

Chapter 2

Smoking Cessation

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2.1 Introduction

2.1.1 *Prevalence of Smoking*

Despite its negative health effects, smoking remains the leading cause of preventable death and disability in the United States [1]. Smoking accounts for 1 in 5 deaths and \$193 billion in healthcare costs each year [1–3]. Although there was a decline in smoking rates following the release of the Surgeon General’s report in 1965, prevalence rates have remained relatively stable over the past 20 years [4, 5]. Currently, approximately 18 % of adults in the USA are regular cigarette smokers [6]. Prevalence rates are higher among males (20.5 %) compared to females (15.8 %), and American Indians/Alaska Natives (21.8 %) compared to Whites (19.7 %), African-Americans (18.1 %), and Asians (10.7 %; [6]). Of importance to note, individuals with less education and lower incomes are particularly vulnerable to smoking. From a treatment perspective, it is key to emphasize that the majority of current smokers want to quit, and approximately half of all smokers try to quit each year; however, fewer than 6 % will achieve long-term quitting [7, 8].

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2.2 Psychological Comorbidities and the Role of Stress and Negative Affect

Psychological factors play a central role in smoking behavior. As a group, smokers have higher rates of mental illness and report greater levels of negative affect than nonsmokers [9, 10]. Smoking is also more common among individuals with mental illness, with an overall prevalence rate of 41 % across psychiatric disorders [6]. Rates of smoking among individuals with severe mental illness are even higher; for example, 60–80 % of patients with schizophrenia smoke [11]. Smokers consistently cite reduction or regulation of negative emotions, as well as coping with emotional distress, as primary reasons for smoking [12, 13]. The high levels of negative affect among smokers contribute to sustained smoking behavior and complicate smoking cessation efforts. Given that negative affect is a salient symptom of nicotine withdrawal, smokers who are unable to tolerate distress without the use of cigarettes experience greater difficulties with smoking cessation, including greater perceived barriers to quitting [14], shorter time to smoking relapse [15], and lower rates of participation in tobacco treatment programs [16].

2.3 Treatment Delivery

Smoking cessation treatment may be delivered individually or in a group setting. Individual treatment provides patient-centered care and may be more logistically feasible. Group treatment provides an opportunity for enhanced social support and shared learning of quitting techniques. Other modalities may be used as an adjunct or primary behavioral treatment, such as telephone counseling, text message programs, or phone applications. Telephone counseling can be provided (1) proactively, in which calls to smokers are initiated by a counselor according to a prearranged time and (2) reactively, such as via a quitline, in which patients initiate calls. A meta-analysis conducted in 2013 found that proactive telephone counseling is more effective than reactive counseling [17]. Web-based smoking treatments can also help patients to quit smoking, particularly if the programs are individualized and interactive [18]. Mobile phone text messaging smoking treatments may consist of automated personalized support messages; several trials have found that text messaging is effective in promoting smoking abstinence [19, 20]. Phone apps have yet to be rigorously studied [20]; however, a 2011 review of the 47 iPhone smoking cessation apps determined that there was low adherence to evidence-based practice guidelines [21].

2.4 Smoking Cessation Medications and Adherence

Seven first-line medications are recommended by the 2008 Clinical Practice Guidelines to increase long-term smoking abstinence rates. These include the following five nicotine replacement therapies: patch, gum, inhaler, lozenge, and

nasal spray. The patch is long-acting and provides slow delivery. Short acting therapies with faster onset include the gum, inhaler (nicotine vapor that is absorbed through the mouth), lozenge, and nasal spray (rapid release delivery). Nicotine replacement therapies involve nicotine substitutes to assist with nicotine withdrawal symptoms and are dosed based on a patient's level of smoking. The side effects vary by nicotine delivery method, and it is essential that smokers are trained in proper use of each product. Bupropion SR (Zyban, Wellbutrin SR) is an antidepressant that inhibits reuptake of dopamine and norepinephrine, which can reduce craving for tobacco. Varenicline (Chantix) is a non-nicotine medication which interferes with nicotine receptors; it has both agonist and antagonist function and thus simultaneously reduces pleasure gained from smoking as well as withdrawal symptoms. In 2009, the FDA published a public health advisory on the neuropsychiatric side effects of varenicline and bupropion, specifically, stating that "[Varenicline] or [bupropion] has been associated with reports of changes in behavior such as hostility, agitation, depressed mood, and suicidal thoughts or actions." A patient's psychiatric stability should therefore be considered when considering varenicline. However, of importance is that recent trials have supported the safety of varenicline and bupropion, even among schizophrenic and depressed patients [22–24]. When patients stop smoking they often, albeit temporarily, experience nicotine withdrawal symptoms (e.g., depressed mood, anxiety, and irritability) and thus should be monitored closely around the time of quitting.

The nicotine replacement products and bupropion have been shown to approximately double quit rates, compared to unassisted attempts, and there is evidence that the use of varenicline can triple quit rates [25]. A Cochrane Database review of 12 trials testing these pharmacological options found that varenicline and combination NRT were superior to single forms of NRT or bupropion [26]. Moreover, the combination of counseling and medications is more effective than either alone. Specifically, studies have shown that the use of smoking cessation medications doubles abstinence rates when combined with evidence-based behavioral treatment [27, 28]. In fact, a series of meta-analyses report abstinence rates to be 1.5–2.27 times higher among smokers who use pharmacological intervention vs. placebo to aid quitting efforts, with rates reportedly higher for patients who use Varenicline [29–32]. Accordingly, the USDHHS Public Health Service guidelines recommend combined medication and behavioral approaches to tobacco treatment [25, 33]. Furthermore, smoking cessation medications have been shown to be effective even amongst smokers with varying levels of quit motivation [34], engendering successful quit attempts in those intending to cut back. While there is evidence that using smoking cessation medications prior to quitting and for extended periods of time may increase the likelihood of achieving better outcomes [35, 36], findings are inconsistent regarding the benefits of long-term consumption [37].

Despite their documented benefit, the use of smoking cessation medications amongst individuals remains suboptimal. Studies conducted in the general population

of smokers document low rates of medication use [38] and adherence [39, 40]. In fact, only 25 % of smokers who have made a quit attempt using a pharmacologic agent to assist cessation efforts [37]. Further, among smokers who choose to initiate pharmacotherapy, a substantial proportion has been shown to discontinue treatment prematurely and to use inadequate, and often, ineffective doses [36]. For instance, a recent survey of 1219 adult smokers in four countries determined that a little over half of the sample (55 %) discontinued NRT use altogether after only 4 weeks [41]. Similar patterns of early treatment withdrawal have been reported for Varenicline [39] and bupropion [42]. These findings are disconcerting, as adherence to smoking cessation medications is central to optimizing cessation outcomes [35, 43].

Given the important role medication adherence has in promoting abstinence, researchers have endeavored to develop a profile of smokers who are likely to have difficulty adhering to cessation medications. Several key factors have been associated with medication discontinuation. In general, studies have found that smokers who are female, younger, and less educated are more likely to demonstrate abrupt and early discontinuation of stop smoking medications [36, 43]. Factors associated with nonadherence to pharmacotherapy guidelines include forgetting, perceived unhelpfulness, relapse, negative attitudes toward medication, distrust in the effectiveness of medication, other substance use (e.g., alcohol), psychiatric history, low quit self-efficacy, and greater smoking rate [35, 41, 44].

In light of this evidence, a focal point of tobacco treatment should include encouraging pharmacotherapy use and adherence amongst smokers intending to quit or reduce cigarette use. Adherence to smoking cessation medication regimens should also be monitored closely; patients often need strategies to decrease, and cope with, side effects. Primary emphasis should be placed on providing psychoeducation regarding the value of smoking cessation medications, their functionality and limitations, and the import of taking them as instructed in efforts to maximize their therapeutic effect [36]. Special attention should be placed on gathering a thorough medical, psychiatric, and smoking history to determine the most effective medication and therapeutic dose. Efforts should be made to help patients develop a medication schedule, which may include assisting patients in identifying and problem-solving barriers to adherence, implementing cue-control strategies to remind them to take their medication and adhere to their regimen, and managing potential side effects [35]. In these endeavors, clinicians can aid patients with developing a medication calendar to monitor use, which the provider can review and provide feedback during each visit. As adherence tends to be strongest during the early stages of treatment and tends to decrease with time, providers should engage patients in ongoing discussion about their medication, noting any changes in medication beliefs, attitudes, and motivation [45]. Use of motivational interviewing and standard cognitive-behavioral approaches will help clinicians in increasing their patients' quitting motivation and self-efficacy as well as modify negative thoughts or beliefs that may dissuade patients from complying with treatment recommendations [35].

2.5 Electronic Cigarettes

Electronic cigarettes are electronic devices which deliver a nicotine vapor, sometimes referred to as e-cigs, e-cigarettes, e-hookah, or personal vaporizers. E-cigs are not FDA regulated as a device or drug product, but they are becoming increasingly used in the USA. Smokers are using them purportedly to try to quit and/or in places where smoking is prohibited. However, it is unclear whether, indeed, e-cigs should be used as a substitute for combustible tobacco use or they provide value as harm reduction devices or quitting assistance. The content of e-cigs, as well as how much nicotine is delivered, is relatively unknown. Research is needed on the efficacy of e-cigs to help smokers cut down and/or quit as well as long-term effects.

2.6 Assessments

A comprehensive assessment of a smoker is an integral starting point to smoking cessation treatment. Smoking history, including age of initiation, quit attempts, and current medical history, in particular comorbid smoking-related medical conditions, should be obtained.

Information should be gathered on cognitive determinants of behavior change, including motivation/readiness to quit, self confidence and importance to quit smoking, perceived severity and risks of smoking. In past quit attempts, triggers to smoking, including individual factors (cravings and withdrawal symptoms) and social/environmental factors (quitting support, smoking policy in household), should be assessed. In addition, a smoker's emotional status, such as psychiatric diagnoses, as well as level of emotional distress, and symptoms of depression and anxiety, should be assessed. Lastly, as many smokers experience shame and self-directed stigma for smoking, such constructs should be assessed.

2.7 Behavioral Treatments: Cognitive-Behavioral Therapy Approaches

Effective counseling programs generally use cognitive-behavioral techniques (CBT; changing maladaptive thinking patterns and associated behaviors) to help patients to identify and cope with triggers that may tempt smoking. Cognitive-behavioral interventions for nicotine dependence that also aim to reduce negative affect or improve emotion regulation are therefore particularly important. Social support is also an important treatment component to reinforce a smoker's confidence in his or her ability to quit [25, 46]. Key CBT strategies to achieving and maintaining abstinence include:

Cutting Back/Tapering: This involves restricting periods of time or places where one smokes, or limiting the number of daily cigarettes smoked. It is helpful to set up, and record, a weekly tapering structure.

Tracking: This is the process of recording one's smoking. Tracking can be used, initially, to help a smoker understand his/her smoking patterns and motivations. It is an integral part of the tapering process; setting up a monitoring system is a concrete way for a smoker to document progress.

Creating a Smoke-Free Environment: An often helpful initial step towards quitting involves creating smoke-free environments, particularly in smokers' homes and cars. The less exposure one has to others' smoking, the better it is for the smoker trying to achieve abstinence. One can begin this process by first creating smoke-free areas in the home and then progress toward the goal of eliminating any smoking in the home or car.

Setting Up Coping Strategies: Inevitably, and particularly during the initial couple of weeks following a quit attempt, smokers may experience withdrawal symptoms such as irritability, restlessness, and feelings of anxiety and depression. It is important to assess what types of withdrawal symptoms smokers are concerned about, and which he/she has experienced in previous quit attempts. It is also crucial for a smoker to anticipate and prepare for how to cope with these symptoms. ACE (Avoid, Change, and Escape) is a helpful mnemonic to learn and practice, in anticipation of confronting a trigger. Avoid ("What can you do to avoid triggers?") Change ("What can you do to change the situation to make smoking less tempting?") Escape ("What would it be like to leave?").

Overcoming Cravings: Often smokers experience cravings, and urges to smoke, intermittently, for a period of time following a quit attempt. It is important to reinforce that cravings are often fleeting, lasting a minute or two. Mini relaxation exercises (e.g., repeating, "This will pass," visualizing a place which feels restful) can help a smoker pass this experience. The "4Ds" are helpful to remember and implement when experiencing cravings. Delay—pause a few moments; Drink—a glass of water; Distraction—do something else; and Deep breathing.

Stress Management and Relaxation Strategies: Stress management strategies such as breath awareness, deep breathing, guided imagery, body scanning, progressive muscle relaxation, brief meditation, or stretching can help one be aware of stressful sensations and decrease the experiences of stress. These strategies can be practiced on an ongoing basis as well as used when confronting a smoking trigger.

Relapse Prevention: It is important for a smoker to be taught to differentiate between a slip (e.g., a puff or a cigarette) vs. a relapse (return to previous rate of smoking) and to anticipate how to handle a slip or relapse. Preparation can be important in determining whether a slip remains a slip or converts into a relapse. If a relapse occurs, a smoker should resume the quitting process, as soon as he/she is ready.

2.8 Motivational Interviewing

Motivational interviewing (MI) is a skillful and empathic clinical style for eliciting from patients their own good motivations for making behavior change in the interest of their health [47]. It posits that, through trained strategic questioning and listening, a clinician can help patients resolve their ambivalence about behavior change, such as quitting smoking. The main goal of MI is to elicit one's own reasons for change—to create and amplify the discrepancy between a patient's behavior and broader goals. Discrepancy is developed through a skillful delivery of questions such as: Why do you want to quit smoking? What are you currently doing? What stops you from becoming smoke-free?

While MI is influenced by the Stages of Change Theory, Rogerian Patient Centered Therapy and cognitive-behavioral therapy, it is distinct in a number of ways. MI differs from the Stages of Change theory in that it conceptualizes motivation as a continuously fluctuating, nonlinear state. MI is akin to Rogerian therapy in its patient-centered approach, but differs in that it is directive, indeed, clinician directed. MI is also very goal-directed, with an ultimate goal to be attained, through negotiations with the clinicians and patient. During times of elevated motivation, CBT skills may be integrated with MI treatment, to apply action goals, such as cutting back on the number of cigarettes per day, or to target barriers to achieving smoking cessation goals, such as stress management practices to alleviate stress-related smoking triggers.

The theory underlying MI is that (1) Motivation is a fluctuating state, (2) The clinician style can determine patient success, (3) Ambivalence is an important part of change, and (4) Everyone has a potential for change. Through use of MI, a clinician uses a series of directive and nondirective approaches. MI aims to (1) build a patient's intrinsic motivation to change (e.g., quit smoking) and (2) resolve ambivalence about change (i.e., the goal of MI is to create and amplify the discrepancy between the patient's present behavior and broader goals). Simply put, to contrast where a patient is (e.g., nicotine dependent) and where a patient wants to be (e.g., nonsmoker). The four MI principles are: (1) Express Empathy (Skillful reflective listening is fundamental); (2) Develop Discrepancy (The patient should present the arguments for change); (3) Roll with Resistance (Avoid arguing for change); and (4) Support Self-Efficacy (The patient's own belief in his/her ability to change becomes a self-fulfilling prophecy). At each MI session, an assessment should be conducted of a patient's motivation and confidence (0–10), as well as the pros and cons to quitting and continuing to smoke. A 2010 meta-analysis was conducted to determine the effects of MI in promoting smoking cessation. Fourteen studies compared MI to brief advice or usual care for smoking cessation and concluded that MI yielded an increase in quitting (RR = 1.27; CI = 1.14–1.42 [48]). The effects of MI, compared with other treatments, however, are mixed.

2.9 Anxiety and Smoking

Anxiety disorders are significantly more prevalent among smokers than in the general population [10, 49]. Reported rates of smoking were highest among individuals with panic-related disorders (i.e., panic attacks, panic disorder, and agoraphobia) and other anxiety disorders in which panic attacks often occur (e.g., social anxiety disorder, posttraumatic stress disorder [PTSD], generalized anxiety disorder; [10]). There is also mounting evidence to suggest that the presence of anxiety disorders can interfere with one's ability to reap the benefit of smoking cessation programs and reduce the odds successful quitting [50]. In addition to diagnosable anxiety disorders, Anxiety Sensitivity, a cognitive risk factor for anxiety, has been associated with worse cessation outcomes [51]. These findings suggest that integrated treatment programs capable of addressing smoking cessation in the presence of co-occurring anxiety disorders or high levels of anxiety sensitivity may allow for improved cessation outcomes and a recent case report provides some preliminary evidence supporting this approach [52].

2.10 Mindfulness and Mind-Body Approaches

Mindfulness involves the self-regulation of attention toward, and nonjudgmental awareness of, present moment experiences [53]. It is most commonly defined as "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" [54]. Mindfulness involves several related but distinct skills, including the ability to (1) observe internal and external events as they occur in the present moment; (2) describe or label these events objectively; (3) act with awareness of the present moment; (4) accept present moment events without judgment; and (5) refrain from reacting impulsively to events. Mindfulness-based interventions help patients cultivate these skills through regular practice in formal (e.g., mindful sitting meditation, body scan meditation) and informal (e.g., mindful walking, mindful eating) mindfulness exercises.

One primary goal of mindfulness-based treatments for nicotine dependence is to increase awareness and acceptance of smoking cues as they occur in the moment. This awareness helps smokers tolerate smoking triggers and choose goal-directed behaviors (e.g., going for a walk vs. automatically smoking a cigarette when upset). Initially, the goal of mindfulness training is simply to become more aware of internal and external events. After bringing these events into conscious awareness, the goal becomes learning to relate to these experiences with openness, non-judgment, and curiosity. Treatment ultimately aims to teach patients to then "de-center" from these experiences by learning to view them as transient aspects of their awareness that may or may not need to be acted upon. For tobacco treatment, this de-centering process means learning to experience smoking triggers without automatically responding to them by smoking.

Mindfulness-based interventions generally take a cognitive-behavioral approach. However, they differ from standard cognitive-behavioral therapies in a few key ways. For example, mindfulness-based interventions aim to change the process of responding to smoking cues, rather than the content of the cues themselves. Additionally, mindfulness-based approaches incorporate a heavy focus on experiential learning in which a clinician helps the patient internalize important lessons from mindfulness or exposure exercises by reflecting key observations back to them (e.g., that a craving naturally subsided on its own during the meditation).

The structure of different mindfulness interventions can vary, though the content remains largely the same. Across interventions, the focus is generally on the role of negative affect and automatic thoughts in smoking, and how to use mindfulness skills to manage these experiences. Treatment typically begins by providing psychoeducation about the nature of addiction, the concept of mindfulness, and how mindful attention can interrupt addiction cycles. Formal meditations are often included in the first session. Over time, mindfulness exercises expand to include a focus on thoughts and emotions, and how they perpetuate smoking behavior. Techniques for applying mindfulness skills to smoking triggers are then highlighted throughout the treatment. For example, the Mindfulness Training for Smoking Cessation program utilizes the acronym RAIN (Recognize, Accept, Investigate, and Note cravings) to help smokers refrain from smoking in response to cravings [55].

2.10.1 Research Evidence Base for Mind-Body Interventions

Research supports the use of mind-body interventions. Previous studies have involved the application of standard mindfulness-based interventions for nicotine dependence (e.g., Mindfulness-Based Stress Reduction; [54]) and the development of smoking-specific mindfulness treatments (e.g., [55, 56]). Two studies comparing mindfulness training to the American Lung Association's (ALA) Freedom from Smoking (FFS) program [57] found similar abstinence rates immediately post-treatment but significantly higher abstinence rates in the mindfulness group at longer-term follow-ups [58]. A study comparing nicotine replacement therapy (NRT) to combination NRT and Acceptance and Commitment Therapy (ACT)—a behavioral intervention incorporating elements of mindfulness and acceptance—found no significant differences post-intervention, but significantly higher abstinence rates at 1-year follow-up in the NRT/ACT group [59]. Mindfulness training might provide unique benefits for relapse prevention.

Improvements in emotional outcomes may serve as mechanisms by which mindfulness training improves smoking outcomes. One study found that levels of acceptance post-treatment significantly mediated the effect of mindfulness training on smoking status at 1-year follow-up [60]. Several other studies have found that mindfulness training weakens or eliminates the relationship between negative affect and smoking urges [61, 62], as well as the relationship between cravings and smok-

ing behavior [63]. These findings suggest that mindfulness training helps smokers break associations between aversive internal experiences and smoking, which likely contributes to decreased smoking behavior.

2.11 Specific Populations of Concern

2.11.1 *Asthma*

Cigarette smoking and asthma commonly co-occur. Prevalence rates of smoking have been shown to be higher among individuals with asthma as compared to those without, particularly for female smokers [64, 65]. For example, 35 % of asthma patients presenting to the emergency department for asthma problems were shown to be current smokers [66], which is substantially higher than the 22 % rate of the general population at that time [6]. Bidirectional associations between smoking and asthma also exist, with smoking serving as a risk factor for the later development of asthma [67]. Smoking among asthma patients is associated with a range of poor asthma outcomes, including decreased asthma control, increased asthma attacks and exacerbations, and increased risk of mortality [67]. Smoking cessation, however, can afford improvements in lung function and asthma symptoms [68, 69].

Smokers with asthma may differ from smokers without asthma in ways that are relevant to tobacco prevention and intervention efforts. There is some research to suggest that smokers with asthma have different risk factors for smoking, including different reasons for smoking and different expectations about what smoking will do for them [67]. For example, adolescents with asthma are more likely than adolescents without asthma to begin smoking due to peer pressure, and continue smoking for weight control reasons [70]. Among smokers, those with asthma have also been found to begin smoking at an earlier age, make more quit attempts, and be motivated to quit smoking in order to develop greater self-control [71].

Anxiety-related factors have been shown to play an important role in asthma-smoking associations. In general, lifetime prevalence rates for anxiety disorders are higher among individuals with asthma compared to those without (e.g., 24 % vs. 10 %, respectively; [72]), and higher among smokers compared to nonsmokers (e.g., 68 % vs. 5 %, respectively; [10]). Recent research suggests that these anxiety-related problems may actually be one of the key mechanisms by which asthma and smoking co-occur. For example, recent findings have shown that anxiety sensitivity mediates the relationship between an asthma diagnosis and smoking status [73]. Taken together, these findings highlight the importance of developing targeted tobacco treatments for asthma patients, and suggest that these treatments include a focus on anxiety-related problems.

2.11.2 Cancer Patients and Survivors

Tobacco use following a cancer diagnosis is prevalent and compromises treatment outcomes. About 10–30 % of cancer patients are smoking at the time of diagnosis [74–79]. Quitting smoking upon cancer diagnosis may improve cancer treatment effectiveness, reducing risk of recurrence and of developing new primary tumors [10–12, 19–22], and may improve chances of survival [75, 80, 81]. Continuing to smoke upon cancer diagnosis may result in diminished quality of life (e.g., elevated pain, shortness of breath; [75, 82]); cancer treatment delays; and increased complications from surgery, radiation, and chemotherapy [83–85]. Adverse effects from smoking at the time of surgery include complications from general anesthesia, increased risk of pulmonary complications, and impaired wound healing. Complications from smoking while undergoing radiation therapy include reduced cancer treatment efficacy and increased toxicity. Smoking while receiving chemotherapy exacerbates drug toxicity side effects and increases the incidence of infection [76, 86–92]. Continued smoking increases patients' vulnerability to subsequent smoking-related diseases following chest radiation [93, 94].

Cancer patients who smoke have socioeconomic, biologic, and psychosocial vulnerabilities. Individuals with lower incomes and education have much higher prevalence of smoking [7, 95]. One study in particular found that Cancer Care Outcomes Research and Surveillance Consortium (CanCORS) participants who were smoking at cancer diagnosis were less likely to have completed high school and more likely to be covered by public health insurance ($p < 0.001$; [78]). Low socioeconomic status increases an individual's risk for smoking initiation and continuation [96]. Moreover, cancer patients face increasing financial hardship [97]. Cancer patients who report current smoking at diagnosis are highly dependent smokers who need comprehensive tobacco treatment to successfully quit smoking. A pilot smoking cessation study of lung cancer patients at a large, city-based hospital found that, 77 % of smokers recruited from lung cancer clinics were nicotine dependent [98]. Furthermore, among CanCORS participants, the heaviest smokers were the most likely to continue smoking following diagnosis [78]. Cancer patients who continue to smoke after diagnosis are vulnerable to internalized stigma for causing their disease [99, 100]; in turn, these smokers who perceive high stigma are less likely to disclose their smoking status.

2.11.3 HIV/AIDS and Smoking

Smoking rates among people living with HIV are considerably higher than the smoking rates observed in the general population (i.e., 21 %; [101]). In fact, Niaura et al. [102] reported that over 70 % of HIV+ outpatients smoked on a daily basis. Prior to the widespread availability of protease inhibitors, smoking had been repeatedly related to poorer health outcomes in HIV, including

significantly reduced survival [103], increased clinical progression to AIDS through more rapid development of pneumocystis carinii pneumonia [104], and increased likelihood of AIDS-related conditions such as community-acquired pneumonia, oral candidiasis, oral hairy leukoplakia, and AIDS-related dementia [105, 106]. The success of antiretroviral therapy in containing HIV viral replication, delaying symptom onset and clinical progression of HIV disease has resulted in an increase in chronic non-AIDS outcomes for patients managing HIV. Accordingly, smoking is playing an increasingly important role in the morbidity and mortality in people living with HIV [107]. For example, among patients living with HIV in San Francisco, smoking was associated with nearly a threefold increase in hazard ratio for death [108]. Similarly, studies have documented an increased risk of bacterial pneumonia, chronic obstructive pulmonary disease (COPD), cardiovascular disease, non-AIDS cancer, and mortality among HIV-infected smokers relative to HIV-infected nonsmokers [109–112]. The relationship between pneumonia and smoking in HIV is evident across the variety of risk groups. For example, among HIV-infected women with a history of IV drug use, smoking doubled the risk of bacterial pneumonia [113]. Similarly, among HIV-infected patients admitted to hospitals, smokers were three times more likely to have pneumocystis carinii pneumonia (PCP) and twice as likely to have bacterial pneumonia than nonsmokers [114]. Importantly, Benard, Mercie, Alioum et al. [115] found that smoking cessation dramatically reduced the risk of bacterial pneumonia regardless of HIV disease stage in HIV+ patients followed longitudinally for 5 years. There also is emerging evidence in diverse samples to suggest that HIV-infected smokers are less adherent to ART than nonsmokers [116, 117]. In a longitudinal study that followed over 900 HIV-infected women for up to 7.9 years, smoking was predictive of poorer medication adherence [118]. This study also found that smokers had poorer viral and immunologic response to highly active antiretroviral therapy (HAART), a greater risk of virologic rebound, and more frequent immunologic failure. More recent work by the same team identified the biological pathways associated with this impaired response to HAART demonstrating the adverse effects of smoking over and above poor adherence.

2.11.3.1 Smoking Cessation and HIV

To date, only a small number of randomized controlled trials examining the efficacy of smoking cessation interventions among HIV-infected adults have been conducted [119–122]. Vidrine and colleagues compared a combination of NRT plus eight sessions of counseling delivered via cell phone to usual care (NRT, self-help materials, physician advice to quit) in 95 HIV+ smokers. The cell phone intervention condition utilized cognitive-behavioral therapy principles (e.g., problem-solving, coping, and social support utilization) aiming to meet the needs of HIV-infected smokers, particularly anticipating HIV-related stressors. At 3 months post-quit date, abstinence rates were 36.8% in the cell phone intervention condition relative to 10.3% in the

control condition, representing a significant difference. Lloyd-Richardson and colleagues randomized 444 participants to receive either standard care (SC, 2 brief sessions with a health educator)+NRT, or motivationally enhanced (ME) treatment (four sessions tailored to the needs of HIV+ individuals)+NRT. Abstinence rates at 2-, 4-, and 6-month follow-up ranged from 9 to 12 % for the ME+NRT condition relative to 10–13 % for the SC+NRT condition, indicating no significant difference. Ingersoll and colleagues also failed to detect significant differences between ME+NRT and standard care in 40 HIV-infected smokers; 22 % of the full sample reported abstinence at 3-month follow-up. Collectively, these findings suggest that: (1) motivational interventions do not contribute significantly to the efficacy of NRT among HIV+ individuals; (2) there may be some benefit to targeting HIV-related stressors and related negative affect as part of smoking cessation programs for HIV+ individuals; and (3) there is a need for the development of interventions [123] that can yield durable positive smoking cessation outcomes in people living with HIV (see also PA-08-253: Unique Interactions Between Tobacco Use and HIV/AIDS).

2.11.4 Smoking Among Ethnic and Racial Minority Patients

Although the prevalence of tobacco use is lower among most racial and ethnic minority groups, blacks and Hispanics are at elevated risk of experiencing the negative health effects of smoking [124]. Specifically, blacks are disproportionately burdened by most of the tobacco-related cancers, including colon, breast, uterine, lung, and prostate cancers, compared to other racial and ethnic groups [124]. Similarly, cancer and heart disease remain two of the leading causes of death for Hispanics [125, 126]. While researchers speculate these disparities may be partially due to environmental and socioeconomic influences, blacks and Hispanics present with a distinctive behavioral profile that may increase their susceptibility for greater smoking-related morbidity and mortality. For instance, although blacks initiate smoking later, have fewer mean-pack years, and smoke fewer cigarettes per day compared to whites [127, 128], they have been shown to take longer and deeper puffs when smoking. In fact, the amount of nicotine and carcinogens consumed per cigarette has been shown to be 30 % higher among blacks [129, 130]. In addition, blacks are more likely to smoke mentholated cigarettes, which also have higher levels of nicotine and carbon monoxide [131]. There is also emerging evidence that blacks may metabolize nicotine at a slower rate, thereby increasing the amount and length of time nicotine is in the body [132]. Hispanics share similar characteristics as blacks, often engaging in light or intermittent smoking. Importantly, although the overall smoking prevalence is typically low, smoking rates vary widely across this heterogeneous group [125]. For instance, Puerto Ricans and more acculturated Hispanics are more likely to resemble white smokers in terms of smoking prevalence and patterns of use [133].

While quitting smoking is a substantial challenge for most smokers, Hispanics and blacks are at increased risk for continued smoking. In particular, despite demonstrating greater intentions, confidence, and more attempts to quit, black and Hispanic smokers are less likely to receive quit advice and assistance from providers [125, 137]. They are also less likely to initiate, participate in, comply with tobacco treatment, and maintain abstinence after quitting [125, 134–137]. Among treatment-seekers, many refuse to utilize pharmacologic agents to assist cessation efforts as a result of fear, distrust, or misconceptions regarding the efficacy, utility, and safety of the medications [138–140]. In fact, a recent study by Fu and colleagues [136] determined that blacks were less likely to report ever having used NRT during a quit attempt (34 % of blacks vs. 50 % of whites). Treatment adherence is particularly difficult for Hispanics, who demonstrate low rates of compliance with treatment recommendations for other chronic illnesses [125]. Additional challenges that may interfere with treatment include the role of risk perceptions. Blacks and Hispanics have been evidenced to have lower knowledge about the risks associated with smoking and the benefits of smoking cessation [141, 142]; accordingly, they may not be motivated to quit as they may not be identified as a smoker.

Given these trends, providers engaging blacks and Hispanics in tobacco treatment will need to account for these racial and ethnic-specific factors in efforts to promote optimal cessation outcomes in these vulnerable groups. Important treatment targets should include psychoeducation around the risks associated with light smoking and the utility of smoking cessation medications. Motivational interviewing strategies will also be advantageous in helping identify and address their reasons for quitting, particularly since other factors, such as their family and children's health, may be driving their motivation to quit. Also, in light of evidence suggesting that blacks are more likely to live with a smoker and to be exposed to secondhand smoking, it may be important to assist them with providing cessation support to their partners.

2.11.5 Case Illustration

Below is a description of a telephone-based motivational treatment to assist cancer patients to quit smoking. The behavioral treatment was delivered in conjunction with FDA-approved smoking cessation medication, over a 6-month period. The treatment was delivered in a motivational style and included CBT and relaxation strategies. The patient completed all recommended sessions, within the allotted time period: four weekly sessions, followed by 4 biweekly sessions, with a final 3 monthly sessions. The initial session lasted for over 40 min; subsequent sessions were 20–30 min.

Patient Description at Intake. Evelyn is a 63-year-old married retired woman, who had smoked for 41 years. She had been diagnosed 3 weeks prior, with stage

three lung cancer. At the start of treatment, she was smoking close to 20 cigarettes, or one pack of cigarettes, per day. She began her day by smoking, within 30 min of waking, which is a marker for nicotine addiction. She was in the “Contemplation” stage of quitting, but she reported that it was very important (10 on a scale of 0–10) for her to quit smoking. Her confidence to quit smoking was very low (2 on a scale of 0–10). In addition to smoking cigarettes, she had recently tried using e-cigs to help her quit. She, like most Americans who smoke, had tried to quit several times in the past. Her longest quit occurred 10 years prior and lasted for many months, but she relapsed due to work stressors. She was not currently using any smoking cessation medications. Her husband was a former smoker, and there was a no smoking policy in their household and home; no one was allowed to smoke anywhere in their home or car. This was encouraging, as a smoke-free environment can help facilitate staying quit.

Evelyn was aware of some of the benefits of quitting (e.g., to decrease treatment complications) but was unaware of other potential benefits, such as protection from recurrence. She denied that her oncology providers had asked about or intervened upon her smoking. She described perceiving moderate (3 on a 1–5 scale of support) social support. She reported very low levels of psychological and physical symptoms (distress, pain, fatigue, nausea) and mild levels of depression and anxiety (PHQ-9=8; GAD-7=5). However, she rated very high on illness stigma (e.g., “I feel others think I am to blame for my illness”).

2.12 First Four Weekly Sessions

Initial Treatment Session (Importance to quit=10; Confidence to quit=2; Distress score=8). Prior to the session, the counselor reviewed the patient’s electronic medical chart. She was just about to begin radiation treatment, and the uncertainty of the procedure and anticipatory pain made her very distressed. Her recent cancer diagnosis made quitting of highest importance, but she was not confident that she could quit, since she had not made any recent smoking behavior changes. Evelyn and the tobacco counselor reviewed her past and current smoking behaviors and FDA approved smoking cessation medications (varenicline, bupropion, and combination NRT). She was not interested in taking additional oral medications and thus selected combination NRT (patch plus lozenge); given her current level of smoking, a 21 mg patch and 4 mg lozenge was dispensed. The clinician also reviewed the benefits of quitting at diagnosis and the potential harms of continued smoking. Pros and cons of continued smoking were elicited. Pros included a perceived calming effect and boredom; cons were the smell, shortness of breath, and health concerns. Barriers to quitting included having no other form of stress or boredom release. Benefits of quitting were to be and feel healthier and stronger.

Goal=Taper down 1 cigarette per day (CPD) and record CPD activity.

Session 2. (Importance to quit=10; Confidence to quit=2; Distress score=5). Evelyn had begun radiation treatment, and thus some of her anticipatory distress had diminished, and had tapered to 15 cigarettes per day but had not yet started the nicotine patches. She noticed a slight improvement in her shortness of breath. The health benefits for cancer patients quitting smoking were again discussed. She shared some negative self-talk ("I might not have the strength to do this too.") and concerns regarding her quitting goals.

Goal=Taper to 12 CPD, by limiting the number of CPD, and begin NRT.

Session 3: (Importance to quit=10; Confidence to quit=4; Distress score=4). Evelyn had completed her first round of radiation treatment. She was smoking 8–12 CPD and is entering the "Preparation" stage of quitting. She attributed her increase in confidence to her success at beginning to cut back; however, she was experiencing some back pain. She began using the patch and lozenge (as needed); the counselor discussed patient's concerns about "too much nicotine." Evelyn reported feeling itchy and obtained hydrocortisone cream. The clinician reviewed the ACE (Avoid, Change and Escape) strategies for dealing with triggers, which included taking a walk after meals, to break the end-of-meal pairing with cigarette and decreasing contact with people who caused stress. Evelyn reflected upon her social support; her husband was her primary source of emotional support and quitting support (e.g., "He does not nag me."); her sister, who once smoked herself, was also a strong source of quitting support.

Goal=Continue on patch and decrease to 9 cpd. Practice ACE. Quit date set for 2 weeks.

Session 4: (Importance to quit=10; Confidence to quit=2; Distress score=6). Evelyn was smoking 10–15 CPD. Her confidence to quit had decreased, since she had not been able to maintain her previous week's reduced smoking rate. Her distress had increased, as she had acclimated to the routine, and support, of ongoing cancer center visits, which was now absent, and waiting a month until her next scan was distressing. The clinician discussed the importance of decreasing to 10 CPD if her patch use were to continue in the same dosage. The importance of proper patch use and adherence was reviewed. The clinician emphasized the importance of decreasing to a 14 mg patch to decrease total nicotine intake and discussed increasing lozenge use if needed to cope with craving. Evelyn had continued to use the patch but itching persisted; she rotated the patch location to decrease itching. She discussed an increasing awareness of her cravings; the counselor and she reviewed how to apply Delay and Distraction techniques (from the 4Ds) to help with her cravings. In addition, the clinician introduced the topic of MINI relaxation exercises (Park et al., Psychosomatics), and Evelyn practiced a few of these.

Goal: Decrease to CPD and switch to 14 mg patch with PRN lozenges. Practice mini. Quit date postponed.

2.13 Four Biweekly Sessions

Session 5: (Importance to quit=10; Confidence to quit=4; Distress score=5). Evelyn was smoking 8–12 CPD. She used the 14 mg patch for a few days but was off of the patch at the time of session. She and the clinician reviewed self-management strategies from previous session, and Evelyn reported that the MINIS were very helpful. The clinician checked in to confirm that her house and car were still smoke-free and reinforced importance of maintaining a smoke-free environment. The counselor asked Evelyn about her beliefs on nicotine and addiction and reinforced importance of medication adherence. They discussed if Evelyn was experiencing any negative self-talk, particularly around quitting; the counselor reinforced the importance of continued positive self-talk. A Values Clarification exercise was introduced, in which the counselor elicited Evelyn's highest priorities; Evelyn identified being considerate of others among her priorities; she and the counselor discussed how becoming smoke-free (e.g., no exposing others to second or thirdhand smoke) was concordant with this perspective.

Goal: Taper to <10 cpd, consistently, every day.

Session 6: (Importance to quit=8; Confidence to quit=7; Distress score=2). The session began with an Appreciation exercise, in which Evelyn shared a few things which she was appreciative of for that week. Evelyn was smoking 12 CPD and is not using any NRT. She was feeling physically well and shared that her follow-up with a mammogram was in one more month. She attributed her slight decrease in importance in not being able to have quit yet, and the clinician elicited confident statements by reviewing her past accomplishments. Evelyn was using cutting back strategies to delay time between cigarettes, which the clinician encouraged her to continue to do. The clinician checked in on expressed smoking-related stigma and negative self-talk; Evelyn's negative talk was that she was not demanding enough of herself. She and the counselor constructed an "Energy Battery," which delineated her "drains" and "charges." Evelyn cited that her negative thoughts were drains and that practicing daily Appreciations and decreases in shortness of breath as charges. Evelyn was particularly appreciative of being able to attend a close friend's daughter's communion. She was not using alternative forms of tobacco or nicotine, but the dangers of light smoking were reviewed. The counselor emphasized the importance of utilizing social support and stress management strategies.

Goal=<10 CPD and work on positive self-talk.

Session 7: (Importance to quit=8; Confidence to quit=7; Distress score=2). Evelyn was still smoking 12 CPD. Her Appreciations included feeling productive, which she also identified as a charge on her energy battery. She and her counselor reviewed her social support, post-treatment support, and compared this to her support during treatment (i.e., her oncology team was very supportive). Now that treatment is finished, Evelyn expressed the need to find a senior group or other avenues

of additional social interaction. She reported that her sleep is often disrupted by awakening due to coughing and breathing, which she identified as a drain on her energy battery. Reducing her cough and improving her breathing are big quit motivators.

Goal=<10 CPD and quit date set.

Session 8. (Importance to quit=10; Confidence to quit=6; Distress score=4). Evelyn was still smoking 12 CPD and was not using any NRT patch or lozenge. Her clinician revisited the health benefits of quitting (decreased shortness of breath and coughing). Evelyn's Appreciation was her health; her mammogram results had been good. She and her counselor discussed the importance of tangible rewards to help with quitting efforts (computer games, creating a nice meal, track improved breathing). They discussed fear of cancer recurrence as a possible trigger to smoke and practiced MINI exercises.

Goal=set quit date with patch use.

2.14 Monthly Sessions

Session 9: (Importance to quit=10; Confidence to quit/stay quit=6; Distress score=3). Evelyn was no longer smoking and had been quit for 2 weeks. She was using the 14 mg patch with no side effects. Her Appreciations included living in a smoke-free beautiful home and having social support. She reported noticeable improvements in her breathing, coughing, and sleep. The counselor conducted a didactic on differentiating smoking slips vs. relapses and normalization of slips. Evelyn expressed concerns about relapsing, and she and the counselor reviewed her ACE strategies for coping with triggers.

Goal=Stay smoke-free and reduce to 7 mg patch.

Session 10: (Importance to quit=10; Confidence to quit=10; Distress score=3). Evelyn was smoke-free and no longer smoking or using the patch. She reported feeling healthier being smoke-free. She had no slips over the past month and described how she utilized her social support to help maintain her smoke-free status. She and the counselor reviewed coping strategies to deal with cravings and relapses.

Goal: Stay smoke-free.

Session 11: (Importance to quit=10; Confidence to quit=10; Distress score=2). Evelyn remained smoke-free and feeling good. She reported minimal cravings and had not had a slip in the past month. Her confidence had increased and she was very proud of her work. She had joined a senior group and she takes time out during the week to prepare some special meals. She and the counselor reviewed the strategies that she had learned throughout the treatment and discussed continued utilization of relapse prevention strategies; Evelyn continued to her ACE, stress management skills, and accesses her support as needed.

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www.lung.org/stop-smoking

www.cancer.gov/cancertopics/tobacco

Smokefree.gov

www.cancer.gov/cancertopics/factsheet/Tobacco/symptoms-triggers-quitting

www.quitnet.com

Smokefree.gov/quit-plan

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