

## **Appendix 14.4**

### **Treatment for Tobacco Use and Dependence**

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## Treatment for Tobacco Use and Dependence

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Substantial epidemiologic evidence, summarized in this and prior Surgeon General's reports, demonstrates that stopping tobacco use benefits smokers, regardless of duration or intensity of their smoking, degree of illness, or age at quitting (U.S. Department of Health and Human Services [USDHHS] 1990; Fiore et al. 2008). Stopping tobacco use before 40 years of age offers the greatest benefit to a smoker, reducing smoking attributable death by 90% (Jha et al. 2013), but stopping smoking has benefits even for smokers who quit later in life or after they develop a chronic disease such as cardiovascular disease (USDHHS 1990, 2004; Doll et al. 2004, Critchley and Capewell 2003).

### Tobacco Use as a Chronic Condition

Surveys of U.S. adults consistently document that most smokers want to quit smoking and try to do so (CDC 2011a). In 2010, 69% of U.S. smokers indicated a desire to quit smoking, and 52% had tried to quit in the past 12 months (see Chapter 13, "Patterns of Tobacco Use Among U.S. Youth, Young Adults, and Adults"). However, far too few have been successful in quitting (about 4–6% of the smoking population as a whole succeed annually) (Burns et al. 2000; CDC 2011a). On any given attempt to quit, few seek formal behavioral and pharmacologic aid in quitting, and most quit attempts fail (Shiffman et al. 2008; CDC 2011a). After an unaided quit attempt, about one-half of smokers return to smoking within the first week (Hughes et al. 2004). However, since 2002 there have been more former smokers than current smokers in the U.S. population, providing evidence to support the contention that many smokers who keep trying to quit eventually succeed (CDC 2004, 2009, 2011b).

The relapsing pattern of tobacco use among smokers who try to quit led to the characterization of tobacco use or dependence as a chronic condition or chronic disease. In 2000, the Surgeon General's report, *Reducing Tobacco Use*, concluded that "Tobacco dependence is best viewed as a chronic disease with remission and relapse. Even though both minimal and intensive interventions increase smoking cessation, most people who quit smoking with the aid of such interventions will eventually relapse and may require repeated attempts before achieving long-term abstinence" (USDHHS 2000, p. 22). The U.S. Public Health Service (PHS) Clinical Practice Guidelines have

consistently framed tobacco use in the same terms, stating in the 2008 update, "Tobacco dependence is a chronic disease that often requires repeated intervention and multiple attempts to quit" (Fiore et al. 2008).

### 2000 Surgeon General's Report

Evidence of the efficacy of clinical approaches to promote tobacco use cessation is extensive and convincing. The evidence base has been comprehensively reviewed in past peer-reviewed reports released by USDHHS, including the 2000 Surgeon General's report. That report (Chapter 4, Management of Nicotine Addiction) reached these conclusions about treatment efficacy:

"Programs using advice and counseling—whether minimal or more intensive—have helped a substantial proportion of people quit smoking. The success of counseling and advice increases with the intensity of the program and may be improved by increasing the frequency and duration of contact.

"The evidence is strong and consistent that pharmacologic treatments for smoking cessation (nicotine replacement therapies and bupropion, in particular) can help people quit smoking." [USDHHS 2000, p. 22]

### U.S. Public Health Service Clinical Practice Guideline

The PHS Clinical Practice Guideline panels have conducted systematic reviews of the evidence about the efficacy of clinical interventions for tobacco use and dependence. The panels conducted meta-analyses to summarize the results of randomized controlled trials with at least 6 months of follow-up data and used this evidence to reach conclusions and make recommendations. The most recent complete systematic review, released in 2000, was supplemented by an update on targeted topics, released in 2008 (Fiore et al. 2008). The 2008 report included these conclusions about the efficacy of tobacco dependence treatment:

- Tobacco dependence is a chronic disease that often requires repeated intervention and multiple attempts to quit. Effective treatments exist, however, that can significantly increase rates of long-term abstinence.
- Brief tobacco dependence treatment is effective. . . Individual, group, and telephone counseling are effective, and their effectiveness increases with treatment intensity. . . Telephone quit line counseling is effective with diverse populations and has broad reach.
- Seven first-line medications (5 nicotine and 2 non-nicotine) reliably increase long-term smoking abstinence rates: bupropion SR, nicotine gum, nicotine inhaler, nicotine lozenge, nicotine nasal spray, nicotine patch, and varenicline.
- 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.

In addition to identifying effective treatments, PHS Guidelines made specific recommendations to clinicians and called on health care systems, insurers, and purchasers to assist clinicians in making effective treatments available to all smokers. The Guidelines included these recommendations to clinicians and health care delivery systems:

- 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.
- Clinicians should offer every patient who uses tobacco at least the brief treatments shown to be effective . . . Clinicians should encourage every patient willing to make a quit attempt to use the counseling treatments and medications recommended . . . Clinicians should encourage [medication] use by all patients attempting to quit smoking—except when medically contraindicated or with specific populations for which there is insufficient evidence of effectiveness. . .
- Both clinicians and health care delivery systems should ensure patient access to quit lines and promote quit line use.

- Tobacco dependence treatments are both clinically effective and highly cost-effective relative to interventions for other clinical disorders. Providing coverage for these treatments increases quit rates. Insurers and purchasers should ensure that all insurance plans include the counseling and medication identified as effective . . . as covered benefits (Fiore et al. 2008, pp.vii–viii).

## Cochrane Collaboration's Database of Systematic Reviews

The Cochrane Collaboration is an independent, non-profit international network that aims to produce high-quality, timely research evidence to inform decisions on questions of human health. It is an additional authoritative source for reviews about tobacco dependence treatment and prevention. The Cochrane Collaboration's Tobacco Addiction Group (2012), headquartered in the United Kingdom, has generated a set of careful systematic reviews of the evidence about a range of tobacco dependence treatment methods. Where possible, its authors use meta-analyses of the evidence from randomized controlled trials with at least 6 months of follow-up. Unlike documents released by HHS, these systematic reviews are updated on a regular schedule. In general, the PHS and Cochrane reviews have reached similar conclusions about treatment efficacy (although PHS reports odds ratios and Cochrane reports risk ratios, as shown in Table 14.4.1).

## Overview of Clinical Treatments

Proven treatment methods fall into two major categories: behavioral support (counseling) and pharmacotherapy (Fiore et al. 2008). Each of these treatments is effective by itself, but combining behavioral support and pharmacotherapy enhances successful cessation, because the treatments are complementary. Although brief interventions of only a few minutes are effective, there is a clear dose-response, whereby more intensive treatment (multiple sessions up to approximately 1.5 hours total per quit attempt) results in greater success rates (Fiore et al. 2008). Behavioral support augments motivation and confidence to quit smoking, and builds coping and other practical skills for quitting; while pharmacotherapy alleviates the withdrawal symptoms that result from nicotine dependence. Adding behavioral support to pharmacotherapy

enhances the quit rates produced by medication only, with some evidence of higher quit rates with greater intensity of treatment (Stead and Lancaster 2012). Adding medication to behavioral support produces higher quit rates than behavioral support alone; this is the study design of most trials testing the efficacy of pharmacotherapy for smoking cessation.

Most clinical interventions are designed for use by smokers who are ready to make a quit attempt. There is far less evidence regarding methods that can help smokers who are not ready to quit by encouraging them to make a quit attempt. The traditional paradigm for treatment is to advise an individual to stop smoking abruptly, usually after a period of preparation lasting less than 1 month. However, this paradigm has been challenged by observations that many former smokers report successful quitting by a gradual reduction in smoking (Fidler et al. 2011). Furthermore, at any one time, only a minority of smokers report being ready to quit in the next month, though many report wanting to quit in the future (Fidler et al. 2011). Some smokers express interest in reducing their tobacco use in preparation for future quitting. A growing body of evidence has compared the strategy of reducing daily cigarette use prior to quitting, with quitting abruptly without prior reduction. Data from published and unpublished studies of smoking reduction have demonstrated the feasibility of this strategy (Hughes and Carpenter 2005) and a qualitative review of 19 studies of smoking reduction and subsequent cessation found no evidence that smoking reduction undermined future cessation (Hughes and Carpenter 2006). A more recent meta-analysis concluded that abrupt cessation and smoking reduction produced comparable quit rates, and suggested that individuals could be offered the choice of strategies to quit (Lindson et al. 2010). Reduce-to-quit interventions tested have included different combinations of self-help programs, behavioral pharmacotherapy (primarily support, and NRT [nicotine replacement therapy]) started prior to the quit date, and additional research is needed to determine which of these strategies is most efficacious (Lindson et al. 2010).

## **Counseling and Behavioral Support**

For smokers who are ready to quit, cognitive-behavioral therapy (CBT) improves the success rate of a quit attempt (Fiore et al. 2008). CBT programs boost motivation to quit smoking, augment social support, and guide

smokers to learn to identify and manage their nicotine withdrawal symptoms, including craving, as well as high-risk situations in which they may be tempted to smoke. CBT is effective at helping smokers counteract what Russell (1971) originally described as the “Habitual repetition of the smoking act [that] may be triggered off by a variety of internal and external cues” (p. 6). The PHS Clinical Guideline highlighted two components of counseling as particularly effective and recommended them to clinicians who are counseling patients to make a quit attempt: “(1) Practical counseling (problem solving/skills training), and (2) Social support delivered as part of treatment” (Fiore et al. 2008, p. vii).

For smokers who are not ready to quit smoking, motivational interviewing (Miller and Rollnick 2012) is efficacious and recommended, although less is known about how to maximally help this segment of the smoking population (Fiore et al. 2008; Lai et al. 2010). The PHS guidelines document organizes this evidence into a specific approach that it calls the 5 R's: relevance, risks, rewards, roadblocks, and repetition. Research suggests that the 5 R's enhance future quit attempts (Table 14.4.2) (Carpenter et al. 2003, 2004).

Behavioral support was initially developed as an in-person, face-to-face modality. Now, evidence supports the use of many modes of behavioral support. When incorporated into routine clinical care, brief counseling is effective (Fiore et al. 2008, Stead et al. 2008). Programs that involve more intensive counseling are more effective, but are not widely accepted by smokers, and, thus, have a lower potential for high net impact. In order to improve their reach and cost-effectiveness, behavioral programs were adapted for delivery via additional communication modes including telephone, texting, smart phone apps, and the Internet.

Of these modes, telephonic counseling is the oldest and most widely adopted and has the strongest evidence base (Stead et al. 2006). Many smokers embrace telephonic counseling for its convenience and privacy. The U.S. network of quit lines provides free care to smokers in all 50 states and Puerto Rico, and is accessible to smokers via a single toll-free number (1-800-QUIT-NOW [1-800-784-8669]) (Barry et al. 2010). Some states are intermittently able to provide free samples of nicotine replacement medication, pending availability of funds (Barry et al. 2010). Smokers may self-refer to quit lines, and health care providers may also refer patients via a fax-referral system. Once a smoker calls or is referred, the counselor initiates a series of calls (typically five).

Newer modalities for delivering behavioral support, such as mobile phone text messaging (Free et al. 2011) or the Internet, have also demonstrated efficacy, although the evidence base to support them is smaller than that for telephone-based counseling (Whittaker et al. 2012). The CDC Guide to Community Preventive Services pronounced mobile phone-based counseling (texting) to be effective, but called for additional evidence before Internet-based behavioral support can be widely adopted as efficacious (Community Preventive Services Task Force 2012). Smart phone applications for smoking cessation exist, but require formal evaluation (Abroms 2011; Whittaker et al. 2012).

### **Other Nonpharmacologic Treatments**

The evidence base supporting other nonpharmacologic treatments for smoking cessation, such as hypnosis, acupuncture and related treatments, and exercise programs, is limited in scope and quality. There is no strong evidence of the efficacy for hypnosis or acupuncture (Fiore et al. 2008; Barnes et al. 2010; White et al. 2011). A 2012 Cochrane review of trials of exercise interventions to promote smoking cessation noted that the specific exercise programs and comparison conditions were highly variable, precluding pooling of results as well as reaching a conclusion about the efficacy of exercise for smoking cessation. However, exercise may be an effective method of managing withdrawal symptoms acutely—a single session significantly reduced craving and prolonged latency to smoking (Taylor et al. 2007) and could assist smoking cessation (Ussher et al. 2012).

### **Pharmacotherapy**

*Note:* Smoking cessation medications are reviewed in Appendix 14.5.

## **Clinical-Systems Approaches to Tobacco Dependence Treatment**

The health care delivery system is an important channel for delivering smoking interventions on a population level. An estimated 70% of smokers see a physician each year, and health care providers are highly credible sources of health information to patients (Fiore et al. 2008). Then, the majority of U.S. smokers would receive advice to quit on a regular basis routinely. Data from a large-cluster randomized trial, which offered repeated cycles of counseling and medication to patients in rural primary care practice, has also demonstrated the benefit

of achieving long-term smoking cessation by proactive, longitudinal-care of smokers delivered via a health care system. Treating smokers is one of the most cost-effective clinical preventive care interventions (Maciosek et al. 2006; Fiore et al. 2008). As the leading preventable cause of death, tobacco use cessation deserves as high a priority in health care as treating other chronic conditions such as diabetes and hypertension.

A strong evidence base underlies recommendations for addressing tobacco use in health care settings (Table 14.4.1). Clinician advice to quit smoking prompts smokers to make quit attempts and increases quit rates (Stead et al. 2006; Fiore et al. 2008). Brief counseling is more effective than advice alone, and cessation rates increase monotonically with counseling intensity (i.e., greater frequency or duration) (Fiore et al. 2008; Rice and Stead 2008; Stead et al. 2008). Delivering smoking interventions in the dental office is also effective (Carr and Ebbert 2012), and the efficacy of smoking interventions delivered by pharmacists in the community has also been studied (Dent et al. 2007).

The components of brief clinician-based interventions with demonstrated efficacy have been organized into a model designed to guide the intervention's implementation and dissemination into practice (Fiore et al. 2008). This "5 A's model" for treating tobacco use, and dependence during a clinical encounter recommends that clinicians: Ask all patients about smoking status; Advise all smokers to quit; Assess readiness to quit; Assist quitting; and Arrange follow-up (Table 14.4.3). An alternative strategy that has been proposed is to offer every smoker help (e.g., access to available and effective smoking cessation treatments) without first asking about a smoker's interest in quitting (Aveyard and Raw 2012). In this study of 13 randomized trials, offering assistance generated more quit attempts than giving advice to quit on medical grounds.

Despite the clear evidence for the efficacy of clinician advice, the rates of delivery remain low in most clinical encounters. In 2010, only 48% of smokers who saw a physician recalled receiving advice to quit smoking (CDC 2011a). Smokers' rates of reporting that their doctors took steps beyond providing advice to quit (e.g., providing assistance with quitting or ensuring follow-up) are even lower (Quinn et al. 2005). A major obstacle to improving rates of delivering advice and counseling are the competing demands for a clinician's limited time during the office visit.

To address this barrier, several models have been proposed that distribute the 5 A tasks across the health care team, thereby allowing physicians to focus on the roles they can best fulfill, such as providing advice to quit, encouraging a quit attempt, and recommending treatment resources. Physicians can delegate other 5 A

**Table 14.4.1 Efficacy of methods used to treat tobacco dependence: results of meta-analyses of systematic reviews: cochrane database and U.S. Public Health Service (PHS) guidelines****A. Nonpharmacologic interventions**

	Cochrane Database		2008 PHS guideline	
	Risk ratio vs. minimal treatment/usual care (95% CI)	Number of trials in meta-analysis	Odds ratio vs. minimal treatment/usual care (95% CI)	Number of treatment arms in meta-analysis
<b>Smoking cessation counseling</b>				
Individual	1.39 (1.24–1.57)	22	1.7 (1.4–2.0)	67
Group	1.98 (1.60–2.46)	13	1.3 (1.1–1.6)	52
Telephone quit line	1.37 (1.26–1.50)	9	1.6 (1.4–1.8)	9
<b>Physician intervention</b>				
Brief advice to quit vs. no advice or usual care	1.66 (1.42–1.94)	17	1.3 (1.1–1.6)	7
Brief counseling vs. no advice or usual care	1.84 (1.60–2.13)	11	2.2 (1.5–3.2)	11
Brief counseling vs. brief advice	1.37 (1.20–1.56)			

**B. Pharmacologic interventions**

	Cochrane Database		2008 PHS guideline	
	Risk ratio vs. placebo or no treatment (95% CI)	Number of trials in meta-analysis	Odds ratio vs. placebo or no treatment (95% CI)	Number of treatment arms in meta-analysis
<b>First-line drugs<sup>a</sup></b>				
Bupropion (sustained release)	1.69 (1.53–1.85)	36	2.0 (1.8–2.2)	26
Varenicline	2.27 (2.02–2.55)	14	3.1 (2.5–3.8)	5
<b>Nicotine replacement</b>				
Nicotine patch	1.66 (1.53–1.81)	41	1.9 (1.7–2.2)	32
Nicotine gum	1.43 (1.33–1.53)	53	1.5 (1.2–1.7)	15
Nicotine lozenge	2.00 (1.63–2.45)	6	2 mg: 2.0 (1.4–2.8) <sup>b</sup> 4 mg: 2.8 (1.9–4.0) <sup>b</sup>	1 <sup>b</sup>
Nicotine inhaler	1.90 (1.36–2.67)	4	2.1 (1.5–2.9)	6
Nicotine nasal spray	2.02 (1.49–3.73)	4	2.3 (1.7–3.0)	4
<b>Second-line drugs<sup>c</sup></b>				
Nortriptyline <sup>d</sup>	2.03 (1.48–2.78)	6	1.8 (1.3–2.6)	5
Clonidine <sup>e</sup>	1.63 (1.22–2.18)	6	2.1 (1.2–3.7)	3

Source: Adapted from Rigotti 2012 with permission from American Medical Association, © 2014; Fiore et al 2008.

Note: **CI** = confidence interval; **mg** = milligrams.

<sup>a</sup>First-line drugs are all approved by the U.S. Food and Drug Administration (FDA) as smoking cessation aids and recommended as first-line drugs by the 2008 PHS guideline.

<sup>b</sup>Results of single randomized controlled trial, not from a meta-analysis.

<sup>c</sup>Drugs classified as second-line by the 2008 PHS guideline have evidence of efficacy in a systematic review but are not approved by FDA as smoking cessation aids and have more concerns about potential side effects than first-line drugs.

<sup>d</sup>Nortriptyline was used at doses of 75–100 mg/day for 6–12 weeks in smoking cessation trials.

<sup>e</sup>Studies of clonidine for smoking cessation are older, have potential sources of bias, and found a high incidence of dose-dependent side effects (dry mouth and sedation).

**Table 14.4.2 Summary of the 5 R's.**

**Enhancing motivation to quit tobacco—the “5 R's”**

<b>Relevance</b>	Encourage the patient to indicate why quitting is personally relevant, being as specific as possible. Motivational information has the greatest impact if it is relevant to a patient's disease status or risk, family or social situation (e.g., having children in the home), health concerns, age, gender, and other important patient characteristics (e.g., prior quitting experience, personal barriers to cessation).
<b>Risks</b>	<p>The clinician should ask the patient to identify potential negative consequences of tobacco use. The clinician may suggest and highlight those that seem most relevant to the patient. The clinician should emphasize that smoking low-tar/low-nicotine cigarettes or use of other forms of tobacco (e.g., smokeless tobacco, cigars, and pipes) will not eliminate these risks. Examples of risks are:</p> <ul style="list-style-type: none"> <li>• Acute risks: Shortness of breath, exacerbation of asthma, increased risk of respiratory infections, harm to pregnancy, impotence, infertility.</li> <li>• Long-term risks: Heart attacks and strokes, lung and other cancers (e.g., larynx, oral cavity, pharynx, esophagus, pancreas, stomach, kidney, bladder, cervix, and acute myelocytic leukemia), chronic obstructive pulmonary diseases (chronic bronchitis and emphysema), osteoporosis, long-term</li> <li>• Environmental risks: Increased risk of lung cancer and heart disease in spouses; increased risk for low birth-weight, sudden infant death syndrome (SIDS), asthma, middle ear disease, and respiratory infections in children of smokers.</li> </ul>
<b>Rewards</b>	<p>The clinician should ask the patient to identify potential benefits of stopping tobacco use. The clinician may suggest and highlight those that seem most relevant to the patient. Examples of rewards follow:</p> <ul style="list-style-type: none"> <li>• Improved health</li> <li>• Food will taste better</li> <li>• Improved sense of smell</li> <li>• Saving money</li> <li>• Feeling better about oneself</li> <li>• Home, car, clothing, breath will smell better</li> <li>• Setting a good example for children and decreasing the likelihood that they will smoke</li> <li>• Having healthier babies and children</li> <li>• Feeling better physically</li> <li>• Performing better in physical activities</li> <li>• Improved appearance, including reduced wrinkling/aging of skin and whiter teeth</li> </ul>
<b>Roadblocks</b>	<p>The clinician should ask the patient to identify barriers or impediments to quitting and provide treatment (problem solving counseling, medication) that could address barriers. Typical barriers might include:</p> <ul style="list-style-type: none"> <li>• Withdrawal symptoms</li> <li>• Fear of failure</li> <li>• Weight gain</li> <li>• Lack of support</li> <li>• Depression</li> <li>• Enjoyment of tobacco</li> <li>• Being around other tobacco users</li> <li>• Limited knowledge of effective treatment options</li> </ul>
<b>Repetition</b>	The motivational intervention should be repeated every time an unmotivated patient visits the clinic setting. Tobacco users who have failed in previous quit attempts should be told that most people make repeated quit attempts before they are successful.

Source: Fiore et al 2008.

**Table 14.4.3 Summary of the 5 A's****The “5 A's” model for treating tobacco use and dependence**

Ask about tobacco use.	Identify and document tobacco use status for every patient at every visit. (Strategy A1)
Advise to quit.	In a clear, strong, and personalized manner, urge every tobacco user to quit. (Strategy A2)
Assess willingness to make a quit attempt.	Is the tobacco user willing to make a quit attempt at this time? (Strategy A3)
Assist in quit attempt.	For the patient willing to make a quit attempt, offer medication and provide or refer for counseling or additional treatment to help the patient quit. (Strategy A4) For patients unwilling to quit at the time, provide interventions designed to increase future quit attempts. (Strategies B1 and B2)
Arrange followup.	For the patient willing to make a quit attempt, arrange for followup contacts, beginning within the first week after the quit date. (Strategy A5) For patients unwilling to make a quit attempt at the time, address tobacco dependence and willingness to quit at next clinic visit.

Source: Fiore et al. 2008.

tasks (i.e., identifying smoking status and providing treatment and follow-up) to additional practice-based staff, a health system-based tobacco coordinator, or community resources. The most accessible external resource in the United States is the national network of telephone quit lines that are funded by state public health departments and are accessible through one toll-free number (1-800-QUIT-NOW). They offer a free set of proactive telephone calls that provide smoking cessation support. Quitlines welcome referrals from clinician offices, and pending availability of funds, some quit lines also offer free samples of NRT (Barry et al. 2010).

The strategies outlined above focus on actions triggered by a single visit, and must be considered an iterative process, if tobacco use is to be treated as a chronic condition. Thus, a longitudinal chronic care management model, such as those used to manage other chronic diseases (i.e., diabetes, heart failure), may prove to be the optimal strategy for treating tobacco dependence. In this model, treatment offered during an office visit or hospitalization would be sustained and coordinated over time and across settings of care. In one randomized trial, a one-year longitudinal model that repeatedly offered telephone counseling and NRT to smokers, improved short and long-term smoking cessation rates, as compared to standard short-term visit-based treatment (Joseph et al. 2011). In another randomized trial, a population management strategy that proactively offered barrier-free treatment to known smokers—independent of their health care visits—increased

self-reported smoking cessation rates at 3-months follow-up (Rigotti et al. 2011). Data from a large cluster-randomized trial, which offered repeated cycles of counseling and medication to patients in rural primary care practices, has also demonstrated the benefit for achieving long-term cessation of proactive, longitudinal care of smoking delivered via a healthcare system (Cupertino et al. 2009; Ellerbeck et al. 2009). These are examples of how treating tobacco dependence can be incorporated into the evolving models of health care delivery in the United States.

### **Clinical Interventions for Smokers with Comorbidities and Smokers in Other Health Care Settings**

The 5 A clinical model was designed for use in adult ambulatory primary care settings and has been demonstrated to be efficacious in this context. In order to reach the full range of smokers and a broader array of health care delivery settings, it has been adapted for use in specific subpopulations and expanded to settings that include specialty care, emergency care, and hospital inpatient settings. Generally, the 5 A model has been tailored to be salient to the specific concerns of smokers with a range of medical and psychiatric comorbidities and to integrate into the way health care is delivered in a range of clinical settings.

### **Hospital patients**

Hospitalization provides smokers with an opportunity to quit smoking. They are required to abstain from tobacco use temporarily, during the hospital stay, and may be more motivated by the occurrence of serious illness to give up smoking, especially if the illness is smoking-related. A Cochrane systematic review found that smoking interventions that start during a hospital stay, and include counseling sustained for at least 1 month after discharge, increase long-term quit rates by 40%. These programs are effective when administered to all hospitalized smokers, regardless of the reason why they were admitted to the hospital, and in the subset of smokers who are admitted to hospital with cardiovascular disease. Adding nicotine replacement therapy to a counseling program initiated in the hospital increases program success by 50% (Rigotti et al. 2012).

In 2004, National Hospital Quality Measures adopted by the Joint Commission (2013), an independent, not-for-profit regulatory organization that accredits and certifies more than 19,000 health care organizations and programs in the United States, included a tobacco measure. Hospitals were expected to document that they offered stop-smoking advice, counseling, or medication to smokers discharged with a diagnosis of acute myocardial infarction, pneumonia, or congestive heart failure. These tobacco measures stimulated the interest of hospitals in tobacco dependence treatment, but by 2011, measures had reached high levels nationwide and the measure was retired. The Joint Commission (2013) revised and expanded their core tobacco measures in 2012. There are now four measures that assess whether hospitals do the following: (1) assess the smoking status of all hospitalized patients, (2) offer both behavioral and pharmacologic treatment during the hospital stay, (3) offer both behavioral and pharmacologic treatment at discharge, and (4) proactively follow up with patients by phone within 1 month after hospital discharge. Unlike the previous measures, hospitals are not required to adopt them, but may voluntarily elect to meet these four measures as part of their reporting requirements. Hospitals have been publicly urged to do so (Fiore et al. 2012), primarily on the basis of a strong body of evidence supporting the recommendations to treat all hospitalized smokers with behavioral and pharmacologic therapies, unless there is a distinct contraindication to do so (Rigotti et al. 2012). Smoking increases the risk for surgical complications (USDHHS 2004). Smoking interventions started before elective surgery increase short-term smoking cessation and, in some cases, have reduced postoperative complications (Thomsen et al. 2010). Many of the stud-

ies enrolled smokers preparing for orthopedic knee and hip replacement procedures. Interventions that included regular counseling, starting 4–8 weeks before surgery, and used NRT were more likely to produce long-term smoking cessation and reduce postoperative complications. In one randomized controlled trial, varenicline increased long-term smoking cessation rates after surgery compared to placebo, but did not reduce postoperative complications (Wong et al. 2012).

### **Persons with Mental or Substance Use Disorders**

Rates of cigarette use among persons with mental or substance use disorders are significantly higher than rates among persons who do not have these disorders, resulting in a disproportionate burden from the health consequences of smoking for these populations. More than 1 in 3 adults (36%) with a mental illness smoke cigarettes compared with about 1 in 5 adults (21%) with no mental illness (CDC 2013; Substance Abuse and Mental Health Services Administration [SAMHSA] 2013b). In addition, adult smokers with mental illness smoke, on average, more cigarettes per month than those without mental illness. Individuals ages 12 and older who received treatment at a specialty facility for a substance use disorder in the past year were about 3 times more likely to be current (past month) smokers than those who did not receive treatment (74.0 vs. 23.8%) (SAMHSA 2011). Although adults with mental or substance use disorders comprise 24.8% of the population, they account for 39.6% of all cigarettes smoked (SAMHSA 2013a). Much remains to be done to integrate smoking cessation services into mental health and addiction treatment settings. These treatment settings provide a significant opportunity for smoking prevention and cessation among populations with high cigarette smoking rates. Research indicates that smoking cessation interventions with individuals experiencing mental or substance use disorders are feasible, beneficial, and needed.

Surveys of persons in substance abuse treatment have found that 44%–80% are interested in quitting their tobacco use (Prochaska et al. 2004). A meta-analysis of 19 studies examining outcomes of smoking cessation interventions among persons in addiction treatment or recovery found that including smoking cessation interventions in substance abuse treatment is associated with a 25% increase in the likelihood of maintaining long-term alcohol and drug abstinence (Prochaska et al. 2004). Subgroup analyses showed that the studies providing NRT resulted in increased smoking abstinence. This indicates that NRT

may be especially useful for smokers with substance use disorders. These studies had provided NRT in conjunction with psychosocial interventions.

Individuals with mental illness are as motivated to quit smoking as are smokers without mental illness (Siru et al. 2009). Evidence suggests that cessation interventions that are tailored to people with mental illness and are integrated into psychiatric care are more efficacious than those designed for the general population of smokers (Hall 2007; Fagerstrom and Aubin 2009; Hall and Prochaska 2009; Hitsman et al. 2009).

In 2008, the National Institute of Mental Health issued a report on tobacco use and mental health disorders. In a meta-analysis of 23 treatment studies involving 8,073 smokers (2,540 with a history of depression), there were no differences in short-term abstinence rates by depression status. However, among individuals with a history of depression, the odds of long-term cessation were lower than among individuals with no history of depression (OR = 0.66; 95% CI, 0.53–0.82) (Ziedonis et al. 2008). Researchers further identified the type of depression assessment (i.e., current vs. lifetime), as a potentially important modifier of the association between depression and long-term cessation. Recurrent depression is also

associated with significantly lower abstinence following treatment Ziedonis and colleagues (2008).

Among smokers with schizophrenia, bupropion was shown in a Cochrane review to be effective for significant smoking reduction with a reduction by at least 50% relative to baseline levels, cessation at end of treatment, and cessation for up to 6 months afterwards (Tsoi et al. 2010). A 2010 review of studies for patients with severe mental illness, including schizophrenia and bipolar disorder, found that treating tobacco dependence is effective; and based on five trials, concluded that bupropion was over twice as effective as placebo for long-term cessation (Banham and Gilbody 2010).

A recent analysis of trends from 2004–2011 found that the decline in smoking among individuals with mental illness was significantly less than among those without mental illness (Cook et al. 2014). However, consistent with the evidence reviewed above, the new analysis found that quit rates were greater among smokers who received mental health treatment. Hence, these results suggest that smokers with mental illness can quit and remain abstinent from cigarettes during mental health treatment, and that this is a promising setting to promote smoking cessation.

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