sessions (60 minutes each) with PHS Clinical Practice Guideline. Content included setting a targeted quit date (~1 week into 3-week program), identifying antecedents for smoking urges and behavior, developing behavioral and cognitive coping skills for high-risk smoking situations, and acquiring extra-treatment support for smoking cessation. On the scheduled quit date, participants were provided NRT. <i>Comparison:</i> 15-minute smoking cessation treatment session + 5-minute follow-up within 3 days of quit date. No NRT provided.	2 weeks post-discharge, 3- and 6-months post- discharge 4 weeks of 21 mg nicotine patches, 2 weeks of 14 mg, and 2 weeks of 7 mg.	<u>Smoking</u> <i>7-day point prevalence abstinence, verified by breath carbon monoxide <10 ppm (intervention vs. comparison):</i> Week 2: 27.5% vs. 6.6%, $p < .01$ Month 3: 4.3% vs. 5.7%, $p > .05$ Month 6: 9.1% vs. 2.1%, $p > .05$ <u>Alcohol</u> <i>Proportion heavy drinking days (≥ 6 drinks for men, ≥ 4 drinks for women; intervention vs. comparison):</i> Week 2: 0.04 vs. 0.02, $p > .05$ Month 3: 0.07 vs. 0.10, $p > .05$ Month 6: 0.02 vs. 0.01, $p > .05$ <i>For alcohol abstinence (intervention vs. comparison):</i> Week 2: 85.5% vs. 88.7%, $p > .05$ Month 3: 71.4% vs. 64.8%, $p > .05$ Month 6: 58.7% vs. 61.2%, $p > .05$

Table 7.4 (continued)

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Cooney et al. 2017 ¹⁴⁸ N = 83 (42i, 41c) Outpatient clinic; Veterans Administration In-person USA	Adult veterans who met DSM-IV criteria for alcohol abuse or dependence, last alcoholic drink within 90 days, smoked 10 or more cigarettes per day, had 3 years of smoking history, and completed substance detoxification prior to randomization	<i>Theoretical approach:</i> CBT <i>All participants:</i> Enrolled in a 3-week intensive outpatient alcohol and substance use treatment program. CBT (120 minutes total) focused on preparation to quit smoking, coping with nicotine withdrawal, and relapse prevention. <i>Intervention:</i> Combination intervention: CBT + NRT + contingency management. CBT was delivered concurrently with alcohol and drug treatment program. Twelve, 10-minute CBT sessions daily, corresponding with daily contingency management sessions. Contingency management provided escalating financial incentives for biochemically verified smoking abstinence (starting at \$5, potential total maximum of \$140 over 8 days). <i>Comparison:</i> Combination intervention: CBT + NRT. CBT delivered concurrently with alcohol treatment program. Three, 40-minute CBT sessions at weekly intervals.	End of behavioral treatment (~1.5 weeks after quit date), 1 month, and 6 months after quit date 8 weeks of nicotine patches; 21 mg for 4 weeks. 14 mg for 2 weeks, 7 mg for 2 weeks	<u>Smoking</u> <i>7-day point prevalence abstinence, verified by breath carbon monoxide ≤5 ppm (intervention vs. comparison):</i> End of treatment: 60% vs. 29%, <i>p</i> = .004 Month 1: 41% vs. 27%, <i>p</i> = .21 Month 6: 12% vs. 5%, <i>p</i> = .27 <u>Alcohol</u> <i>Abstinence:</i> Exact abstinence rates at the end of treatment and at each follow-up were not presented; <i>p</i> values at all points > .05.

Table 7.4 (continued)

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Das et al. 2017 ¹⁵¹ N = 216 (105i, 111c) Inpatient facility In-person USA	Adults who smoked at least 5 cigarettes daily; these results restricted to those who had a SUD (positive substance abuse screening test score ≥ 3 or positive Alcohol Use Disorders Identification Test (AUDIT) score ≥ 8)	<i>Theoretical approach:</i> Transtheoretical model (stages of change) <i>Intervention:</i> Usual care plus the Transtheoretical model stage tailored computer-delivered intervention with printed report, stage-matched treatment manual, and on-unit individual cessation counseling. Offered 10-week course of nicotine patches available at time of hospital discharge or anytime up to 6-month follow-up assessment when ready to quit. The 15–30-minute counseling provided motivational enhancement and stage-tailored strategies. Repeated the computer interventions at 3 and 6 months posthospitalization. <i>Comparison:</i> Usual care which included brief advice to quit, NRT during their smokefree hospitalization, and a quit smoking pamphlet	3 months; 6 months; 12 months Nicotine patches in hospital and 10-week course for intervention.	<u>Tobacco</u> 7-day point prevalence abstinence, verified by breath carbon monoxide ≤ 10 ppm (intervention vs. comparison): Month 3: 12.5% vs. 3.7% Month 6: 13.5% vs. 5.5% Month 12: 22.1% vs. 11.0% Tobacco abstinence over 12 months was higher in the intervention condition than in the comparison condition (OR = 2.30, 95% CI = 1.08–4.90, $p < .05$). <u>Alcohol</u> Alcohol abstinence in past 30 days (intervention vs. comparison): Month 12: 42.9% vs. 52.7%, (RR = 1.21, 95% CI, = 0.88–1.67, $p > .05$)

Table 7.4 (continued)

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Grant et al. 2003 ¹⁵⁴ N = 42 (21i, 21c) Outpatient clinic; Veterans Administration In-person USA	Adult veterans who met DSM-IV criteria for alcohol abuse/dependence, smoked at least 10 cigarettes per day, and were enrolled in outpatient treatment for alcohol use	<i>Theoretical approach:</i> N/A <i>All participants:</i> Engaged in the same outpatient alcohol treatment program <i>Intervention:</i> 5 weeks of 30-min education and 1-hour group therapy sessions, education sessions addressed nicotine dependence, nicotine withdrawal, and other behavioral conditions. An 8-week trial of NRT gum or patch was offered. <i>Comparison:</i> Participants were not discouraged from attempting to discontinue smoking; had access to smoking cessation resources at the Medical Center (1 educational session and NRT).	2 weeks, 1 month, 6 months, 12 months An 8-week trial of nicotine gum or patch offered	<u>Smoking</u> <i>Past 7-day smoking (intervention vs. comparison):</i> Week 2: 78.6% vs. 87.5% Month 1: 63.6% vs. 86.7% Month 6: 88.9% vs. 92.9% Month 12: 100% vs. 93.3% $p > .20$ (all) <u>Alcohol</u> <i>Any drinking (intervention vs. comparison):</i> Week 2: 13.3% vs. 6.3%, Month 1: 38.5% vs. 17.6% Month 6: 38.5% vs. 35.3% Month 12: 53.8% vs. 43.8% $p > .20$ (all) <i>Having more than 1 drink (intervention vs. comparison):</i> Week 2: 6.7% vs. 0%, ($p > .20$) Month 1: 33.3% vs. 0% ($p = .024$) Month 6: 33.3% vs. 13.3% ($p > .20$) Month 12: 53.8% vs. 40.0% ($p > .20$) <i>Heavy drinking in the past 2 days (intervention vs. comparison):</i> Week 2: 0.0% vs. 0.0%, Month 1: 16.7% vs. 6.3% Month 6: 10.0% vs. 18.8% Month 12: 27.3% vs. 26.7% $p > .20$ (all)

Table 7.4 (continued)

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Mueller et al. 2012 ¹⁵⁹ N = 103 (53i, 50c) Inpatient facility In-person Switzerland	Adults (ages 18–65) who were alcohol dependent according to ICD-10 criteria, currently smoked tobacco, and were motivated to quit or reduce their tobacco use	<i>Theoretical approach:</i> CBT <i>Intervention:</i> Five, 30-minute group sessions. Received a modified version of a manual CBT program with additional information regarding the harm of concomitant use of tobacco and alcohol. Sessions included motivational processes, education about nicotine and its effects, psychological factors in SUD, and elements of relapse prevention. Nicotine patches offered during inpatient stay. <i>Comparison:</i> Practiced the relaxation technique autogenic training. Nicotine patches offered during inpatient stay.	End of intervention; 6 months Nicotine patches (21 mg).	<u>Smoking</u> 7-day point prevalence abstinence, verified by breath carbon monoxide <10 ppm and urinary cotinine level (intervention vs. comparison): End of intervention: 7.5% vs. 4%, p value not presented Month 6: 0% vs. 6%, p value not presented <u>Alcohol</u> Month 6 alcohol abstinence (of n = 44; intervention vs. comparison): 47.6% vs. 39.1%, p value not presented

Table 7.4 (continued)

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Nieva et al. 2011 ¹⁶⁰ N = 92 (51i, 41c) Outpatient clinic In-person Spain	Adults (ages 18–65) who met DSM-IV criteria for nicotine and alcohol dependence, smoked more than 5 cigarettes per day for more than 1 year, and wanted to quit drinking and smoking	<i>Theoretical approach:</i> CBT <i>Intervention:</i> Simultaneous group started smoking cessation treatment on Day 1 of enrollment. Ten, 30- to 45-minute individual sessions based on CBT with emphasis on skill training, problem-solving strategies, and relapse prevention. Self-help materials were also provided. All patients used NRT. Received standard alcohol treatment concurrently with smoking cessation treatment. <i>Comparison:</i> Delayed group started smoking cessation treatment on day 180. Received alcohol treatment at the start of the study and smoking cessation treatment 180 days after enrollment.	30 days; 60 days; 90 days; 180 days Nicotine patches (size reduced after 4 weeks and lasted approximately 3 months), and/or nicotine gum, or nicotine lozenges	<u>Smoking</u> 7-day point prevalence abstinence, verified by breath carbon monoxide ≤ 9 ppm and urinary cotinine level (intervention vs. comparison): Day 30: 33.3% vs. 19.5%, <i>p</i> value not presented. Day 60: 21.6% vs. 9.8%, <i>p</i> value not presented. Day 90: 21.6% vs. 4.9%, <i>p</i> = .04 Day 180: 13.7% vs. 2.4%, <i>p</i> > .05 <u>Alcohol</u> 7-day abstinence (intervention vs. comparison): Day 30: 76.5% vs. 70.7%, <i>p</i> value not presented. Day 60: 66.6% vs. 58.5%, <i>p</i> value not presented. Day 90: 49.0% vs. 51.2%, <i>p</i> value not presented. Day 180: 25.5% vs. 34.1%, <i>p</i> value not presented.

Table 7.4 (continued)

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Pengpid et al. 2015 ¹⁶¹ N = 620 (215i, 199 tobacco control, 206 alcohol control) Outpatient clinic In-person Thailand	Adults (ages 18–60) who were assessed at moderate risk for tobacco and alcohol use with ASSIST	<i>Theoretical approach:</i> N/A <i>Intervention:</i> 3 sessions of brief counseling for alcohol use reduction and tobacco use cessation. Sessions based on the ASSIST-linked brief intervention in primary care for hazardous and harmful substance use. Also included feedback and discussion on the relationship between drinking and smoking and the effects of alcohol consumption on smoking cessation, advice to avoid or minimize drinking during the smoking cessation process, and self-efficacy for change. <i>Comparison (tobacco only):</i> 3 sessions of brief counseling on tobacco use cessation only using the ASSIST-linked brief intervention for hazardous and harmful substance use manual for use in primary care <i>Comparison (alcohol only):</i> 3 sessions of brief counseling on alcohol use reduction only using the ASSIST-linked brief intervention for hazardous and harmful substance use manual for use in primary care	3 months; 6 months None	<u>Tobacco</u> <i>ASSIST Tobacco Score (intervention vs. tobacco only vs. alcohol only):</i> Month 3: 7.0 vs. 9.1 vs. 8.9 Month 6: 6.3 vs. 9.1 vs. 8.5 <i>p</i> for GEE intervention x time = .004 <i>Self-reported 7-day point prevalence abstinence (intervention vs. tobacco only vs. alcohol only):</i> Month 3: 19.1 vs. 41.2 vs. 24.3 Month 6: 17.7 vs. 49.0 vs. 26.7 <i>p</i> for GEE intervention x time = .007; the tobacco only condition had higher smoking abstinence than the alcohol only condition (<i>p</i> < .001), which in turn had higher smoking abstinence than the intervention (<i>p</i> = .028) <u>Alcohol</u> <i>ASSIST Alcohol Score (intervention vs. tobacco only vs. alcohol only):</i> Month 3: 5.6 vs. 7.5 vs. 6.3 Month 6: 6.1 vs. 8.6 vs. 4.8 <i>p</i> for GEE intervention x time = 0.179

Table 7.4 (continued)

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Rohsenow et al. 2014 ¹⁶² N =165 (80i, 85c) Inpatient facility In-person USA	Individuals who met DSM-IV criteria for alcohol dependence and smoked ≥10 cigarettes per day for the past 6 months, and were not using NRT or bupropion	<i>Theoretical approach:</i> Motivational interviewing <i>Booster session:</i> Half of intervention participants and half of control participants received a 5–15-minute booster session 7–30 days after the initial session. <i>Intervention:</i> Initial 45-minute session involving pros and cons of smoking, interpreting health risks of carbon monoxide levels, costs of smoking relative to their income, smoking rate compared to norms, relationship of smoking to ongoing alcohol use and sobriety and the barriers to change. Patients selected stage-appropriate goals and methods, were informed of free access to NRT, and provided with smoking cessation pamphlets. Patients who attended booster sessions were asked about progress toward goals and focused on barriers self-efficacy. The second booster session reviewed feedback from 1 month assessment. <i>Comparison:</i> Smoking cessation counseling based on PHS Clinical Practice Guideline: 15-minute initial session assessing smoking rate and interest in quitting, advice on quitting and useful methods, and setting a quit date within 2 weeks. Provided with a consumer guide for smoking cessation and a list of smoking services in the state and informed of free access to NRT and smoking cessation pamphlets. Booster sessions involved checking on progress toward smoking cessation, engaged in problem-solving around barriers, noted successes and reminded patients of methods available.	1 month; 3 months; 6 months; 12 months Nicotine patches or nicotine gum	<u>Smoking</u> 7-day point prevalence abstinence, verified by breath carbon monoxide ≤10 ppm: Data not presented. <i>p</i> values for treatment and booster effect described as nonsignificant. <u>Alcohol</u> Number of days alcohol and/or drugs used during each follow-up period: Data not presented. <i>p</i> values for treatment and booster effect described as nonsignificant.

Table 7.4 (continued)

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Interventions in non-substance use treatment settings				
Ames et al. 2010 ¹⁴⁶ N = 41 (22i, 19c) Community In-person USA	Young adults (ages 18–30) who were interested in quitting smoking, who smoked 10 or more cigarettes per day during the past 6 months, and who reported binge drinking (≥4 drinks in a row for women; ≥5 drinks in a row for men) on 2 or more occasions per month in the past 3 months	<i>Theoretical approach:</i> N/A <i>Intervention (alcohol + tobacco):</i> 8 sessions of individual-based, semi-structured counseling integrated with PHS Clinical Practice Guideline, with Brief Alcohol Screening and Intervention for college students Week 1–6: Focused on behavioral treatments related to alcohol consumption, the link between tobacco and alcohol use, and addressing high-risk drinking's role in maintaining smoking Week 7–8: Brief visits (dispense nicotine patches, monitor participant safety) <i>Comparison (tobacco only):</i> 8 individual-based, semi-structured counseling sessions aligned with PHS Clinical Practice Guideline Week 1–6: Behavioral treatment Week 7–8: Brief visits (dispense nicotine patches, monitor participant safety)	Tobacco use evaluated at weeks 12 and 24 All participants received 8 weeks of nicotine patches; 21 mg/24 hours for 4 weeks, 14 mg/24 hours for 2 weeks, and 7 mg/24 hours for 2 weeks.	<u>Tobacco</u> <i>7-day point prevalence abstinence (intervention vs. comparison):</i> Week 12 (verified by breath carbon monoxide <8 ppm): 45% vs. 26%, $p = .33$ Week 24 (verified by salivary cotinine <15 ng/ml): 23% vs. 11%, $p = .42$ <u>Alcohol</u> <i>Number of drinks per month (intervention vs. comparison)</i> Week 12: 34.2 vs. 67.1, $p = .259$ Week 24: 39.3 vs. 60.8, $p = .596$ <i>Number of binge drinking episodes per month (intervention vs. comparison):</i> Week 12: 3.2 vs. 5.8, $p = .242$ Week 24: 3.8 vs. 6.3, $p = .365$

Table 7.4 (continued)

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Ames et al. 2014 ¹⁴⁵ N = 95 (48i, 47c) Community In-person USA	Young adults (ages 18–30) who smoked 1 or more cigarettes per day over the past 6 months and reported binge drinking (≥4 drinks in a row for women, ≥5 drinks in a row for men) on 1 or more occasions per month during the past 3 months	<i>Theoretical approach:</i> N/A <i>Intervention:</i> 8 sessions of individual-based, semi-structured counseling with PHS Clinical Practice Guideline + NRT Week 1–6: NRT and addressing alcohol-related behaviors, the alcohol-tobacco relationship, and the role of high-risk drinking in smoking maintenance. Behavioral aspects included developing a relapse prevention plan and implementing strategies for sustaining abstinence. Week 7–8: NRT and assessing compliance <i>Comparison:</i> 8 sessions of individual-based, semi-structured counseling with PHS Clinical Practice Guideline + NRT Week 1–6: Behavioral treatment Week 7–8: NRT and assessing compliance	Tobacco use evaluated at weeks 12 and 24. All participants received 8 weeks of nicotine patches with dosing based on their cigarette usage: ≥10 cigarettes/day Week 1–4: 21 mg/24 hours Week 5–6: 14 mg/24 hours Week 7–8: 7 mg/24 hours ≤9 cigarettes/day Week 1–6: 14 mg/24 hours Week 7–8: 7 mg/24 hours	<u>Tobacco</u> 7-day point prevalence abstinence (intervention vs. control): Week 12 (verified by breath carbon monoxide <8 ppm): 19% vs. 9%, $p = .078$ Week 24 (verified by salivary cotinine <15 ng/ml indicative of abstinence): 21% vs. 9%, $p = .050$ <u>Alcohol</u> Number of drinks per month (intervention vs. comparison) Week 24: 49.2 vs. 51.3, $p = .665$ Number of binge drinking episodes per month (intervention vs. comparison): Week 24: 4.5 vs. 4.7, $p = .703$

Table 7.4 (continued)

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Correa-Fernandez et al. 2017 ¹⁵⁰ N = 202 (101i, 101c) Community Telephone; printed materials USA	Adults in Puerto Rico who smoked daily, were interested in quitting smoking, and met at least 1 at-risk drinking criterion in the past 30 days ($\geq 2/\geq 1$ drinks per day for men/women, drinking at least 5/4 drinks on 2 or more occasions for men/women, or driving after consuming ≥ 3 drinks on 1 or more occasions)	<i>Theoretical approach:</i> MAPS <i>All participants:</i> Received Spanish-language self-help materials on tobacco and alcohol use and received up to 7 telephone counseling calls (20–30 min each) focusing on increasing motivation to change smoking behavior and enhancing participant's self-efficacy to make a quit attempt. <i>Intervention:</i> Enhanced Motivation and Problem Solving (MAPS+). Components described above; in calls, the counselor also utilized motivational enhancement techniques to address at-risk drinking. <i>Comparison:</i> Standard Motivation and Problem Solving (S-MAPS), described above. No additional components.	12 weeks; 26 weeks; 52 weeks None	<u>Smoking</u> <i>Self-reported 7-day point prevalence abstinence:</i> Data not presented. <i>p</i> values by condition overall and for each time point > .05 <u>Alcohol</u> <i>Overall at-risk drinking:</i> Full data not presented, <i>p</i> values for condition overall (Beta = -.01, 95% CI = -.27–.24) and for each time point > .05 <i>Average drinks per day:</i> Full data not presented, <i>p</i> values for condition overall (Beta = .04, 95% CI = -.26–.34) and for each time point > .05 <i>Number of binge drinking episodes:</i> Full data not presented. <i>p</i> values for condition overall (Beta = .50, 95% CI = -.49–1.49) and for each time point > .05 <i>Number of drinking and driving episodes:</i> Full data not presented. <i>p</i> values for condition overall (Beta = -.14, 95% CI = -.63–.35) and for each time point > .05

Table 7.4 (continued)

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
				Note: participants who successfully quit smoking and received the MAPS+ intervention were more likely to reduce their at-risk drinking behaviors than those who successfully quit and received the standard MAPS intervention.
Fridberg et al. 2015 ¹⁵² N = 33 (11i [BI-S], 10i [BI-ARF], 11c) Community In-person USA	Young adults (ages 21–29) who reported current smoking, were not seeking treatment for tobacco or alcohol use, and reported heavy drinking (1–5 binge drinking episodes weekly and consumed 10 to 40 drinks per week), and who smoked 10–70 cigarettes/week	<i>Theoretical approach: N/A</i> <i>Intervention 1 (standard alcohol brief intervention: BI-S):</i> Participants completed assessment on desire to change smoking and drinking behavior and alcohol-related consequences and then two, 20–30-minute behavioral intervention sessions which included feedback on alcohol-related problems, education, and motivational enhancements to change drinking behavior. <i>Intervention 2 (standard alcohol brief intervention with personalized alcohol response feedback: BI-ARF):</i> Participants completed assessment on desire to change smoking and drinking behavior and alcohol-related consequences and then two, 20–30-minute behavioral intervention sessions which included feedback on alcohol-related problems, education, and motivational enhancements to change drinking behavior. An additional alcohol response session was included in the first behavioral intervention session where respondents consumed an alcoholic beverage and completed a questionnaire and then received feedback related to their individual responses to alcohol and how it serves as a potent cue to increase smoking urges and behavior. <i>Control:</i> Preintervention alcohol response session without feedback or discussion of results. Behavioral intervention sessions focused on general health and progressive muscle relaxation for stress reduction.	1 month; 6 months None	<u>Smoking</u> Reduction in self-reported number of smoking days at Month 6: 39% reduction (BI-ARF) vs. 3% reduction (control group), $p = .004$, BI-S estimate not presented <u>Alcohol</u> Reduction in binge drinking at Month 6: 64% (BI-ARF) vs. 16% (BI-S group), 25% (control group). $p < .001$ Reduction in drinking frequency at Month 6: 32% reduction (BI-ARF) vs. 2% increase (BI-S), $p < .001$, control group estimate not presented Reduction in drinks per drinking day at Month 6: 26% (BI-ARF) vs. 3% (BI-S), $p < .001$, control group estimate not presented <u>Co-use</u> Reduction in smoking-alcohol co-use at Month 6: 39% (BI-ARF) vs. 27% (BI-S) vs. 11% (control group)

Table 7.4 (continued)

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Fucito et al. 2020 ¹⁵³ N = 26 (13i, 13c) Community In-person USA	Adults who smoked on average ≥ 5 cigarettes on smoking days for a year or more, were interested in tobacco or alcohol treatment, and reported heavy drinking ($>14/7$ drinks per week for men/women or $>5/4$ drinks per day once per month for men/women over the past year)	<i>Theoretical approach:</i> Social cognitive theory <i>Intervention:</i> During first 4 weeks, participants attended weekly counseling and then could return weekly or biweekly for 4 weeks. Sessions addressed tobacco and alcohol and incorporated motivation and confidence to change, goal setting, stimulus control, managing urges and triggers, and behavior-change maintenance. <i>Comparison:</i> During first 4 weeks, participants attended weekly counseling and then could return weekly or biweekly for 4 weeks. Sessions addressed tobacco or alcohol, depending on a participant's primary presenting concern, and incorporated motivation and confidence to change, goal setting, stimulus control, managing urges and triggers, and behavior-change maintenance.	4 weeks after treatment; 12 weeks, and 6 months 12 weeks of varenicline	<u>Smoking</u> <i>7-day point prevalence abstinence at Month 6, confirmed by breath carbon monoxide ≤ 4 ppm (intervention vs. comparison): 46% vs. 23%, $p = .17$, $d = .59$</i> <u>Alcohol</u> <i>Percent heavy drinking days:</i> There was no difference by condition overall or over time by condition, $p > .60$, full data not shown
Joseph et al. 2004 ¹⁵⁵ N = 499 (251i, 248c) Outpatient clinic and inpatient facility In-person USA	Adults (ages 21 to 75) who met DSM-IV criteria for alcohol abuse/dependence, smoked more than 5 cigarettes per day for more than 1 year, and had completed 1 week of treatment for alcohol use	<i>Theoretical approach:</i> Stages of change <i>Intervention:</i> Concurrent tobacco and alcohol cessation treatment, 1-hour face-to-face session and up to 3 follow-up sessions. Treatments were based on the PHS Smoking Cessation Clinical Practice Guideline and content varied depending on the participant's stage of change. Addressed the relationships between smoking and alcohol use and the potential advantages of recovery from all substance use. Participants in the action stage of change received a free prescription for NRT. Behavioral and pharmacological treatments were available for 1 year following initiation of smoking cessation treatment. Participants received reminder postcards indicating treatment was available every 3 months. <i>Comparison:</i> Delayed cessation treatment; identical treatment to concurrent treatment but timed to begin 6 months after study enrollment	3 months; 6 months; 12 months; 18 months Nicotine patches (21 mg for 6 weeks, 14 mg for 2 weeks, and 7 mg for 2 weeks) and gum.	<u>Smoking</u> <i>7-day point prevalence abstinence verified by breath carbon monoxide (intervention vs. comparison):</i> Month 3: 15.5% vs. 4.4%, $p < .001$ Month 6: 10.8% vs. 5.2%, $p = .02$ Month 12: 12.8% vs. 10.1%, $p > .05$ Month 18: 12.4% vs. 13.7%, $p > .05$ <u>Alcohol</u> <i>6-month abstinence (intervention vs. comparison):</i> Month 6: 41% vs. 56%, $p = .001$ Month 12: 33% vs. 42%, $p = .06$ Month 18: 41% vs. 48%, $p = .14$

Table 7.4 (continued)

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Kahler et al. 2008 ¹⁵⁷ N = 236 (119i, 117c) Community In-person USA	Adults who smoked cigarettes regularly for at least 1 year, currently smoked at least 10 cigarettes per day, reported heavy drinking (>14/7 drinks per week for men/women or ≥5/4 drinks per occasion for men/women at least once per month over the past 12 months), and did not meet full DSM-IV criteria for alcohol dependence in the past 12 months	<i>Theoretical approach:</i> Motivational interviewing <i>All participants:</i> Had 4 individual counseling sessions with the quit date occurring at session 2, plus 6 weeks of nicotine patch. Counseling sessions were focused on problem-solving regarding high-risk situations for smoking relapse, providing support within the treatment, and encouraging participants to seek support for quitting smoking outside of treatment. <i>Intervention:</i> Brief alcohol information was included in sessions 1 and 2, including open-ended discussions of drinking and smoking patterns, normative feedback on drinking levels, and the risk of smoking relapse associated with drinking. Participants were encouraged to abstain from alcohol while on the nicotine patch. <i>Comparison:</i> Brief advice to avoid or reduce drinking while quitting smoking	2 weeks; 8 weeks; 16 weeks; 26 weeks after quit date Nicotine patches (21 mg for 4 weeks, 14 mg for 2 weeks, and 7 mg for 2 weeks).	<u>Smoking</u> 7-day point prevalence abstinence, verified by breath carbon monoxide ≤10 ppm at weeks 2 and 8 and salivary cotinine ≤15 ng/ml at weeks 16 and 26 (intervention vs. comparison): Week 2: 57.3% vs. 45.4%, $p = .07$ Week 8: 39.3% vs. 31.1%, $p = .18$ Week 16: 18.0% vs. 17.7%, $p = .95$ Week 26: 19.1% vs. 17.7%, $p = .76$ <u>Alcohol</u> Heavy drinking in past 2 weeks (intervention vs. comparison): Week 2: 45.9% vs. 58.7%, $p = .06$ Week 8: 51.9% vs. 57.7%, $p = .39$ Week 26: 60.0% vs. 68.0%, $p = .23$ <i>Drinks per week:</i> Intervention participants reported fewer drinks per week than participants in the comparison condition, $\exp(\text{Beta}) = .81$ (95% CI = 0.67–0.98), $p = .027$; exact estimates of drinks per week not presented.

Table 7.4 (continued)

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Kahler et al. 2020 ¹⁵⁶ N = 119 (58i, 61c) Internet Online; text messages USA	Adults who currently smoked daily and reported heavy drinking (>14/7 drinks per week for men/women or ≥5/4 drinks per occasion at least once in the last month for men/women)	<i>Theoretical approach:</i> N/A <i>Intervention:</i> Participants were given access to self-administered modules on BecomeAnEx.org with standard smoking cessation content plus content specific to heavy drinking + 2 text messages/day before quit date, 3–5 messages/day for 2 weeks after their quit date, 1–2 messages/day for 6 weeks past quit date; 24 of the messages were alcohol-focused messages. <i>Comparison:</i> BecomeAnEx.org with standard content and up to 128 text messages using the schedule described above; only 1 text addressed alcohol use	1 month; 6 months None	<u>Smoking</u> <i>7-day abstinence (intervention vs. comparison):</i> Month 1 (self-reported): 17% vs. 16%, $p = .90$ Month 6 (verified by salivary cotinine <15 ng/ml): 5% vs. 2%, $p = .36$ Note: Participants who received BecomeAnEx.org modules with added alcohol content were less likely to report having a smoking lapse while drinking alcohol compared with those in the standard program. <u>Alcohol</u> <i>Number of heavy drinking days in the last 30 days (intervention vs. comparison):</i> Month 1: 4.4 vs. 2.9, $p = .36$ Month 6: 3.8 vs. 2.6, $p = .92$ <i>Total drinks in last 7 days (intervention vs. comparison):</i> Month 1: 8.8 vs. 10.6, $p = .29$ Month 6: 7.7 vs. 8.1, $p = .57$

Table 7.4 (continued)

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Meacham et al. 2021 ¹⁵⁸ N = 179 (85i, 94c) Internet Online USA	Young adults (ages 18–25) who used Facebook at least 4 days per week, currently smoked at least 1 cigarette per day at least 4 days a week, ≥100 lifetime cigarettes, and reported at least 1 heavy episodic drinking day in the past month (≥5/4 drinks on an occasion for men/women)	<i>Theoretical approach:</i> Motivational interviewing, CBT, and transtheoretical model <i>All participants:</i> Received tailored daily Facebook posts over 90 days that focused on use patterns, quitting strategies, and awareness of tobacco industry targeting. Participants also had access to live weekly group smoking cessation counseling for 12 weeks. Counseling content was based on readiness to quit, motivational interviewing, and coping skills. <i>Intervention:</i> Tailored posts addressed cigarette and alcohol co-use but did not aim to eliminate alcohol use. Tobacco-only posts represented a smaller proportion of overall post material (31%–55%). <i>Comparison:</i> Tailored posts to readiness to quit smoking only, did not address alcohol.	3 months; 6 months; 12 months 14 days of nicotine patches, either 14 mg for 5–9 cigarettes/day or 21 mg patches for 10 or more cigarettes/day	<u>Smoking</u> 7-day point prevalence abstinence, verified by salivary cotinine <11 ng/ml (intervention vs. comparison): Month 3: 3.5% vs. 4.3%, $p > .05$ Month 6: 0% vs. 1.2%, $p > .05$ Month 12: 3.5% vs. 0%, $p > .05$ <u>Alcohol</u> Days of binge drinking (intervention vs. comparison): Month 3: 4.8 vs. 7.6, Month 6: 3.8 vs. 6.0, Month 12: 3.2 vs. 5.6, p value for condition = .322 Number of drinks in the past week (intervention vs. comparison): Month 3: 4 vs. 6, Month 6: 5 vs. 7, Month 12: 1 vs. 4, p values not provided Alcohol Use Disorders Identification Test-Concise (AUDIT-C) scores (intervention vs. comparison): Month 3: 3.9 vs. 5, Month 6: 3.7 vs. 4.8, Month 12: 3.5 vs. 4.1, p value for condition = .416

Table 7.4 (continued)

Study N (intervention [i], comparison [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Toll et al. 2015 ⁸³ N = 1,948 (975i, 973c) Community; tobacco quitline Telephone USA	Adults who reported smoking and heavy drinking (≥14/7 drinks/week for men/women or ≥5/4 drinks per day for men/women at least once in the past year)	<i>Theoretical approach:</i> Motivational interviewing <i>All participants:</i> Received an intake call that included medical screening for a 2-week starter package of nicotine patches or gum, the New York State Smoker's Quitline booklet ("Break Loose!"), and a smoking cessation tip sheet. Callers received a quit-day telephone call and NRT. <i>Intervention:</i> Alcohol + tobacco counseling included additional assessment questions in their interview focused on how smoking and drinking are paired and the ways drinking may inhibit smoking cessation. Research findings on how alcohol undermines smoking cessation efforts were shared and callers were recommended to never drink more than 3 (for women) or 4 (for men) drinks per sitting. Callers also received an additional NIAAA booklet on alcohol use ("Rethinking Drinking"). <i>Comparison:</i> The tobacco-only counseling condition focused on standard smoking cessation advice and received "Clearing the Air" booklet.	7 months Nicotine patch or nicotine gum	<u>Smoking</u> <i>Self-reported 7-day point prevalence abstinence (intervention vs. comparison):</i> 13.5% vs. 10.3%, OR = 1.37, 95% CI = 1.04–1.80, $p = .03$ <u>Alcohol</u> <i>7-day abstinence from heavy drinking (intervention vs. comparison):</i> 74.6% vs. 70.3%, OR = 1.29, 95% CI = 0.98–1.69, $p = .07$

Note. ASSIST = Alcohol, Smoking, and Substance Involvement Screening Test; CBT = cognitive behavioral therapy; DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, 4th Edition; CI = confidence interval; GEE = generalized estimating equations; ICD-10 = International Classification of Diseases, 10th Revision; mg = milligram; ml = milliliter; N/A = not applicable; NIAAA = National Institute on Alcohol Abuse and Alcoholism; ng = nanogram; NRT = nicotine replacement therapy; OR = odds ratio; PHS = Public Health Service; ppm = parts per million; SUD = substance use disorder; USA = United States of America.

Behavioral Interventions Outside of Substance Use Treatment Settings

The majority of clinical trials that have focused on treating smoking in people with SUD (including AUD) have been conducted in substance use treatment settings. Less is known about the feasibility and efficacy of intervening with tobacco and alcohol co-use outside of substance use treatment settings. As of 2026, there are no published review of studies testing the efficacy of behavioral interventions for smoking cessation that also addressed alcohol use in settings outside of intensive alcohol use treatment (e.g., community settings). Therefore, this section provides an overview of this subset of studies and the details of the individual studies noted in this section are in Table 7.4. The studies span a wide variety of settings and modalities,^{83,145,146,150,152,153,156-158,161} including interventions delivered online. There has also been variation in the definitions of tobacco and alcohol use for defining the target population in these studies. For example, the tobacco use inclusion criteria have included callers to a state tobacco quitline who report any level of smoking,⁸³ individuals in the community who report regular smoking for a year and currently smoking at least 10 cigarettes per day,¹⁵⁷ and young adults in the community who report smoking at least 1 cigarette per day during the past 6 months.¹⁴⁵ By contrast, the alcohol use inclusion criteria have been more consistent, with most studies focusing on binge and heavy drinking.^{83,145,146,148,150,152,153,156-158,161} Several studies reviewed in this section excluded potential participants meeting criteria for AUD.^{153,156,157,161} In general, the results of these studies of combined tobacco and alcohol interventions offered outside of substance use treatment settings may be broadly generalizable to adults who smoke cigarettes and engage in frequent and/or heavy episodic drinking, but not those meeting the diagnostic criteria for AUD.

Across the small set of studies reviewed in this section, there was substantial variation in study design and population of focus, and many of the studies are small or pilot studies.^{145,146,152,153,156,158} Study populations included young adults from the general community,^{145,146,152,158} callers to a state quitline,⁸³ and people being seen in an outpatient hospital setting (not specific to SUD treatment) who were screened for tobacco and alcohol use, among other behaviors.¹⁶¹ The majority of these behavioral smoking cessation and alcohol use interventions focused on integrating alcohol reduction content, largely focused on addressing alcohol as a barrier to quitting smoking, within the context of a smoking cessation intervention.^{83,145,146,150,152,153,156-158,161} Several interventions were grounded in motivational interviewing to support smoking cessation and reduce drinking with alcohol reduction content added to the foundational smoking-only content.^{83,157,158}

Some of the interventions were delivered entirely remotely via phone, website, or app-based platforms and text messaging. Specifically, Toll and colleagues (2015)⁸³ screened callers to a state tobacco quitline for heavy drinking and tested the efficacy of an augmented smoking cessation quitline protocol using specific content to address how alcohol use may interfere with successful smoking cessation. They found significantly higher smoking abstinence rates among the group that received the combined intervention (smoking cessation and addressed alcohol use) compared with the usual care quitline protocol (focused only on smoking cessation) intervention (7-day point prevalence abstinence at 7-month follow-up: 13.5% vs. 10.3%, $p = .03$). Meacham and colleagues (2021)¹⁵⁸ compared the efficacy of a Facebook-based smoking cessation intervention that also addressed heavy episodic drinking with a Facebook-based, smoking cessation-only intervention among young adults who engage in co-use. There were no

statistically significant intervention effects for the smoking abstinence or on the alcohol use outcomes. Kahler and colleagues (2020)¹⁵⁶ tested an integrated intervention consisting of a smoking cessation web-based program, and a tailored text messaging program designed to address both tobacco and alcohol use. There were no statistically significant effects for the integrated intervention compared to the standard care intervention for either the smoking or alcohol use outcomes, although participants in the integrated intervention were less likely to report drinking during a smoking lapse compared to those in the standard intervention.¹⁵⁶ More research employing remotely-delivered interventions for tobacco and alcohol co-use is warranted given their relatively low implementation costs and potential for broad reach.

NRT was offered in 5 of 10 studies but with varying implementation protocols.^{83,145,146,157,158} Compared with the studies that implemented tobacco use treatment in substance use treatment settings, NRT was offered less consistently in studies conducted in other settings. Only one community-based study investigated the potential benefit of using varenicline as part of their behavioral counseling intervention designed to treat both tobacco use and heavy drinking.¹⁵³ Smoking cessation outcomes were consistently measured using 7-day point prevalence abstinence,^{83,145,146,150,153,156-158,161} and some studies also included biochemical verification of self-reported cessation.^{145,146,153,156-158} Primary and secondary alcohol outcomes varied and included outcomes such as ASSIST alcohol score,¹⁶¹ percentage of heavy drinking days in the last 4 weeks,¹⁵³ any drinking in the past month,^{83,152} drinks per week^{156,157} or month,^{145,146} abstinence from heavy drinking,⁸³ and number of binge drinking episodes in the last week¹⁵⁸ or month.^{145,146,156}

The studies reviewed here on behavioral interventions to treat smoking in the context of alcohol use outside of substance use treatment settings offer some evidence that combined smoking cessation and alcohol use treatments can be effective for smoking cessation. In addition, results from several studies suggest that successfully quitting smoking may confer a benefit for alcohol reduction.^{83,150} For example, Toll and colleagues (2015)⁸³ found that the combined intervention (alcohol + tobacco use treatment) was more effective than usual care for smoking cessation but did not find a main effect on reducing alcohol use. However, an interaction effect demonstrated that the combined intervention reduced drinking among participants who successfully quit smoking and may aid the maintenance of smoking abstinence.⁸³

Summary: Behavioral Treatments for Smoking Cessation in the Context of Alcohol Use

In summary, the combined behavioral smoking cessation and alcohol reduction interventions delivered in inpatient and outpatient SUD settings and outside of substance use treatment settings appear to have one of two effects: (1) they improve smoking cessation outcomes (better cessation rates in enhanced versus usual or standard care) or (2) they have equal smoking cessation rates for enhanced compared with usual or standard care. The interventions did not exacerbate alcohol use, nor did they harm the success of AUD treatment.

In addition, in some of the studies conducted with populations not in a substance use treatment setting where no main effect of the combined intervention on alcohol use was found, interaction effects in two studies suggest that addressing alcohol use as part of a smoking cessation intervention may help those who successfully quit smoking during the study to reduce drinking and stay abstinent from tobacco.^{83,150}

One potential limitation of the extant studies is that none attempted an explicitly adaptive approach to the tobacco or alcohol treatments, where the interplay of the tobacco and alcohol use behaviors was periodically assessed and informed the content of the intervention in real time. The theoretical treatment paradigms used in the present studies, such as motivational interviewing, motivational enhancement, CBT, and quitline counseling sessions, lend themselves to iterative and adaptive study designs that may be needed to better understand effective delivery of multiple behavior interventions, as these approaches focus on identifying goals, triggers and coping strategies in an iterative process.

Treatment of Tobacco and Alcohol Use in Adolescent and Young Adult Populations

Most substance use, including cigarette smoking and alcohol use, begins in adolescence, and addressing these behaviors early in life can reduce the risk of tobacco and alcohol-related health consequences.^{163,164} Importantly, the brain is still developing through adolescence and until about age 25. This development includes brain structures involved in executive function and reward, such as the mesocorticolimbic system and the prefrontal cortex, which are key brain structures for executive function, learning, and memory. Both nicotine and alcohol can interfere with and impair this development, putting adolescents at risk for impaired learning and memory and priming the brain for the rewarding effects of other drugs.^{73,165,166} Intervening early to interrupt progression of tobacco and/or alcohol use and to treat established use and/or use disorder is critical for adolescent health and to prevent the long-term consequences of use, including cancers. This section and Table 7.5 describe several studies of interventions specific to the adolescent population.

One meta-analysis has examined whether brief interventions to reduce alcohol use (with or without directly addressing tobacco use) would have effects on tobacco use among adolescents and young adults who use both substances.¹⁶⁷ This meta-analysis of 17 randomized or quasi-experimental controlled studies (ages 13–18 years, $N = 2,709$) published between 1980 and 2012 showed that brief interventions to reduce alcohol use among adolescents and young adults had a statistically significant effect on reducing alcohol use but not tobacco use, regardless of whether tobacco use was a direct target of intervention. However, the authors note that there was a statistically significant degree of heterogeneity among studies on the tobacco outcomes, indicating that variation across studies could be contributing to the null effect.

Myers and Prochaska (2008)¹⁶⁸ conducted an exploratory secondary analysis of data collected during an RCT for smoking cessation for adolescents (ages 13–18 years, $N = 54$) in treatment for SUDs (including alcohol), where the smoking cessation treatment was effective at 3-month follow-up. The secondary analysis also examined whether the tobacco cessation treatment affected the alcohol and substance use outcomes. The findings demonstrate that intervening with adolescents to treat tobacco use in the context of alcohol treatment may enhance success of the alcohol treatment; adolescents who received the smoking cessation intervention were significantly more likely to have reduced the number of days using alcohol and/or other substances at 3-month follow-up compared with those in the waitlist control group who did not receive the intervention. However, this reduction was not sustained at 6 months, and all findings could be considered preliminary due to small sample size.

Jaszyna-Gasior and colleagues (2007)¹⁶⁹ examined the influence of alcohol use on smoking cessation outcomes among a sample of adolescents (ages 13–17 years, $N = 101$) enrolled in an RCT testing NRT plus CBT-based group counseling for smoking cessation. The authors found that, among adolescents receiving the smoking cessation intervention, those who reported using alcohol were significantly less likely to have quit smoking. The level of alcohol use pre-enrollment in the trial was not associated with cessation success. These findings are concordant with adult studies where reducing or abstaining from alcohol while in treatment for tobacco dependence supports successful cessation.⁸³ This implies that including advice to abstain from alcohol while quitting smoking is important to treatment success among adolescents as well as that of adults.

Pedersen and colleagues (2022)¹⁷⁰ conducted a secondary analysis of a pilot study of a brief text message smoking cessation program that augmented usual care (brief counseling plus NRT) for unhoused young adults (ages 18–25 years; $N = 77$) receiving care/assistance through drop-in centers. The pilot study showed efficacy of the augmented program compared to usual care. In their secondary analysis to understand whether the intervention influenced alcohol use, other tobacco product use, and/or cannabis use at 3-month follow-up, they found that young adults receiving the enhanced intervention reported a significantly greater reduction in number of drinks on drinking days at 3-month follow-up than those in the control condition. These results are concordant with the adult literature where the tobacco intervention may also have a positive effect of reducing alcohol use, thus maximizing overall health benefit for people who use multiple substances.

Haug and colleagues (2017)¹⁷¹ conducted a cluster RCT in Switzerland to compare the efficacy of a smoking cessation intervention that incorporated stage-specific text messages with additional alcohol content (MobileCoach Tobacco + [MCT+]) to that of an intervention with tobacco only content (MobileCoach Tobacco [MCT]) among 1,471 vocational and upper secondary school students. Effects on smoking abstinence at 6-month follow-up were moderated by maximum number of alcoholic drinks per day at baseline. MCT+ produced significantly greater 7-day point prevalence smoking abstinence than MCT for participants with heavier peak drinking at baseline (10+ drinks on at least 1 day) (16.5% for MCT+ versus 9.5% for MCT), whereas for participants with only 0–9 drinks on their heaviest drinking occasion, MCT+ and MCT produced similar 7-day point prevalence smoking abstinence at 6-month follow-up (0–2 drinks: 15.7% for MCT+ versus 15.9% for MCT; 3–9 drinks: 13.4% for MCT+ versus 16.0% for MCT).

One study tested an intervention designed to interrupt early progression of tobacco and alcohol use.¹⁷² Preventing escalation from infrequent/intermediate use to regular use may be an important intermediate target for intervention efforts because adolescents may find it easier to achieve long-term abstinence at a time when dependence has not become entrenched. Evers and colleagues (2012)¹⁷² conducted an RCT testing the efficacy of a computer administered transtheoretical model-based tobacco, alcohol, and other substance cessation program for middle and junior high school students. At 3-month follow-up, students randomized to receive the intervention were more likely to quit smoking and reduce alcohol use than students randomized to the control condition.

Summary: Treatment of Tobacco and Alcohol Use in Adolescent and Young Adult Populations

Taken together, the literature on treating adolescent tobacco use in the context of alcohol use has described findings similar to those seen in studies of adults. In particular, intervening on tobacco use either alone or with alcohol-specific intervention content may improve smoking cessation outcomes. In addition, the one intervention that treated adolescent tobacco use in the context of alcohol and SUD treatment contributes preliminary evidence that treating tobacco use may improve short-term alcohol use outcomes,¹⁶⁸ which aligns with some of the adult literature on this topic. Moreover, the promise of the interventions that have been tested is strengthened by their brevity and sound theoretical and evidence base with some evaluating and finding effectiveness in real-world settings, such as schools and clinics serving homeless youth. Overall, treating both tobacco and alcohol use concurrently may be an important and efficient approach for improving adolescent and young adult tobacco cessation outcomes and adolescent health more generally.

However, the existing literature on this topic has several limitations. Though some of the studies focused on treating tobacco use in populations that experience greater burden (e.g., youth with a SUD, unhoused youth),^{168,170} only one study focused on intervening with adolescents who are members of racial and ethnic populations that experience tobacco-related differences in health outcomes.¹⁷³ In addition, all the studies focus on one type of tobacco product use—cigarette smoking. This is a notable limitation in understanding how to address tobacco and alcohol co-use in adolescents, especially because e-cigarettes were the most commonly used tobacco product among adolescents as of 2026.¹⁷⁴ Moreover, adolescents frequently report concurrent use of multiple tobacco products.¹⁷⁵ More research is needed to understand what interventions are effective for treating adolescents who report co-use of e-cigarettes or other tobacco products and alcohol.

Table 7.5 Selected Studies of Interventions for Smoking Cessation and Alcohol Use Targeting Adolescents Discussed in This Chapter

Study N (intervention [i], control [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Evers et al. 2012 ¹⁷² N = 1,590 students who ever used alcohol, tobacco, cannabis, or other drugs (865i, 725c) Middle and junior high schools Computer-based in classroom setting with teacher present USA	Students from 22 middle and junior high schools (ages not reported; grades included were 6th through 9th grade)	<i>Theoretical approach:</i> Transtheoretical model <i>Intervention:</i> Up to three, 30-minute, internet-based, individualized sessions. Computerized tailored intervention program based on the transtheoretical model, with interactive features such as assessment questions, feedback, images, and QuickTime movies. Sessions delivered once per month. <i>Comparison:</i> No intervention	1 pretest assessment and 2 post-test (3 months after pretest and 14 months after).	<u>Any substance use</u> Cessation of use of any substances (alcohol, tobacco, cannabis, other drugs) (intervention vs. comparison): Post-test 1: 39.6% vs. 24.6% Post-test 2: 36.9% vs. 32.1% Random effects logistic regression models showed that differences between control and intervention groups were statistically significant at post-test 1 ($p < .05$) but not at post-test 2.
Haug et al. 2017 ¹⁷¹ N = 1,471 (741i, 730c) Schools Online; text messages Switzerland	Students in vocational schools, mean age 18.6 years	<i>Theoretical approach:</i> HAPA <i>Mobile Coach Tobacco (MCT) system:</i> Both MCT and MCT+ interventions were developed using the MobileCoach system and received individually tailored text messages to support smoking cessation over a 3-month period. <i>Intervention:</i> Mobile Coach System + (MCT+). Subjects in the MCT+ group received integrated intervention, including web-based tailored feedback on alcohol consumption. For those who binge drank, personalized text messages were sent to encourage maintaining drinking within low-risk limits over a 3-month period. <i>Comparison:</i> Standard MCT intervention	Baseline survey; 6-month follow-up assessment	<u>Smoking</u> 7-day point prevalence abstinence (intervention vs. comparison): 15.0% vs. 13.9% (CC $p = .61$, ITT $p = .82$). <i>Mean number of cigarettes smoked per day (intervention vs. comparison):</i> Decrease of 2.7 vs. 2.8 (CC $p = .97$, ITT $p = .93$) MCT+ was more effective at improving smoking abstinence among participants who reported a higher drinking at baseline compared to those who reported less drinking (CC $p = .008$, ITT $p = .049$) <i>7-day point prevalence abstinence by number of drinks on heaviest drinking occasion at baseline (intervention vs. comparison):</i> 10+ drinks: 16.5% vs. 9.5% 3–9 drinks: 13.4% vs. 16.0% 0–2 drinks: 15.7% vs. 15.9% <u>Alcohol</u> <i>Mean alcoholic drinks per week at follow-up (intervention vs. comparison):</i> Decrease of 4.8 vs. 4.2 (CC $p = .74$, ITT $p = .28$)

Table 7.5 (continued)

Study N (intervention [i], control [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Jaszyna-Gasior et al. 2007 ¹⁶⁹ N = 101 analyzed (120 randomized) Community In-person USA	Adolescents aged 13–17 who smoked and were interested in quitting	<i>Theoretical approach:</i> CBT <i>All participants:</i> Attended a 45-minute CBT group session led by a trained social worker during each treatment visit. Visits occurred weekly during weeks 1–6 and every other week during weeks 7–12. <i>Group 1:</i> Active nicotine gum + placebo patch <i>Group 2:</i> Active nicotine patch + placebo gum <i>Group 3:</i> Placebo gum + placebo patch	Baseline, weeks 1–6, week 8, week 10, week 12, week 26 Nicotine gum or patch	<u>Smoking</u> 7-day point prevalence abstinence, verified by breath carbon monoxide ≤ 6 ppm: Those reporting drinking since the previous visit had lower odds of abstinence (unadjusted OR = 0.42, 95% CI = 0.23–0.78, $p = .0057$; adjusted OR = 0.30, 95% CI = 0.16–0.58, $p = .0003$) compared to those who did not reporting drinking. <u>Alcohol</u> On average, participants reported alcohol use between visits on approximately 20% of visits (18.6% $\pm$ 26.4%).
Myers et al. 2008 ¹⁶⁸ N = 54 with baseline information. 39 (20i, 19c) completed follow-up assessments Outpatient clinic In-person USA	Adolescents aged 13–18 who reported weekly cigarette smoking, recruited from 4 outpatient substance abuse treatment programs in Southern California	<i>Theoretical approach:</i> N/A <i>Intervention:</i> 6, weekly, hour-long sessions intended to motivate and encourage changes in smoking behavior. <i>Comparison:</i> No intervention. Participation in the intervention was offered after completion of the 6-month follow-up interview.	Baseline, 3 months, 6 months	<u>Substance use</u> <i>Past-30-day abstinence from alcohol and other drugs:</i> Odds of abstinence were not significantly different for the treatment group vs. the comparison group at 3 months (OR = 3.6, 95% CI = 0.73–17.38, $p = .12$) or 6 months ($p = .75$). <i>Days of substance use (alcohol and other drugs):</i> Participants in the treatment condition had significantly fewer days of substance use than the comparison group at 3 months ($p = .015$) but not at 6 months ($p = .31$).

Table 7.5 (continued)

Study N (intervention [i], control [c]) Setting Intervention mode Country	Sample	Theoretical approach(es) Intervention and comparison condition	Assessment points Smoking cessation medication protocol	Results
Pedersen et al. 2022 ¹⁷⁰ N = 77 (40i, 37c) Community Text messages USA	Participants ages 18–25 who smoked ≥ 5 cigarettes/day on at least 20 days in the past month, were ready to set a quit date in the next 30 days, had a cell phone that could receive text messages, and were seeking services at 1 of 3 drop-in centers for youth experiencing homelessness in Los Angeles	<i>Theoretical approach:</i> NA <i>All participants:</i> Received a 30-minute group smoking cessation counseling session following the 5 As protocol (i.e., Ask, Advise, Assess, Assist, Arrange). <i>Intervention:</i> 174 automated text messages for 6 weeks, designed to provide strategies for getting quit support, calculations for money saved by quitting, information on health and social benefits of quitting. <i>Comparison:</i> No text messaging intervention	Baseline, 3 months All participants received a supply of nicotine patches with instructions for use and written materials on quitting.	<u>Tobacco</u> <i>Maximum of noncigarette tobacco use days in past month (intervention vs. comparison):</i> Change in outcomes at 3 months: -9.21 vs. 3.30, Cohen's $d = 0.53$, $p = .05$ <i>Sum of noncigarette tobacco use days in past month (intervention vs. comparison):</i> Change in outcomes at 3 months: -23.11 vs. -7.30, Cohen's $d = 0.58$, $p = .04$ <u>Alcohol</u> <i>Days of alcohol use in past month (intervention vs. comparison):</i> Change in outcomes at 3 months: -4.53 vs. -0.77, Cohen's $d = 0.33$, $p = .19$ <i>Typical number of drinks on drinking days (intervention vs. comparison):</i> Change in outcomes at 3 months: -2.94 vs. 1.64, Cohen's $d = 0.69$, $p = .01$

Note. CBT = cognitive behavioral therapy; CC = complete case; CI = confidence interval; HAPA = Health Action Process Approach; ITT = intention to treat; OR = odds ratio; USA = United States of America.

Treatment of Tobacco and Alcohol Use in Cancer Survivors

Cancer survivors are an important population for treating both tobacco and alcohol use. As described in chapter 3, similar to the general population, current or former smoking is associated with more frequent alcohol use and binge drinking among cancer survivors. The co-use of these substances continues exposure to two significant, and potentially synergistic, risk factors for cancer. Tobacco and alcohol use also increases the risk for health effects in addition to cancer (e.g., cardiopulmonary disease) and diminished quality of life (e.g., financial toxicity). Intervening after a cancer diagnosis is critical given the known effects of tobacco use on cancer treatment, cancer-specific mortality and secondary primary cancer development,^{35,176} as well as the potential for alcohol use to reduce cancer treatment effectiveness, increase the risk of recurrence or second primary cancers, and decrease overall survival rates.¹⁷⁷⁻¹⁸⁰ Though there are limited data specifically on treatment for co-use of tobacco and alcohol among cancer survivors, clinical guidance for addressing tobacco and alcohol use in cancer survivors is similar to that indicated for the general population (as discussed in detail in this chapter). Clinicians are encouraged to screen for tobacco and alcohol use in the oncology setting (as well as other clinical settings), provide FDA-approved medications paired with behavioral counseling, or refer patients to programs that can provide the treatment.^{94,176,181} For alcohol use, Karam-Hage and colleagues (2026)¹⁸¹ note that due to the lower level of awareness of alcohol as a cause of cancer, clinicians screening for alcohol use may also need to educate their cancer patients about this risk before, or alongside, providing treatment or referral to an alcohol treatment program. Clinical guidance also encourages treating mental health conditions that often co-occur with tobacco and alcohol use and the experience of having cancer, as the stress of cancer diagnosis may cause or exacerbate mental health issues that need to be addressed in parallel with cancer treatment. Being diagnosed with cancer, especially a cancer caused by tobacco or alcohol, is often a key moment for patients in terms of motivation to quit or reduce use, and for doctors in terms of timing to provide counseling to quit or reduce use and assist with treatment.

Chapter Summary

Quitting smoking is challenging; it usually takes numerous attempts to achieve long-term abstinence. In the context of alcohol use, especially heavy drinking, the likelihood of successful smoking cessation is hampered further. Reducing and quitting drinking can be challenging as well, especially for people with alcohol use disorder. People seeking treatment for alcohol use disorder often relapse within 6 months of treatment. Effective pharmacological and behavioral treatments exist for treating tobacco use and for treating alcohol use disorder, yet these treatments are underutilized. Treatments that target tobacco and alcohol co-use have the potential to improve quit outcomes and health benefits. Tobacco and alcohol use and the development of use disorders are linked neurobiologically and behaviorally, which may inform new treatment targets. A line of research has sought to design and deliver integrated pharmacological and behavioral therapies that work together to optimize quit outcomes for both smoking and drinking. Engaging people who use both tobacco and alcohol in treatment for one substance provides an opportunity to treat the other, which could lead to successful treatment of both

behaviors. For example, offering treatment for tobacco use in the context of alcohol treatment can lead to successful smoking cessation and may also reduce drinking. In addition, increasing provider education about the benefits of treating smoking in the context of alcohol use and encouraging screening for both tobacco use and alcohol use, especially alcohol use disorder, to improve the use of effective treatments would further efforts to reduce cancer risks.

This chapter reviewed the available evidence from published systematic reviews and studies published after the systematic reviews were conducted. Some of the available evidence combines alcohol with other substance use when evaluating how best to deliver smoking cessation treatment to people with substance use disorder. This makes some aspects of understanding the role of alcohol use in the context of smoking cessation treatment more difficult to extrapolate. Nonetheless, currently available studies of smoking cessation in the context of alcohol treatment reviewed in this chapter have returned two consistent conclusions: (1) integration of smoking cessation treatment into alcohol use disorder treatment settings is not detrimental to the goals of reduced drinking or abstinence, and (2) treatment integration can reduce use of both tobacco and alcohol. Smoking cessation interventions that included alcohol-specific content in a motivation-based approach appeared to enhance the durability of the successful quit attempts and reduce drinking among those who had quit. However, integrated treatment development is still fairly nascent, with no single breakthrough treatment identified. Both of the Food and Drug Administration-approved medication classes for smoking cessation (i.e., nicotine replacement therapy and the oral medications varenicline and bupropion, which do not contain nicotine) have been evaluated for their effects on drinking when treating smoking, with unclear evidence for reducing alcohol use. The few studies conducted among adolescents find that, similar to adults, treating smoking and alcohol use in combination generally results in improved outcomes.

The health risks, including cancer risk, of concurrent smoking and alcohol consumption are well documented in the literature (see chapters 4 and 5), and warrant attention in provider-, education-, and systems-level interventions to support treatment of tobacco and alcohol use, in combination, routinely in the clinical and public health context.

Research Needs

New drug discovery is needed to effectively treat both tobacco and alcohol use independently, as well as new research to develop integrated pharmacologic and behavioral therapies for co-use and attention to high-risk subgroups. Future therapies would ideally leverage the overlapping neurobiological and neurobehavioral systems related to substance use dependence (described in chapter 6) to reduce the use of both substances. This is an emerging area of scientific research. For example, glucagon-like peptide-1 (GLP-1) agonist medications are approved for treatment of diabetes and obesity by the Food and Drug Administration (see chapter 6); as the use of these agents has become common, interest in understanding their effects on tobacco and alcohol use is increasing.¹⁸² Although preclinical, animal research, and early clinical trial research with human participants indicates this potential concurrent effect, research is needed to more fully understand the effects of GLP-1 on the brain and the

implications of GLP-1 as a treatment for tobacco, alcohol, and/or other substance use.¹⁸² The added benefit of counseling to support and sustain behavioral changes also warrants investigation. The genetics findings presented here and in chapter 6 are also important to consider when evaluating the utility of personalized integrated approaches.

More research is needed to understand how best to combine and schedule integrated treatments. People who smoke cigarettes and drink heavily may not be ready to directly tackle changing both behaviors at once. However, as this chapter has shown, progress made in changing one risk factor may have indirect effects on changing another and may indirectly support motivation to change another. Leveraging the process of change in one behavior (e.g., as elaborated in the Transtheoretical Model) to facilitate change in another highlights the need for integrated treatment strategies that more fully consider the interplay between smoking and alcohol use behaviors.^{83,183} Moreover, research is needed to understand how societal trends in tobacco (e.g., e-cigarette use) and alcohol use (e.g., greater awareness of alcohol as a cause of cancer) interact and whether they encourage people to seek treatment.

The field needs standardized methods and reporting protocols for clinical trials that focus on the integrated treatment of tobacco and alcohol use. Studies ought to clearly define co-use, heavy use, and/or dual disordered use in stating their inclusion criteria. Definitions need to consider changes in tobacco and alcohol products and use behaviors. For example, there has been a decrease in the proportion of daily versus nondaily smoking (see chapter 2), and an increase in the use of e-cigarettes and other tobacco products (e.g., heated tobacco, nicotine pouches). Researchers should clearly specify the primary versus secondary intervention target(s) in their trial, whether the proposed therapy is aimed at treating both substances concurrently, and any hypothesized mediation effects. In addition, the paucity of evidence on treating other tobacco product use in the context of alcohol use presents an important research opportunity.

Investigators focused strictly on smoking cessation should measure alcohol use and analyze changes in alcohol use as an outcome and potential mediator and consider broadening inclusion criteria. In addition, there is substantial heterogeneity in the measurement of alcohol use outcomes (e.g., drinks per day, heavy drinking, alcohol abstinence), which indicates a need for developing consensus around common alcohol use outcomes to include in studies to improve interpretation of findings across studies. Moreover, there are relatively few studies that include people who report levels of drinking that do not exceed the guidelines and/or do not meet the criteria for alcohol use disorder. Those studies demonstrate potential for improving smoking cessation and reducing drinking among people who successfully quit. Understanding how to refine smoking cessation interventions to increase quitting in people who drink alcohol would advance smoking cessation while potentially reducing drinking. In addition, the enrollment criteria for many smoking cessation trials have excluded people who report other substance use, including alcohol use, especially heavy drinking. Although additional safety measures may be needed, broadening for the inclusion of people who drink heavily will increase study generalizability.

More research on treating young people who engage in tobacco and alcohol co-use is warranted. Although most initiation of tobacco product use and alcohol use occurs in adolescence and young adulthood, there have been relatively few treatment intervention studies for tobacco and alcohol co-use focused on that population. The research reviewed in this chapter indicates that treating both tobacco and alcohol use in adolescence and young adulthood is feasible and effective for quitting smoking and may be effective for reducing drinking. Research in treating co-use in young people has largely been conducted for cigarette smoking. Yet, as adolescent smoking has decreased, the use of e-cigarettes and other types of tobacco products has become more prevalent. Because co-use of these products and alcohol is widespread among youth and because there are few studies addressing co-use in youth, greater efforts are needed to develop interventions addressing co-use of e-cigarette and other noncigarette tobacco products and alcohol.

Conclusions

1. **The efficacy of smoking cessation treatment can be enhanced by reducing alcohol use, especially heavy alcohol use.** Most studies addressing tobacco cessation in the context of alcohol use have been conducted with people who engage in heavy drinking and/or have alcohol or substance use disorders. The preponderance of evidence shows that continued use of alcohol during smoking cessation treatment is a barrier to quitting smoking. For this reason, people trying to quit smoking should be advised and assisted to decrease 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.
2. **Coordinated treatment of concurrent tobacco and alcohol use is warranted.** Health care providers should screen for both tobacco and alcohol use, provide advice to quit tobacco and to reduce or quit alcohol to maximize health benefits, assess readiness to quit, and offer coordinated care and/or referral to evidence-based treatment that includes both pharmacological and behavioral interventions.
3. **Smoking cessation interventions are effective for people who smoke and have an alcohol use disorder, and providing smoking cessation treatment does not harm alcohol use outcomes; conversely, the evidence suggests it may improve them.** Engaging in smoking cessation treatment during treatment for alcohol use disorder does not jeopardize sobriety outcomes. Evidence-based treatments for quitting smoking in the general population are also effective for people who smoke and have an alcohol use disorder.
4. **Effective pharmacological and behavioral therapies to treat tobacco use and to treat alcohol use are available; however, evidence is still emerging to inform the development of combined treatment approaches for co-use.** The high prevalence of co-use of tobacco and alcohol points to the need for additional research to develop pharmacological and/or behavioral treatments that can effectively address treatment needs for people who co-use both substances.

5. **Measuring co-use in tobacco and alcohol treatment studies is critical for improving tobacco use treatment.** Regardless of the tobacco focus of the treatment study, systematically measuring alcohol use in that context will improve understanding of the effect of alcohol use on tobacco use treatment. This can also inform how tobacco use treatment affects alcohol use, thus enhancing understanding of how to treat both causes of cancer. Finally, measuring and addressing both tobacco and alcohol use in cancer treatment trials is important both to continue to better understand the effects of continued use of these substances on cancer treatment and patient outcomes.
6. **Pharmacological and behavioral tobacco treatment trials could be improved by taking alcohol use into account.** The high prevalence of tobacco and alcohol co-use means that excluding people who drink alcohol at any level (e.g., infrequent drinking, heavy drinking) from smoking cessation trials limits the generalizability of these trials. Additionally, because the use of other substances (e.g., cannabis or illicit drugs) is common among people who smoke and drink alcohol, differentiating between alcohol and “other drug use” in trials is important to determine the effect of alcohol on the efficacy of tobacco use treatment.

Appendix 7A Literature Search Strategy

Searches for relevant studies of pharmacotherapy and behavioral treatments were conducted with the assistance of a National Institutes of Health (NIH) librarian, using Boolean logic combining indexed terms (e.g., MeSH, Emtree) and keywords. PubMed (National Library of Medicine), EMBASE (Elsevier), Cochrane Library (Wiley & Sons), and Web of Science (Clarivate) were searched for this review. In addition, relevant clinical trials listed in the ClinicalTrials.gov database and reference lists of the included articles were also searched. Search terms were selected to encompass cigarette smoking, other tobacco product use, alcohol use, alcohol use disorder, and tobacco cessation.

Inclusion Criteria: Overall

In general, an article must have (a) been peer-reviewed and published between January 1, 2002, and January 31, 2023, in English, German, or Spanish; (b) described the outcomes of a randomized controlled trial (RCT), quasi-randomized (pre/post) clinical trial, or a nonrandomized (participants/researchers select group) clinical trial; and (c) been an intervention study for tobacco and alcohol cessation/reduction that reported intervention effects (i.e., results that report on outcomes for both behaviors separately), including interventions for reducing tobacco and alcohol use along with other substances, such as those conducted in a treatment facility or part of a modifiable risk behavior-focused intervention. Articles were excluded if they were baseline intervention data analyses, epidemiologic studies, study protocols, prevention interventions (i.e., to prevent smoking and/or drinking), economic/cost analyses, or preclinical, basic science, or mechanistic studies.

Inclusion Criteria: Pharmacotherapy Treatments

The section on pharmacotherapy treatments focused on RCTs only. Articles were excluded if they included people younger than 18 years of age, did not include tobacco and alcohol use as primary or secondary outcomes, focused on psychosocial/behavioral efficacy exclusively, and did not include behavior change as an outcome (e.g., quality of life).

Inclusion Criteria: Behavioral Treatments Among Adults

The section on behavioral treatments among adults excluded articles if they included people younger than 18 years of age, used tobacco use and drinking indicators as secondary outcomes, focused on medication/pharmacotherapy product efficacy exclusively, and those that did not include behavior change as an outcome (e.g., quality of life).

Inclusion Criteria: Behavioral Treatments Among Adolescents

The section on behavioral treatments among adolescents included articles if they were conducted with a population of adolescents (younger than 18 years of age) who reported any use of tobacco and alcohol and examined effects of an intervention to quit and/or reduce tobacco use and measured and reported effects of alcohol use.

Search Terms

Search strings are listed below. Search strings included terms for each tobacco and alcohol use and cessation behaviors:

- Alcohol: “Alcohol-Related Disorders”[MeSH] OR “Alcohol-Induced Disorders, Nervous System”[MeSH] OR “Drinking Behavior”[MeSH] OR “alcohol*”[Title/Abstract] OR “drinking behavior*”[Title/Abstract] OR “binge drinking”[Title/Abstract] OR “heavy drink*”[Title/Abstract] OR “drinking problem*”[Title/Abstract] OR “drinking motiv*”[Title/Abstract]
- Tobacco Smoking: “Smoking Devices”[MeSH] OR “Tobacco Use”[MeSH] OR “Tobacco Use Disorder”[MeSH] OR “smoking”[Title/Abstract] OR “smoker*”[Title/Abstract] OR “nicotine*”[Title/Abstract] OR “tobacco”[Title/Abstract] OR “cigarette*”[Title/Abstract] OR “cigar*”[Title/Abstract] OR “e-cig*”[Title/Abstract] OR “vaping”[Title/Abstract] OR “vape”[Title/Abstract] OR “snuff”[Title/Abstract] OR “snus”[Title/Abstract] OR “hookah”[Title/Abstract] OR “waterpipe”[Title/Abstract] OR “smokeless”[Title/Abstract]
- Cessation Behavior: “Treatment Outcome”[MeSH] OR “treatment*”[Title/Abstract] OR “Therapeutics”[MeSH:NoExp] OR “Behavior Therapy”[MeSH] OR “therap*”[Title/Abstract] OR “behavior chang*”[Title/Abstract] OR “Counseling”[MeSH] OR “counseling*”[Title/Abstract] OR “motivational interviewing*”[Title/Abstract] OR “mindfulness”[Title/Abstract] OR “Recurrence”[MeSH] OR “recurrence*”[Title/Abstract] OR “relapse*”[Title/Abstract] OR “remission*”[Title/Abstract] OR “abstinence*”[Title/Abstract] OR “Alcoholics Anonymous”[Title/Abstract] OR “stop”[Title/Abstract] OR “stopped”[Title/Abstract] OR “stopping”[Title/Abstract] OR “quit”[Title/Abstract] OR “quitting”[Title/Abstract] OR “Tobacco Use Cessation”[MeSH] OR “Smoking Cessation”[MeSH] OR “Smoking Reduction”[MeSH] OR “cessation*”[Title/Abstract] OR “abstinence*”[Title/Abstract] OR “Telemedicine”[MeSH] OR “telemedicine*”[Title/Abstract] OR “telehealth*”[Title/Abstract] OR “mHealth*”[Title/Abstract] OR “m-Health*”[Title/Abstract] OR “eHealth*”[Title/Abstract] OR “e-Health*”[Title/Abstract] OR “Digital Technology”[MeSH] OR “digital technolog*”[Title/Abstract] OR “digital health*”[Title/Abstract] OR “digital intervention*”[Title/Abstract]

References

1. Leeman RF, Huffman CJ, O'Malley SS. Alcohol history and smoking cessation in nicotine replacement therapy, bupropion sustained release and varenicline trials: a review. *Alcohol Alcohol*. 2007;42(3):196-206. doi:10.1093/alcalc/agm022.
2. Van de Graaf RC, Veldman K, Anthonio GG. Reaction to 'Integrating smoking cessation care in alcohol and other drug treatment settings using an organizational change intervention: a systematic review' by Skelton et al. (2018). *Addiction*. 2018;113(12):2318. doi:10.1111/add.14409.
3. Falk DE, Ryan ML, Fertig JB, et al. Gabapentin enacarbil extended-release for alcohol use disorder: a randomized, double-blind, placebo-controlled, multisite trial assessing efficacy and safety. *Alcohol Clin Exp Res*. 2019;43(1):158-169. doi:10.1111/acer.13917.
4. Kahler CW, Cioe PA, Tzilos GK, et al. A double-blind randomized placebo-controlled trial of oral naltrexone for heavy-drinking smokers seeking smoking cessation treatment. *Alcohol Clin Exp Res*. 2017;41(6):1201-11. doi:10.1111/acer.13396.
5. King A, Fucito L. Cigarette smoking and heavy alcohol drinking: the challenges and opportunities for combination treatments. *Am J Psychiatry*. 2021;178(9):783-85. doi:10.1176/appi.ajp.2021.21070692.
6. McKee SA, Falba T, O'Malley SS, Sindelar J, O'Connor PG. Smoking status as a clinical indicator for alcohol misuse in U.S. adults. *Arch Intern Med*. 2007;167(7):716-21. doi:10.1001/archinte.167.7.716.
7. van Amsterdam J, van den Brink W. Smoking as an outcome moderator in the treatment of alcohol use disorders. *Alcohol Alcohol*. 2022;57(6):664-73. doi:10.1093/alcalc/agac027.
8. van Amsterdam J, van den Brink W. The effect of alcohol use on smoking cessation: a systematic review. *Alcohol*. 2023;109:13-22. doi:10.1016/j.alcohol.2022.12.003.
9. Bandiera FC, Anteneh B, Le T, Delucchi K, Guydish J. Tobacco-related mortality among persons with mental health and substance abuse problems. *PLoS One*. 2015;10(3):e0120581. doi:10.1371/journal.pone.0120581.
10. Hurt RD, Offord KP, Croghan IT, Gomez-Dahl L, Kottke TE, Morse RM, et al. Mortality following inpatient addictions treatment. Role of tobacco use in a community-based cohort. *JAMA*. 1996;275(14):1097-103. doi:10.1001/jama.275.14.1097.
11. Apollonio D, Philipps R, Bero L. Interventions for tobacco use cessation in people in treatment for or recovery from substance use disorders. *Cochrane Database Syst Rev*. 2016;11(11):CD010274. doi:10.1002/14651858.CD010274.pub2.
12. Prochaska JJ, Delucchi K, Hall SM. A meta-analysis of smoking cessation interventions with individuals in substance abuse treatment or recovery. *J Consult Clin Psychol*. 2004;72(6):1144-56. doi:10.1037/0022-006X.72.6.1144.
13. Thurgood SL, McNeill A, Clark-Carter D, Brose LS. A systematic review of smoking cessation interventions for adults in substance abuse treatment or recovery. *Nicotine Tob Res*. 2016;18(5):993-1001. doi:10.1093/ntr/ntv127.
14. Tobacco Use and Dependence Guideline Panel. Treating Tobacco Use and Dependence: 2008 Update. Rockville (MD): U.S. Department of Health and Human Services; 2008. [cited 2026 Mar 27]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK63952/>
15. Lynch KL, Twesten JE, Stern A, Augustson EM. Level of alcohol consumption and successful smoking cessation. *Nicotine Tob Res*. 2019;21(8):1058-1064. doi:10.1093/ntr/nty142.
16. Wong BKC, Veldhuizen S, Minian N, Zawertailo L, Selby P. The effects of alcohol use on smoking cessation treatment with nicotine replacement therapy: an observational study. *Addict Behav*. 2024;155:108045. doi:10.1016/j.addbeh.2024.108045.
17. Yardley MM, Mirbaba MM, Ray LA. Pharmacological options for smoking cessation in heavy-drinking smokers. *CNS Drugs*. 2015;29(10):833-45. doi:10.1007/s40263-015-0284-5.
18. Parks MJ, Blanco C, Creamer MR, et al. Cigarette smoking during recovery from substance use disorders. *JAMA Psychiatry*. 2025;82(10):1002-8.
19. Chaiton M, Diemert L, Cohen JE, Bondy SJ, Selby P, Philipneri A, et al. Estimating the number of quit attempts it takes to quit smoking successfully in a longitudinal cohort of smokers. *BMJ Open*. 2016;6(6):e011045. doi:10.1136/bmjopen-2016-011045.
20. Durazzo TC, Meyerhoff DJ. Psychiatric, demographic, and brain morphological predictors of relapse after treatment for an alcohol use disorder. *Alcohol Clin Exp Res*. 2017;41(1):107-116. doi:10.1111/acer.13267.
21. Kirshenbaum AP, Olsen DM, Bickel WK. A quantitative review of the ubiquitous relapse curve. *J Subst Abuse Treat*. 2009;36(1):8-17. doi:10.1016/j.jsat.2008.04.001.

22. Maisto SA, Clifford PR, Stout RL, Davis CM. Drinking in the year after treatment as a predictor of three-year drinking outcomes. *J Stud Alcohol*. 2006;67(6):823-32. doi:10.15288/jsa.2006.67.823.
23. Acheson A, Mahler SV, Chi H, de Wit H. Differential effects of nicotine on alcohol consumption in men and women. *Psychopharmacology (Berl)*. 2006;186(1):54-63. doi:10.1007/s00213-006-0338-y.
24. Chatterjee S, Bartlett SE. Neuronal nicotinic acetylcholine receptors as pharmacotherapeutic targets for the treatment of alcohol use disorders. *CNS Neurol Disord Drug Targets*. 2010;9(1):60-76. doi:10.2174/187152710790966597.
25. Kahler CW, Metrik J, Spillane NS, et al. Sex differences in stimulus expectancy and pharmacologic effects of a moderate dose of alcohol on smoking lapse risk in a laboratory analogue study. *Psychopharmacology (Berl)*. 2012;222(1):71-80. doi:10.1007/s00213-011-2624-6.
26. McKee S, Krishnan-Sarin S, Shi J, Mase T, O'Malley S. Modeling the effect of alcohol on smoking lapse behavior. *Psychopharmacology*. 2006;189(2):201-210. doi:10.1007/s00213-006-0551-8.
27. Mintz J, Boyd G, Rose JE, Charuvastra VC, Jarvik ME. Alcohol increases cigarette smoking: a laboratory demonstration. *Addict Behav*. 1985;10(3):203-7. doi:10.1016/0306-4603(85)90001-2.
28. Nocente R, Vitali M, Balducci G, Enea D, Kranzler HR, Ceccanti M. Varenicline and neuronal nicotinic acetylcholine receptors: a new approach to the treatment of co-occurring alcohol and nicotine addiction? *Am J Addict*. 2013;22(5):453-9. doi:10.1111/j.1521-0391.2013.12037.x.
29. Sayette MA, Martin CS, Wertz JM, Perrott MA, Peters AR. The effects of alcohol on cigarette craving in heavy smokers and tobacco chippers. *Psychol Addict Behav*. 2005;19(3):263-70. doi:10.1037/0893-164X.19.3.263.
30. Steensland P, Simms JA, Holgate J, Richards JK, Bartlett SE. Varenicline, an alpha4beta2 nicotinic acetylcholine receptor partial agonist, selectively decreases ethanol consumption and seeking. *Proc Natl Acad Sci U S A*. 2007;104(30):12518-23. doi:10.1073/pnas.0705368104.
31. U.S. Department of Health and Human Services. *Smoking Cessation. A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2020.
32. Cornelius ME, Loretan CG, Jamal A, Davis Lynn BC, Mayer M, Alcantara IC, et al. Tobacco product use among adults - United States, 2021. *MMWR Morb Mortal Wkly Rep*. 2023;72(18):475-483. doi:10.15585/mmwr.mm7218a1.
33. Krist AH, Davidson KW, Mangione CM, et al. Interventions for tobacco smoking cessation in adults, including pregnant persons: U.S. Preventive Services Task Force recommendation statement. *JAMA*. 2021;325(3):265-279. doi:10.1001/jama.2020.25019.
34. U.S. Department of Health and Human Services. *How Tobacco Smoke Causes Disease: The Biology and Behavioral Basis for Smoking-Attributable Disease: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2010.
35. U.S. Department of Health and Human Services. *The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2014. Printed with corrections, January 2014.
36. World Health Organization. Tobacco: key facts [Internet]. [cited 2026 Mar 27]. Available from: <https://www.who.int/news-room/fact-sheets/detail/tobacco>.
37. Arias AJ, Kranzler HR. Treatment of co-occurring alcohol and other drug use disorders. *Alcohol Res Health*. 2008;31(2):155-67.
38. Kalman D, Kim S, DiGirolamo G, Smelson D, Ziedonis D. Addressing tobacco use disorder in smokers in early remission from alcohol dependence: the case for integrating smoking cessation services in substance use disorder treatment programs. *Clin Psych Rev*. 2010;30(1):12-24. doi:10.1016/j.cpr.2009.08.009.
39. Bold KW, Rosen RL, Steinberg ML, Epstein EE, McCrady BS, Williams JM. Smoking characteristics and alcohol use among women in treatment for alcohol use disorder. *Addict Behav*. 2020;101:106137. doi:10.1016/j.addbeh.2019.106137.
40. Ellingstad TP, Sobell LC, Sobell MB, Cleland PA, Agrawal S. Alcohol abusers who want to quit smoking: implications for clinical treatment. *Drug Alcohol Depend*. 1999;54(3):259-65. doi:10.1016/s0376-8716(98)00180-x.
41. Fucito LM, Hanrahan TH. Heavy-drinking smokers' treatment needs and preferences: a mixed-methods study. *J Subst Abuse Treat*. 2015;59:38-44. doi:10.1016/j.jsat.2015.07.001.

42. Joseph A, Lexau B, Willenbring M, Nugent S, Nelson D. Factors associated with readiness to stop smoking among patients in treatment for alcohol use disorder. *Am J Addict.* 2004;13(4):405-17. doi:10.1080/10550490490483116.
43. Rohsenow DJ, Colby SM, Martin RA, Monti PM. Nicotine and other substance interaction expectancies questionnaire: relationship of expectancies to substance use. *Addict Behav.* 2005;30(4):629-41. doi:10.1016/j.addbeh.2005.01.001.
44. Syan SK, Belisario KL, Rahman L, et al. Smoking in substance use disorder patients: prevalence, comorbidities, impulsivity, and patterns of readiness to change. *Nicotine Tob Res.* 2025;27(10):1813-1822. doi:10.1093/ntr/ntaf089.
45. Goodwin RD, Wu M, Davidson L. An empirical perspective on cigarette use in substance use recovery. *Psychol Med.* 2021;51(14):2299-2306. doi:10.1017/s0033291721002300.
46. Hughes JR, Kalman D. Do smokers with alcohol problems have more difficulty quitting? *Drug Alcohol Depend.* 2006;82(2):91-102. doi:10.1016/j.drugalcdep.2005.08.018.
47. Substance Abuse and Mental Health Services Administration. You can quit - flyer for tobacco users. [cited 2026 Mar 27]. Available from: <https://library.samhsa.gov/sites/default/files/sma18-5069ycq.pdf>.
48. Substance Abuse and Mental Health Services Administration. Quitting tobacco - flyer for providers. [cited 2026 Mar 27]. Available from: <https://library.samhsa.gov/sites/default/files/sma18-5069qt.pdf>.
49. Substance Abuse and Mental Health Services Administration. Implementing tobacco cessation programs in substance use disorder treatment settings: a quick guide for program directors and clinicians. 2018 [cited 2026 Mar 27]. Available from: <https://library.samhsa.gov/sites/default/files/sma18-5069qg.pdf>.
50. Substance Abuse and Mental Health Services Administration. National Substance Use and Mental Health Services Survey (N-SUMHSS) 2024: Annual detailed tables. [cited 2026 Mar 27]. Available from: <https://www.samhsa.gov/data/sites/default/files/reports/rpt56703/2024-N-SUMHSS-Annual-Detailed-Tables.pdf>.
51. Kelly JF, Yeterian JD. The role of mutual-help groups in extending the framework of treatment. *Alcohol Res Health.* 2011;33(4):350-5.
52. Adams S. Psychopharmacology of tobacco and alcohol comorbidity: a review of current evidence. *Curr Addict Rep.* 2017;4(1):25-34. doi:10.1007/s40429-017-0129-z.
53. Burch JB, de Fiebre CM, Marks MJ, Collins AC. Chronic ethanol or nicotine treatment results in partial cross-tolerance between these agents. *Psychopharmacology (Berl).* 1988;95(4):452-8. doi:10.1007/BF00172954.
54. Collins AC, Romm E, Selvaag S, Turner S, Marks MJ. A comparison of the effects of chronic nicotine infusion on tolerance to nicotine and cross-tolerance to ethanol in long- and short-sleep mice. *J Pharmacol Exp Ther.* 1993;266(3):1390-7.
55. Collins AC, Wilkins LH, Slobe BS, Cao JZ, Bullock AE. Long-term ethanol and nicotine treatment elicit tolerance to ethanol. *Alcohol Clin Exp Res.* 1996;20(6):990-9. doi:10.1111/j.1530-0277.1996.tb01936.x.
56. de Fiebre CM, Marks MJ, Collins AC. Ethanol-nicotine interactions in long-sleep and short-sleep mice. *Alcohol.* 1990;7(3):249-57. doi:10.1016/0741-8329(90)90014-4.
57. Hendrickson LM, Gardner P, Tapper AR. Nicotinic acetylcholine receptors containing the alpha4 subunit are critical for the nicotine-induced reduction of acute voluntary ethanol consumption. *Channels (Austin).* 2011;5(2):124-7. doi:10.4161/chan.5.2.14409.
58. Chatterjee S, Bartlett S. Neuronal nicotinic acetylcholine receptors as pharmacotherapeutic targets for the treatment of alcohol use disorders. *CNSDDT.* 2010;9(1):60-76. doi:10.2174/187152710790966597.
59. Prendergast MA, Rogers DT, Barron S, Bardo MT, Littleton JM. Ethanol and nicotine: a pharmacologic balancing act? *Alcohol Clin Exp Res.* 2002;26(12):1917-8. doi:10.1097/01.ALC.0000040846.27378.80.
60. Benowitz NL. Pharmacology of nicotine: addiction, smoking-induced disease, and therapeutics. *Annu Rev Pharmacol Toxicol.* 2009;49:57-71. doi:10.1146/annurev.pharmtox.48.113006.094742.
61. Little HJ. Behavioral mechanisms underlying the link between smoking and drinking. *Alcohol Res Health.* 2000;24(4):215-24.
62. Verplaetse TL, McKee SA. An overview of alcohol and tobacco/nicotine interactions in the human laboratory. *Am J Drug Alcohol Abuse.* 2017;43(2):186-196. doi:10.1080/00952990.2016.1189927.
63. Drobos DJ. Concurrent alcohol and tobacco dependence: mechanisms and treatment. *Alcohol Res Health.* 2002;26(2):136.
64. Harrison EL, Hinson RE, McKee SA. Experimenting and daily smokers: episodic patterns of alcohol and cigarette use. *Addict Behav.* 2009;34(5):484-6. doi:10.1016/j.addbeh.2008.12.013.

65. Rose JE, Brauer LH, Behm FM, Cramblett M, Calkins K, Lawhon D. Psychopharmacological interactions between nicotine and ethanol. *Nicotine Tob Res.* 2004;6(1):133-44. doi:10.1080/14622200310001656957.
66. Mitchell SH, de Wit H, Zacny JP. Effects of varying ethanol dose on cigarette consumption in healthy normal volunteers. *Behav Pharmacol.* 1995;6(4):359-365.
67. Piasecki TM, Jahng S, Wood PK, et al. The subjective effects of alcohol-tobacco co-use: an ecological momentary assessment investigation. *J Abnorm Psychol.* 2011;120(3):557-71. doi:10.1037/a0023033.
68. Piasecki TM, McCarthy DE, Fiore MC, Baker TB. Alcohol consumption, smoking urge, and the reinforcing effects of cigarettes: an ecological study. *Psychol Addict Behav.* 2008;22(2):230-9. doi:10.1037/0893-164X.22.2.230.
69. Rose JE, Brauer LH, Behm FM, Cramblett M, Calkins K, Lawhon D. Potentiation of nicotine reward by alcohol. *Alcohol Clin Exp Res.* 2002;26(12):1930-1. doi:10.1097/01.ALC.0000040982.92057.52.
70. Barrett SP, Tichauer M, Leyton M, Pihl RO. Nicotine increases alcohol self-administration in non-dependent male smokers. *Drug Alcohol Depend.* 2006;81(2):197-204. doi:10.1016/j.drugalcdep.2005.06.009.
71. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR).* 2022.
72. Seo D, Sinha R. Neuroplasticity and predictors of alcohol recovery. *Alcohol Res.* 2015;37(1):143-52.
73. U.S. Department of Health and Human Services. *Facing addiction in America: the Surgeon General's report on alcohol, drugs, and health.* 2016 [cited 2026 Mar 27]. Available from: <https://www.hhs.gov/sites/default/files/facing-addiction-in-america-surgeon-generals-report.pdf>.
74. Kozak K, Lucatch AM, Lowe DJE, Balodis IM, MacKillop J, George TP. The neurobiology of impulsivity and substance use disorders: implications for treatment. *Ann N Y Acad Sci.* 2019;1451(1):71-91. doi:10.1111/nyas.13977.
75. Volkow ND, Blanco C. Substance use disorders: a comprehensive update of classification, epidemiology, neurobiology, clinical aspects, treatment and prevention. *World Psychiatry.* 2023;22(2):203-229. doi:10.1002/wps.21073.
76. McNally GP, Jean-Richard-Dit-Bressel P, Millan EZ, Lawrence AJ. Pathways to the persistence of drug use despite its adverse consequences. *Mol Psychiatry.* 2023;28(6):2228-2237. doi:10.1038/s41380-023-02040-z.
77. Hintz T, Mann K. Long-term behavior in treated alcoholism: evidence for beneficial carry-over effects of abstinence from smoking on alcohol use and vice versa. *Addict Behav.* 2007;32(12):3093-100. doi:10.1016/j.addbeh.2007.06.006.
78. Weinberger AH, Platt J, Jiang B, Goodwin RD. Cigarette smoking and risk of alcohol use relapse among adults in recovery from alcohol use disorders. *Alcohol Clin Exp Res.* 2015;39(10):1989-96. doi:10.1111/acer.12840.
79. Cook JW, Fucito LM, Piasecki TM, Piper ME, Schlam TR, Berg KM, Baker TB. Relations of alcohol consumption with smoking cessation milestones and tobacco dependence. *J Consult Clin Psychol.* 2012;80(6):1075-85. doi:10.1037/a0029931.
80. Dollar KM, Homish GG, Kozlowski LT, Leonard KE. Spousal and alcohol-related predictors of smoking cessation: a longitudinal study in a community sample of married couples. *Am J Public Health.* 2009;99(2):231-3. doi:10.2105/AJPH.2008.140459.
81. Kahler CW, Borland R, Hyland A, McKee SA, Thompson ME, Cummings KM. Alcohol consumption and quitting smoking in the International Tobacco Control (ITC) Four Country Survey. *Drug Alcohol Depend.* 2009;100(3):214-20. doi:10.1016/j.drugalcdep.2008.10.006.
82. Leeman RF, McKee SA, Toll BA, Krishnan-Sarin S, Cooney JL, Makuch RW, O'Malley SS. Risk factors for treatment failure in smokers: relationship to alcohol use and to lifetime history of an alcohol use disorder. *Nicotine Tob Res.* 2008;10(12):1793-809. doi:10.1080/14622200802443742.
83. Toll BA, Martino S, O'Malley SS, et al. A randomized trial for hazardous drinking and smoking cessation for callers to a quitline. *J Consult Clin Psychol.* 2015;83(3):445-54. doi:10.1037/a0038183.
84. Kahler CW, Spillane NS, Metrik J. Alcohol use and initial smoking lapses among heavy drinkers in smoking cessation treatment. *Nicotine Tob Res.* 2010;12(7):781-5. doi:10.1093/ntr/ntq083.
85. Cooney NL, Litt MD, Cooney JL, Pilkey DT, Steinberg HR, Oncken CA. Alcohol and tobacco cessation in alcohol-dependent smokers: analysis of real-time reports. *Psychol Addict Behav.* 2007;21(3):277-86. doi:10.1037/0893-164x.21.3.277.
86. Cooney NL, Litt MD, Sevarino KA, Levy L, Kranitz LS, Sackler H, Cooney JL. Concurrent alcohol and tobacco treatment: Effect on daily process measures of alcohol relapse risk. *J Consult Clin Psychol.* 2015;83(2):346-58. doi:10.1037/a0038633.

87. Dawson DA, Goldstein RB, Grant BF. Rates and correlates of relapse among individuals in remission from DSM-IV alcohol dependence: a 3-year follow-up. *Alcohol Clin Exp Res*. 2007;31(12):2036-45. doi:10.1111/j.1530-0277.2007.00536.x.
88. Friend KB, Pagano ME. Smoking cessation and alcohol consumption in individuals in treatment for alcohol use disorders. *J Addict Dis*. 2005;24(2):61-75. doi:10.1300/J069v24n02_06.
89. Reus VI, Fochtmann LJ, Bukstein O, et al. The American Psychiatric Association practice guideline for the pharmacological treatment of patients with alcohol use disorder. *Am J Psychiatry*. 2018;175(1):86-90. doi:10.1176/appi.ajp.2017.1750101.
90. Department of Veterans Affairs and Department of Defense. VA/DoD clinical practice guideline for the management of substance use disorders. [cited 2026 Mar 27]. Available from: https://www.healthquality.va.gov/guidelines/MH/sud/VA-DoD-SUD-CPG_Final_for-508_v3.pdf.
91. Substance Abuse and Mental Health Services Administration. Medication for the treatment of alcohol use disorder: a brief guide. [cited 2026 Mar 27]. Available from: <https://library.samhsa.gov/product/medication-treatment-alcohol-use-disorder-brief-guide/sma15-4907>.
92. U.S. Preventive Services Task Force. Unhealthy alcohol use in adolescents and adults: screening and behavioral counseling interventions. [cited 2026 Mar 27]. Available from: <https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/unhealthy-alcohol-use-in-adolescents-and-adults-screening-and-behavioral-counseling-interventions>.
93. American Society of Addiction Medicine. Integrating tobacco use disorder interventions in addiction treatment. [cited 2026 Mar 27]. Available from: <https://sitefinitystorage.blob.core.windows.net/sitefinity-production-blobs/docs/default-source/guidelines/tobacco-guide.pdf>.
94. Shields PG, Bierut L, Arenberg D, et al. Smoking cessation, version 3.2022, NCCN clinical practice guidelines in oncology. *J Natl Compr Canc Netw*. 2023;21(3):297-322. doi:10.6004/jnccn.2023.0013.
95. U.S. Preventive Services Task Force. Tobacco smoking cessation in adults, including pregnant persons: interventions. [cited 2026 Mar 27]. Available from: <https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/tobacco-use-in-adults-and-pregnant-women-counseling-and-interventions>.
96. McCambridge J, Jenkins RJ. Do brief interventions which target alcohol consumption also reduce cigarette smoking? Systematic review and meta-analysis. *Drug Alcohol Depend*. 2008;96(3):263-70.
97. Cooney NL, Perry BL, Carbone M, et al. Smoking cessation during alcohol treatment: a randomized trial of combination nicotine patch plus nicotine gum. *Addiction*. 2009;104(9). doi:10.1111/j.1360-0443.2009.02624.x.
98. King A, Vena A, de Wit H, Grant JE, Cao D. Effect of combination treatment with varenicline and nicotine patch on smoking cessation among smokers who drink heavily: a randomized clinical trial. *JAMA Netw Open*. 2022;5(3):e220951. doi:10.1001/jamanetworkopen.2022.0951.
99. Litten RZ, Ryan ML, Fertig JB, et al. A double-blind, placebo-controlled trial assessing the efficacy of varenicline tartrate for alcohol dependence. *J Addict Med*. 2013;7(4):277-86. doi:10.1097/ADM.0b013e31829623f4.
100. O'Malley SS, Zweben A, Fucito LM, et al. Effect of varenicline combined with medical management on alcohol use disorder with comorbid cigarette smoking: a randomized clinical trial. *JAMA Psychiatry*. 2018;75(2):129-138. doi:10.1001/jamapsychiatry.2017.3544.
101. Grant KM, Kelley SS, Smith LM, Agrawal S, Meyer JR, Romberger DJ. Bupropion and nicotine patch as smoking cessation aids in alcoholics. *Alcohol*. 2007;41(5):381-91. doi:10.1016/j.alcohol.2007.03.011.
102. Hays JT, Decker PA, Croghan IT, Offord KP, Patten CA. A randomized, controlled trial of bupropion sustained-release for preventing tobacco relapse in recovering alcoholics. *Nicotine Tob Res*. 2009;11(7). doi:10.1093/ntr/ntp077.
103. Fridberg DJ, Cao D, Grant JE, King AC. Naltrexone improves quit rates, attenuates smoking urge, and reduces alcohol use in heavy drinking smokers attempting to quit smoking. *Alcohol Clin Exp Res*. 2014;38(10):2622-9. doi:10.1111/acer.12513.
104. King A, Cao D, Vanier C, Wilcox T. Naltrexone decreases heavy drinking rates in smoking cessation treatment: an exploratory study. *Alcohol Clin Exp Res*. 2009;33(6):1044-50. doi:10.1111/j.1530-0277.2009.00925.x.
105. King A, Cao D, Zhang L, Rueger SY. Effects of the opioid receptor antagonist naltrexone on smoking and related behaviors in smokers preparing to quit: a randomized controlled trial. *Addiction*. 2013;108(10):1836-44. doi:10.1111/add.12261.

106. Ray LA, Green R, Enders C, et al. Efficacy of combining varenicline and naltrexone for smoking cessation and drinking reduction: a randomized clinical trial. *Am J Psychiatry*. 2021;178(9):818-828. doi:10.1176/appi.ajp.2020.20070993.
107. Ray LA, Courtney KE, Ghahremani DG, Miotto K, Brody A, London ED. Varenicline, low dose naltrexone, and their combination for heavy-drinking smokers: human laboratory findings. *Psychopharmacology (Berl)*. 2014;231(19):3843-53. doi:10.1007/s00213-014-3519-0.
108. Roberts W, Shi JM, Tetrault JM, McKee SA. Effects of varenicline alone and in combination with low-dose naltrexone on alcohol-primed smoking in heavy-drinking tobacco users: a preliminary laboratory study. *J Addict Med*. 2018;12(3):227-233. doi:10.1097/adm.0000000000000392.
109. Pfizer Inc. Cease the sale of NICOTROL® Inhaler (nicotine inhalation system) once inventory is exhausted. [cited 2026 Mar 27]. Available from: https://cdn.pfizer.com/pfizercom/DHCP_Letter_Nicotrol_Inhaler_5.30.2023.pdf.
110. Hays JT, Ebbert JO. Varenicline for tobacco dependence. *N Engl J Med*. 2008;359(19):2018-24. doi:10.1056/NEJMct0800146.
111. Nides M, Oncken C, Gonzales D, Rennard S, Watsky EJ, Anziano R, Reeves KR. Smoking cessation with varenicline, a selective alpha4beta2 nicotinic receptor partial agonist: results from a 7-week, randomized, placebo- and bupropion-controlled trial with 1-year follow-up. *Arch Intern Med*. 2006;166(15):1561-8. doi:10.1001/archinte.166.15.1561.
112. Williams KE, Reeves KR, Billing CB, Jr., Pennington AM, Gong J. A double-blind study evaluating the long-term safety of varenicline for smoking cessation. *Curr Med Res Opin*. 2007;23(4):793-801. doi:10.1185/030079907x182185.
113. Fucito LM, Toll BA, Wu R, Romano DM, Tek E, O'Malley SS. A preliminary investigation of varenicline for heavy drinking smokers. *Psychopharmacology (Berl)*. 2011;215(4):655-63. doi:10.1007/s00213-010-2160-9.
114. McKee SA, Harrison EL, O'Malley SS, et al. Varenicline reduces alcohol self-administration in heavy-drinking smokers. *Biol Psychiatry*. 2009;66(2):185-90. doi:10.1016/j.biopsych.2009.01.029.
115. Phimarn W, Sakhancord R, Paitoon P, Saramunee K, Sunghong B. Efficacy of varenicline in the treatment of alcohol dependence: an updated meta-analysis and meta-regression. *Int J Environ Res Public Health*. 2023;20(5). doi:10.3390/ijerph20054091.
116. Bito-Onon JJ, Simms JA, Chatterjee S, Holgate J, Bartlett SE. Varenicline, a partial agonist at neuronal nicotinic acetylcholine receptors, reduces nicotine-induced increases in 20% ethanol operant self-administration in Sprague-Dawley rats. *Addict Biol*. 2011;16(3):440-9. doi:10.1111/j.1369-1600.2010.00309.x.
117. Ericson M, Lof E, Stomberg R, Soderpalm B. The smoking cessation medication varenicline attenuates alcohol and nicotine interactions in the rat mesolimbic dopamine system. *J Pharmacol Exp Ther*. 2009;329(1):225-30. doi:10.1124/jpet.108.147058.
118. Wouda JA, Riga D, De Vries W, et al. Varenicline attenuates cue-induced relapse to alcohol, but not nicotine seeking, while reducing inhibitory response control. *Psychopharmacology (Berl)*. 2011;216(2):267-77. doi:10.1007/s00213-011-2213-8.
119. Lacroix F, Pettorelli A, Maddux JN, Heidari-Jam A, Chaudhri N. Varenicline reduces context-induced relapse to alcohol-seeking through actions in the nucleus accumbens. *Neuropsychopharmacology*. 2017;42(5):1037-1048. doi:10.1038/npp.2016.254.
120. Hendrickson LM, Zhao-Shea R, Pang X, Gardner PD, Tapper AR. Activation of alpha4* nAChRs is necessary and sufficient for varenicline-induced reduction of alcohol consumption. *J Neurosci*. 2010;30(30):10169-76. doi:10.1523/JNEUROSCI.2601-10.2010.
121. Guo K, Li J, Li J, Chen N, Li Y, Yang K, Li X. The effects of pharmacological interventions on smoking cessation in people with alcohol dependence: a systematic review and meta-analysis of nine randomized controlled trials. *Int J Clin Pract*. 2021;75(11):e14594. doi:10.1111/ijcp.14594.
122. Food and Drug Administration. FDA Drug Safety Communication: FDA updates label for stop smoking drug Chantix (varenicline) to include potential alcohol interaction, rare risk of seizures, and studies of side effects on mood, behavior, or thinking [Internet]. [cited 2026 Mar 27]. Available from: <https://web.archive.org/web/20251128060035/https://www.fda.gov/drugs/drug-safety-and-availability/fda-drug-safety-communication-fda-updates-label-stop-smoking-drug-chantix-varenicline-include>.
123. Huecker MR, Smiley A, Saadabadi A. Bupropion. StatPearls Publishing. [cited 2026 Mar 27]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK470212/>.

124. Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Treatment. Incorporating alcohol pharmacotherapies into medical practice. Chapter 4 - Oral Naltrexone. [cited 2026 Mar 27]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK64042/>.
125. Substance Abuse and Mental Health Services Administration. Naltrexone. [cited 2026 Mar 27]. Available from: <https://www.samhsa.gov/medications-substance-use-disorders/medications-counseling-related-conditions/naltrexone>.
126. Fucito LM, Park A, Gulliver SB, Mattson ME, Gueorguieva RV, O'Malley SS. Cigarette smoking predicts differential benefit from naltrexone for alcohol dependence. *Biol Psychiatry*. 2012;72(10):832-8. doi:10.1016/j.biopsych.2012.03.023.
127. Anton RF, Latham PK, Voronin KE, Randall PK, Book SW, Hoffman M, Schacht JP. Nicotine-use/smoking is associated with the efficacy of naltrexone in the treatment of alcohol dependence. *Alcohol Clin Exp Res*. 2018;42(4):751-760. doi:10.1111/acer.13601.
128. David SP, Lancaster T, Stead LF, Evins AE, Prochaska JJ. Opioid antagonists for smoking cessation. *Cochrane Database Syst Rev*. 2013;6(6). doi:10.1002/14651858.CD003086.pub3.
129. O'Malley SS, Robin RW, Levenson AL, et al. Naltrexone alone and with sertraline for the treatment of alcohol dependence in Alaska natives and non-natives residing in rural settings: a randomized controlled trial. *Alcohol Clin Exp Res*. 2008;32(7):1271-83. doi:10.1111/j.1530-0277.2008.00682.x.
130. Green R, Bujarski S, Lim AC, Venegas A, Ray LA. Naltrexone and alcohol effects on craving for cigarettes in heavy drinking smokers. *Exp Clin Psychopharmacol*. 2019;27(3):257-264. doi:10.1037/pha0000252.
131. Ray LA, Miranda R, Jr., Kahler CW, Leventhal AM, Monti PM, Swift R, Hutchison KE. Pharmacological effects of naltrexone and intravenous alcohol on craving for cigarettes among light smokers: a pilot study. *Psychopharmacology (Berl)*. 2007;193(4):449-56. doi:10.1007/s00213-007-0794-z.
132. King AC, Cao D, O'Malley SS, et al. Effects of naltrexone on smoking cessation outcomes and weight gain in nicotine-dependent men and women. *J Clin Psychopharmacol*. 2012;32(5):630-6. doi:10.1097/JCP.0b013e3182676956.
133. Byars JA, Frost-Pineda K, Jacobs WS, Gold MS. Naltrexone augments the effects of nicotine replacement therapy in female smokers. *J Addict Dis*. 2005;24(2):49-60. doi:10.1300/J069v24n02_05.
134. King A, de Wit H, Riley RC, Cao D, Niaura R, Hatsukami D. Efficacy of naltrexone in smoking cessation: a preliminary study and an examination of sex differences. *Nicotine Tob Res*. 2006;8(5):671-82. doi:10.1080/14622200600789767.
135. Rohsenow DJ, Monti PM, Colby SM, Gulliver SB, Swift RM, Abrams DB. Naltrexone treatment for alcoholics: effect on cigarette smoking rates. *Nicotine Tob Res*. 2003;5(2):231-6. doi:10.1080/1462220031000073298.
136. Karnieg T, Wang X. Cytisine for smoking cessation. *CMAJ*. 2018;190(19):E596. doi:10.1503/cmaj.171371.
137. Puljević C, Stjepanović D, Meciar I, et al. Systematic review and meta-analyses of cytisine to support tobacco cessation. *Addiction*. 2024;119(10):1713-25. doi:10.1111/add.16592.
138. Tutka P, Vinnikov D, Courtney RJ, Benowitz NL. Cytisine for nicotine addiction treatment: a review of pharmacology, therapeutics and an update of clinical trial evidence for smoking cessation. *Addiction*. 2019;114(11):1951-1969. doi:10.1111/add.14721.
139. Prochaska J, Rubinstein M, Perdok R, Blumenstein B, Jacobs C. Cytisinicline for smoking cessation in individuals with self-reported COPD: a post hoc analysis of the ORCA-2 and ORCA-3 trials. *Thorax*. 2026;81(2):164-169. doi:10.1136/thorax-2025-223880.
140. Rigotti NA, Benowitz NL, Prochaska JJ, et al. Cytisinicline for smoking cessation: The ORCA Phase 3 replication randomized clinical trial. *JAMA Intern Med*. 2025;185(6):648-655. doi:10.1001/jamainternmed.2025.0628.
141. Rigotti NA, Kruse GR, Livingstone-Banks J, Hartmann-Boyce J. Treatment of tobacco smoking: a review. *JAMA*. 2022;327(6):566-577. doi:10.1001/jama.2022.0395.
142. Achieve Life Sciences. Achieve Life Sciences meets key milestones advancing Cytisinicline NDA for smoking cessation [Internet]. [cited 2026 Mar 27] Available from: <https://achieve Lifesciences.com/achieve-meets-key-milestones-advancing-cytisinicline-nda-for-smoking-cessation>.
143. Achieve Life Sciences. Achieve Life Sciences announces submission of NDA to FDA for Cytisinicline as a treatment of nicotine dependence for smoking cessation [Internet]. [cited 2026 Mar 27]. Available from: <https://ir.achieve Lifesciences.com/news-events/press-releases/detail/229/achieve-life-sciences-announces-submission-of-ndato-fda-for-cytisinicline-as-a-treatment-of-nicotine-dependence-for-smoking-cessation>.

144. Tindle HA, Freiberg MS, Cheng DM, et al. Effectiveness of varenicline and cytisine for alcohol use reduction among people with HIV and substance use: a randomized clinical trial. *JAMA Netw Open*. 2022;1;5(8):e2225129.
145. Ames SC, Pokorny SB, Schroeder DR, Tan W, Werch CE. Integrated smoking cessation and binge drinking intervention for young adults: a pilot efficacy trial. *Addict Behav*. 2014;39(5):848-53. doi:10.1016/j.addbeh.2014.02.001.
146. Ames SC, Werch CE, Ames GE, Lange LJ, Schroeder DR, Hanson AC, Patten CA. Integrated smoking cessation and binge drinking intervention for young adults: a pilot investigation. *Ann Behav Med*. 2010;40(3):343-9. doi:10.1007/s12160-010-9222-4.
147. Carmody TP, Delucchi K, Duncan CL, et al. Intensive intervention for alcohol-dependent smokers in early recovery: a randomized trial. *Drug Alcohol Depend*. 2012;122(3):186-94. doi:10.1016/j.drugalcdep.2011.09.026.
148. Cooney JL, Cooper S, Grant C, Sevarino K, Krishnan-Sarin S, Gutierrez IA, Cooney NL. A randomized trial of contingency management for smoking cessation during intensive outpatient alcohol treatment. *J Subst Abuse Treat*. 2017;72:89-96. doi:10.1016/j.jsat.2016.07.002.
149. Cooney NL, Litt MD, Cooney JL, Pilkey DT, Steinberg HR, Oncken CA. Concurrent brief versus intensive smoking intervention during alcohol dependence treatment. *Psychol Addict Behav*. 2007;21(4):570-5. doi:10.1037/0893-164x.21.4.570.
150. Correa-Fernández V, Díaz-Toro EC, Reitzel LR, et al. Combined treatment for at-risk drinking and smoking cessation among Puerto Ricans: a randomized clinical trial. *Addict Behav*. 2017;65:185-192. doi:10.1016/j.addbeh.2016.10.009.
151. Das S, Hickman NJ, Prochaska JJ. Treating smoking in adults with co-occurring acute psychiatric and addictive disorders. *J Addict Med*. 2017;11(4):273-279. doi:10.1097/adm.0000000000000320.
152. Fridberg DJ, Cao D, King AC. Integrating alcohol response feedback in a brief intervention for young adult heavy drinkers who smoke: a pilot study. *Drug Alcohol Depend*. 2015;155:293-7. doi:10.1016/j.drugalcdep.2015.08.017.
153. Fucito LM, Wu R, O'Malley SS, et al. An integrated behavioural intervention combined with varenicline for heavy-drinking smokers: a randomized pilot study. *J Smok Cessat*. 2020;15(3):119-127. doi:10.1017/jsc.2020.13.
154. Grant KM, Northrup JH, Agrawal S, Olsen DM, McIvor C, Romberger DJ. Smoking cessation in outpatient alcohol treatment. *Addict Disord Their Treat*. 2003;2(2):41-46.
155. Joseph AM, Willenbring ML, Nugent SM, Nelson DB. A randomized trial of concurrent versus delayed smoking intervention for patients in alcohol dependence treatment. *J Stud Alcohol*. 2004;65(6):681-91. doi:10.15288/jsa.2004.65.681.
156. Kahler CW, Cohn AM, Costantino C, Toll BA, Spillane NS, Graham AL. A digital smoking cessation program for heavy drinkers: pilot randomized controlled trial. *JMIR Form Res*. 2020;4(6):e7570. doi:10.2196/formative.7570.
157. Kahler CW, Metrik J, LaChance HR, Ramsey SE, Abrams DB, Monti PM, Brown RA. Addressing heavy drinking in smoking cessation treatment: a randomized clinical trial. *J Consult Clin Psychol*. 2008;76(5):852-62. doi:10.1037/a0012717.
158. Meacham MC, Ramo DE, Prochaska JJ, Maier LJ, Delucchi KL, Kaur M, Satre DD. A Facebook intervention to address cigarette smoking and heavy episodic drinking: a pilot randomized controlled trial. *J Subst Abuse Treat*. 2021;122:108211. doi:10.1016/j.jsat.2020.108211.
159. Mueller SE, Petitjean SA, Wiesbeck GA. Cognitive behavioral smoking cessation during alcohol detoxification treatment: a randomized, controlled trial. *Drug Alcohol Depend*. 2012;126(3):279-85. doi:10.1016/j.drugalcdep.2012.05.026.
160. Nieva G, Ortega LL, Mondon S, Ballbè M, Gual A. Simultaneous versus delayed treatment of tobacco dependence in alcohol-dependent outpatients. *Eur Addict Res*. 2011;17(1):1-9. doi:10.1159/000321256.
161. Pengpid S, Peltzer K, Puckpinyo A, et al. Screening and concurrent brief intervention of conjoint hazardous or harmful alcohol and tobacco use in hospital out-patients in Thailand: a randomized controlled trial. *Subst Abuse Treat Prev Policy*. 2015;10:22. doi:10.1186/s13011-015-0018-1.
162. Rohsenow DJ, Martin RA, Monti PM, et al. Motivational interviewing versus brief advice for cigarette smokers in residential alcohol treatment. *J Subst Abuse Treat*. 2014;46(3):346-55. doi:10.1016/j.jsat.2013.10.002.

163. U.S. Department of Health and Human Services. *Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2012.
164. U.S. Department of Health and Human Services. *E-Cigarette Use Among Youth and Young Adults. A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2016.
165. National Institute on Alcohol Abuse and Alcoholism. Alcohol and the adolescent brain [Internet]. [cited 2026 Mar 27]. Available from: <https://www.niaaa.nih.gov/publications/alcohol-and-adolescent-brain>.
166. Griffin EA Jr, Melas PA, Zhou R, et al. Prior alcohol use enhances vulnerability to compulsive cocaine self-administration by promoting degradation of HDAC4 and HDAC5. *Sci Adv*. 2017 Nov 1;3(11):e1701682. doi: 10.1126/sciadv.1701682.
167. Hennessy EA, Tanner-Smith EE, Steinka-Fry KT. Do brief alcohol interventions reduce tobacco use among adolescents and young adults? A systematic review and meta-analysis. *J Behav Med*. 2015;38(6):899-911. doi:10.1007/s10865-015-9653-2.
168. Myers MG, Prochaska JJ. Does smoking intervention influence adolescent substance use disorder treatment outcomes? *Subst Abus*. 2008;29(2):81-8. doi:10.1080/08897070802093361.
169. Jaszyna-Gasior M, Schroeder JR, Moolchan ET. Alcohol use and tobacco abstinence among adolescents in cessation treatment: preliminary findings. *Addict Behav*. 2007;32(3):617-21. doi:10.1016/j.addbeh.2006.05.009.
170. Pedersen ER, Linnemayr S, Shadel WG, Zutshi R, DeYoreo M, Cabrerros I, et al. Substance use and mental health outcomes from a text messaging-based intervention for smoking cessation among young people experiencing homelessness. *Nicotine Tob Res*. 2022;24(1):130-134. doi:10.1093/ntr/ntab160.
171. Haug S, Paz Castro R, Kowatsch T, Filler A, Schaub MP. Efficacy of a technology-based, integrated smoking cessation and alcohol intervention for smoking cessation in adolescents: results of a cluster-randomised controlled trial. *J Subst Abuse Treat*. 2017;82:55-66. doi:10.1016/j.jsat.2017.09.008.
172. Evers KE, Paiva AL, Johnson JL, et al. Results of a transtheoretical model-based alcohol, tobacco and other drug intervention in middle schools. *Addict Behav*. 2012;37(9):1009-18. doi:10.1016/j.addbeh.2012.04.008.
173. Russell MA, Coatsworth JD, Brown A, Zaharakis N, Mennis J, Rodriguez GC, Mason MJ. Peer network counseling effects on substance use: an individual participant data meta-analysis integrating three randomized controlled trials. *Prev Sci*. 2023;24(8):1510-1522. doi:10.1007/s11121-022-01468-z.
174. Food and Drug Administration. Results from the Annual National Youth Tobacco Survey. [cited 2026 Mar 27]. Available from: <https://www.fda.gov/tobacco-products/youth-and-tobacco/results-annual-national-youth-tobacco-survey-nyts#2024%20Findings%20on%20Youth%20Use%20for%20E-Cigarette%20Products>.
175. Dermody S. Risk of polysubstance use among sexual minority and heterosexual youth. *Drug Alcohol Depend*. 2018;192:38-44. doi:10.1016/j.drugalcdep.2018.07.030.
176. U.S. National Cancer Institute. *Treating Smoking in Cancer Patients: An Essential Component of Cancer Care*. National Cancer Institute Tobacco Control Monograph 23. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; 2022.
177. Druesne-Pecollo N, Keita Y, Touvier M, Chan DS, Norat T, Hercberg S, Latino-Martel P. Alcohol drinking and second primary cancer risk in patients with upper aerodigestive tract cancers: a systematic review and meta-analysis of observational studies. *Cancer Epidemiol Biomarkers Prev*. 2014;23(2):324-31. doi:10.1158/1055-9965.Epi-13-0779.
178. Lemieux J, Diorio C, Côté MA, et al. Alcohol and HER2 polymorphisms as risk factor for cardiotoxicity in breast cancer treated with trastuzumab. *Anticancer Res*. 2013;33(6):2569-76.
179. Schwedhelm C, Boeing H, Hoffmann G, Aleksandrova K, Schwingshackl L. Effect of diet on mortality and cancer recurrence among cancer survivors: a systematic review and meta-analysis of cohort studies. *Nutr Rev*. 2016;74(12):737-748. doi:10.1093/nutrit/nuw045.
180. van Kooten RT, Voeten DM, Steyerberg EW, et al. Patient-related prognostic factors for anastomotic leakage, major complications, and short-term mortality following esophagectomy for cancer: a systematic review and meta-analyses. *Ann Surg Oncol*. 2022;29(2):1358-1373. doi:10.1245/s10434-021-10734-3.

181. Karam-Hage M, Minnix J, Cinciripini PM. Treatment of alcohol use and smoking for cancer survivors. UpToDate. Available from: <https://www.uptodate.com/contents/treatment-of-alcohol-use-and-smoking-for-cancer-survivors>.
182. Volkow ND, Xu R. GLP-1R agonist medications for addiction treatment. *Addiction*. 2024. doi:10.1111/add.16626.
183. Cohn A, Brandon T, Armeli S, Ehlke S, Bowers M. Real-time patterns of smoking and alcohol use: an observational study protocol of risky-drinking smokers. *BMJ Open*. 2015;5(1):e007046. doi:10.1136/bmjopen-2014-007046.

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