Reducing Tobacco-Related Cancer Incidence and Mortality: Summary of an Institute of Medicine Workshop

ERIN P. BALOGH,^a CAROLYN DRESLER,^b MARK E. FLEURY,^c ELLEN R. GRITZ,^d THOMAS J. KEAN,^e MATTHEW L. MYERS,^f SHARYL J. NASS,^a BRENDA NEVIDJON,^g BENJAMIN A. TOLL,^{h,j} GRAHAM W. WARREN,^{m,n} ROY S. HERBST^{i,k,l}

^aInstitute of Medicine, Washington, D.C., USA; ^bArkansas Department of Health, Little Rock, Arkansas, USA; ^cAmerican Association for Cancer Research, Washington, D.C., USA; ^dDepartment of Behavioral Science, University of Texas, MD Anderson Cancer Center, Houston, Texas, USA; ^eC-Change, Washington, D.C., USA; ^fCampaign for Tobacco-Free Kids, Washington, D.C., USA; ^gDuke University School of Nursing, Durham, North Carolina, USA; ^hCancer Prevention and Control Program and ⁱThoracic Oncology Program, Yale Cancer Center, New Haven, Connecticut, USA; Departments of ^jPsychiatry, ^kPharmacology, and ^lMedical Oncology, Yale School of Medicine, New Haven, Connecticut, USA; Departments of ^mRadiation Oncology and ⁿCell and Molecular Pharmacology and Experimental Therapeutics, Hollings Cancer Center, Medical University of South Carolina, Charleston, South Carolina, USA

Key Words. Tobacco use • Tobacco cessation • Cancer • Tobacco prevention and control

Learning Objectives

Describe strategies that clinicians can implement to reduce the burden of tobacco-related cancers.

Identify potential actions that could facilitate access to and advance tobacco cessation treatment.

ABSTRACT

Tobacco use remains a serious and persistent national problem. Recognizing that progress in combating cancer will never be fully achieved without addressing the tobacco problem, the National Cancer Policy Forum of the Institute of Medicine convened a public workshop exploring current issues in tobacco control, tobacco cessation, and implications for

cancer patients. Workshop participants discussed potential policy, outreach, and treatment strategies to reduce tobacco-related cancer incidence and mortality, and highlighted a number of potential high-value action items to improve tobacco control policy, research, and advocacy. *The Oncologist* 2014;19:21–31

Implications for Practice: Tobacco use is the leading cause of preventable death in the U.S.; approximately 30% of all cancer deaths and 80% of lung cancer deaths are due to tobacco use. Substantial evidence also demonstrates that smoking is associated with poor outcomes in cancer patients. The Institute of Medicine's National Cancer Policy Forum convened a public workshop to examine current issues in tobacco control and tobacco cessation. This article highlights potential high-value action items to improve tobacco cessation treatment and advance tobacco control policy, research, and advocacy. Clinicians play a vital role in reducing the burden of tobacco-related cancers by providing tobacco cessation treatment to their patients.

INTRODUCTION

Tobacco use remains a serious and persistent national problem. As the leading cause of preventable death in the U.S., smoking accounts for more than 440,000 deaths annually, including 30% of all cancer deaths, and results in \$193 billion in health-related economic losses each year [1, 2]. Recognizing that progress in combating cancer will never be fully achieved without addressing the tobacco problem, the National Cancer Policy Forum of the Institute of Medicine convened a public workshop titled *Reducing Tobacco-Related Cancer Incidence and Mortality* in June 2012 [3].

The National Cancer Policy Forum convenes representatives from government, industry, and academia, along with other stakeholders, to consider issues in science, medicine, public health, and policy relevant to the goals of reducing the

burden of cancer. This workshop gathered experts to examine the current issues in tobacco control and tobacco cessation at the population level and their impact on cancer patient outcomes, and to discuss potential policy, outreach, and treatment strategies to reduce tobacco-related cancer incidence and mortality. This article summarizes presentations and discussion from the workshop, and it highlights a number of potential high-value action items to improve tobacco control policy, research, and advocacy.

TRENDS IN TOBACCO USE IN THE U.S.

Although the U.S. has made progress in reducing tobacco use by reducing adult smoking prevalence from approximately 40% at the time of the first U.S. Surgeon General's report on

Correspondence: Erin P. Balogh, M.P.H., Associate Program Officer, Institute of Medicine, 500 Fifth Street NW, Washington, D.C. 20001, USA. Telephone: 202-334-2501; E-Mail: ebalogh@nas.edu Received June 26, 2013; accepted for publication September 24, 2013; first published online in *The Oncologist Express* on December 4, 2013. ©AlphaMed Press 1083-7159/2013/\$20.00/0 <http://dx.doi.org/10.1634/theoncologist.2013-0230>

Figure 1. Percentage of high school students who reported current cigarette use, 1991 to 2011. For all high school students, cigarette smoking increased from 1991 to 1997 and decreased from 1997 to 2011. The rate of decline in smoking has slowed down from 2003 to 2011 compared with 1997 to 2003. Note: Current cigarette use is defined as smoking on at least 1 day during the 30 days prior to the survey. Source: CDC. 2012. *Adolescent and school health: Youth risk behavior survey fact sheets*. <http://www.cdc.gov/healthyyouth/yrbs/factsheets/index.htm>.

smoking in 1964 to 18.9% today [4, 5], progress in reducing tobacco use has slowed. Compared with the overall population, there is a greater burden of smoking in certain population subgroups, including individuals with lower socioeconomic status and educational attainment, individuals with a history of mental illness and/or substance abuse, and military personnel [6–9]. For youth, after several decades of progress in reducing tobacco use, the decline in smoking seems to be slowing (Fig. 1) and is at a standstill for smokeless tobacco use. Preventing tobacco use in youth is critical; according to the 2012 U.S. Surgeon General’s report, 99% of individuals who smoke start by age 26, and nearly 90% of smokers begin by age 18 [10]. According to Dr. Howard Koh, Assistant Secretary for Health at the U.S. Department of Health and Human Services, “It is time to accelerate and reinvigorate our efforts and reaffirm that tobacco use is the premier public health challenge of our time.”

Although the cigarette is the most prominent tobacco product on the market, the use of other tobacco and nicotine products, including cigars, snus, spit tobacco, dissolvable tobacco products, and the e-cigarette, may be increasing [11, 12]. The health consequences of many new alternative tobacco products have not been tested or monitored, and are thus unknown. A major concern is that they will extend tobacco dependence of people who smoke regularly through their use in locations or during times that smoking would otherwise not be possible, thereby blunting public health measures designed to encourage tobacco cessation. Ultimately, the public health effects of these products will depend not only on their physical and chemical characteristics, but also on how they are marketed by companies, regulated by the Food and Drug Administration (FDA), and used by consumers.

Increased consumption of cigars is being influenced by disparities in taxes among cigarettes, small cigars, and large cigars. By slightly increasing the weight of small cigars, tobacco manufacturers can take advantage of the preferential tax treatment afforded to products classified as large cigars.

However, these cigars seem to be used functionally more like cigarettes than traditional large cigars [13].

TOBACCO AND CANCER

There is sufficient scientific evidence to causally link tobacco use to cancers at 18 different organ sites through a number of mechanisms [2, 14–17]. Tobacco use accounts for approximately 30% of all cancer deaths and approximately 80% of lung cancer deaths [2]. Lung cancer, for which smoking is the primary risk factor, is the leading cause of cancer death in both men and women, accounting for more cancer deaths than the next four cancers combined [2].

In addition, there is substantial evidence demonstrating that smoking is associated with poor outcomes in cancer patients. Table 1 provides a compilation of selected studies showing that current smoking in proximity to a cancer diagnosis increases cancer-related and noncancer-related mortality, increases cancer recurrence, increases treatment toxicity, increases risk of developing a second primary cancer, increases risk of noncancer-related comorbidity, and decreases quality of life in a diversity of cancer disease sites. The adverse effects of smoking on survival are noted by a number of studies through a variety of mechanisms [18–25]. Smoking is known to increase mortality due to vascular disease, heart disease, cerebrovascular disease, chronic obstructive pulmonary disease, smoking-related cancers, and nonsmoking-related cancers [26]. Bittner et al. [27] in 2008 exemplify the importance of noncancer-related smoking effects: in 1,354 prostate cancer patients treated with brachytherapy, only 8.7% of total deaths were attributed to prostate cancer. In these prostate cancer patients, current smoking increased the risk of death from cardiovascular disease (RR 3.05), cancers other than prostate cancer (RR 4.09), and death from other causes (RR 5.52), suggesting that for prostate cancer patients smoking may play a bigger role in survival than the prostate cancer itself [27]. Smoking increases the risk of developing second primary cancers [28–31], and smoking may synergistically enhance the risk of second

Table 1. Selected studies on the effects of smoking in cancer patients

Study	Design/Population	Findings
Warren et al., 2013 [20]	5,185 cancer patients with structured interview within 30 days of diagnosis (Roswell Park Cancer Institute)	In the overall cohort, current smoking increased overall mortality vs. recently quit (HR 1.17), former (HR 1.29), and never smokers (HR 1.38). Current smoking increased disease-specific mortality vs. former (HR 1.23) and never smokers (HR 1.18). Current smoking increased overall and disease-specific mortality vs. recently quit in head/neck and lung cancer. The effects of smoking were noted in both tobacco-related and non-tobacco-related cancers. The effects were more significant in men than women.
Gajdos et al., 2012 [21]	20,413 gastrointestinal (G), thoracic (T), and urologic (U) cancer patients with major surgery through VA health care system (VA Surgery Quality Improvement Program)	Current smoking increased risk for surgical site infection (OR: G = 1.20), pneumonia (OR: G = 1.98, T = 1.51, U = 1.97), failure to wean from ventilator (OR: G = 2.21, T = 1.64), reintubation (OR: G = 2.15, T = 1.72), combined pulmonary outcome (OR: G = 1.96, T = 1.62, U = 1.57), return to operating room (OR: G = 1.31, U = 1.44), 30-day mortality (OR: G = 1.41), and 1-year mortality (OR: G = 1.62, T = 1.50).
Gillison et al., 2012 [22]	502 stage III–IV head/neck cancer patients from phase III trials treated with RT or CRT (RTOG 9003 and 0129)	Smoking during RT decreased overall survival (HR 2.33) and progression-free survival (HR 2.19). Smoking at diagnosis in patients treated with CRT decreased progression-free survival (HR 2.73) with a near significant decrease in overall survival (HR 2.05, 0.98–4.30).
Richards et al., 2011 [23]	423 stage I–III colorectal cancer patients treated with surgery (United Kingdom)	Current smoking increased risk for postoperative complications (HR 1.32). Smoking decreased disease-free survival (HR 1.25) and overall survival (HR 1.30) with increased risk of systemic recurrence ($p = .041$).
Kenfield et al., 2011 [24]	5,366 prostate cancer patients with repeated smoking assessments every 2 years (Health Professionals Study)	Current smoking increased risk of prostate cancer death (HR 1.61), biochemical recurrence (HR 1.61), deaths from any cause (HR 2.28), and cardiovascular death (HR 2.13).
Waggoner et al., 2006 [25]	315 advanced cervical cancer patients from phase III study of CRT (GOG 165)	Current smoking decreased overall survival (HR 1.51) with a near significant decrease in progression-free survival (HR 1.35) as compared with former/never smokers combined.
van den Belt-Dusebout et al., 2007 [30]	2,707 testicular cancer patients with at least 5 years of survival (The Netherlands)	With 17.6 years median follow-up, smoking at or following diagnosis increased risk for second malignancy (HR 1.8), cardiovascular disease (HR 1.8), and second malignancy combined with cardiovascular disease (HR 3.4).
Travis et al., 2002 [31]	222 Hodgkin's disease patients with lung cancer matched to 444 Hodgkin's disease patients without lung cancer (from a cohort of 19,046 Hodgkin's disease patients)	Current smoking at diagnosis increased risk of lung cancer (RR 21.2) with lesser risks in former smokers (RR 4.0). In current smokers with at least a 1-pack per day habit, current smoking increased risk in a synergistic manner when combined with cytotoxic treatments (RR 6.0 for smoking alone; RR 20.2 when smoking was combined with RT; RR 16.8 when smoking was combined with alkylating agents; RR 49.1 when smoking was combined with RT + alkylating agents).
Hoening et al., 2007 [33]	7,425 breast cancer patients with stage I–IIIA breast cancer and at least 10 years of survival (Late Effects Breast Cancer Cohort)	With 17.7 years median follow-up, current smoking increased risk of myocardial infarction and congestive heart failure. The risk of heart disease with RT alone was nonsignificant, but became significant when RT was combined with current smoking (HR 3.04).
Jang et al., 2011 [38]	1,920 women diagnosed with breast, colorectal, or endometrial cancer (Women's Health Study)	Persistent smoking with a higher incidence of stroke (OR 2.32), lower physical activity (OR 1.42), lower mental health ($p < .05$), lower emotional role ($p < .05$), and lower physical function ($p < .05$).

Abbreviations: CRT, chemoradiotherapy; GOG, Gynecologic Oncology Group; HR, hazard ratio; OR, odds ratio; RR, relative risk; RT, radiotherapy; RTOG, Radiation Therapy Oncology Group.

malignancy and comorbid disease associated with cytotoxic cancer treatments [30–33]. Smoking also increases the risk of complications from cancer treatment [21, 23, 34, 35], decreases compliance with cancer-related therapeutics [36],

and decreases quality of life in cancer patients and/or caregivers [37, 38]. Interestingly, studies suggest that between 30% and 40% of cancer patients who smoke may under-represent tobacco use by self-report [39, 40], suggesting that the observed

effects of smoking may be underestimated. For example, Marin et al. [41] in 2008 demonstrated that self-reported current smoking had no significant effect on wound healing in head/neck cancer patients, but biochemically confirmed tobacco use with serum cotinine significantly predicted poor surgical outcomes. Recent studies have developed prognostic algorithms for smoking in head and neck cancer patients [42], and others have extended evidence to suggest that smoking be considered as a new standard part of cancer staging [43], which may be important considerations given the broad diversity of effects due to smoking.

Smoking increases the risk of developing second primary cancers, and smoking may synergistically enhance the risk of second malignancy and comorbid disease associated with cytotoxic cancer treatments. Smoking also increases the risk of complications from cancer treatment, decreases compliance with cancer-related therapeutics, and decreases quality of life in cancer patients and/or caregivers.

Relatively few studies have evaluated the effect of smoking cessation on outcome, but these limited studies suggest that continued smoking after diagnosis may worsen outcome and that tobacco cessation may reverse the adverse effects of smoking in cancer patients [44]. Phipps et al. [45] in 2011 reported on 2,264 colorectal cancer patients interviewed a median of 6.9 months after diagnosis, demonstrating that smoking increased cause-specific and overall mortality with higher risks in patients who continued to smoke at the time of interview. Browman et al. [46] in 1993 demonstrated that smoking during radiotherapy decreases overall and disease-free survival, but quitting within 12 weeks of diagnosis resulted in improved survival. In 1,416 prostate cancer patients treated with radical prostatectomy, smoking within 5 years prior to surgery increased risk of diagnosis at a younger age, advanced stage, and positive surgical margins; however, only persistent smoking 1 year after surgery was associated with increased recurrence [47]. A study by Bjarnason et al. [48] in 2009 evaluated 205 head/neck cancer patients treated with radiotherapy, demonstrating that patients who smoked during radiotherapy and who were treated in the morning had decreased severe mucositis than smoking patients treated in the afternoon (42.9% vs. 72%, $p = .024$), suggesting that some of the adverse effects of smoking may be acutely reversible. Unfortunately, there are no large randomized studies evaluating the effect of tobacco cessation on outcomes for cancer patients, but data support tobacco cessation at or following diagnosis as a potentially useful mechanism to improve cancer treatment outcomes and survival.

Despite this evidence of worse outcomes, a sizable portion of patients with cancer—as well as their families—continue to smoke after a cancer diagnosis [49–54]. Although many individuals are willing to try to quit, nicotine is highly addictive and overall success in quitting is relatively low [55, 56]. This may be due in part to the fact that many tobacco users do not utilize evidence-based approaches for tobacco cessation (i.e., formal smoking cessation support combined with

pharmacotherapy) or do not receive sufficient support or referrals from their clinicians [55, 56].

TOBACCO CESSATION TREATMENT

There is a strong evidence base for tobacco cessation treatment. The U.S. Public Health Service (PHS) clinical practice guideline on tobacco cessation is based on nearly 9,000 studies and 35 meta-analyses and demonstrates that tobacco cessation treatments are effective across a wide range of populations [56]. Among the actions recommended by the guideline are the use of seven FDA-approved first-line medications and tobacco cessation counseling. Combining tobacco cessation medications, as well as tailoring medications to individual patient preferences, can be effective strategies to improve quitting success. The guideline also found that spending more time counseling patients led to higher quit rates. However, even group and telephone counseling, which are discussed below, are effective interventions, as well as brief interventions as short as 3 minutes.

Quitlines reach a broad population with evidence-based tobacco cessation counseling, education, and referrals. In the U.S., individuals can call into the national network of state quitlines at 1-800-QUIT-NOW or visit <http://www.smokefree.gov>. Other partners in national tobacco control, including the American Cancer Society and Legacy, offer quitlines and online quitting resources, such as the EX Plan [57]. In addition, clinicians can provide tobacco cessation counseling and medication, or patients can be referred to tobacco cessation programs, in some cases, including inpatient treatment. The guideline recommends that all clinicians utilize the 5A's approach for treating tobacco dependence, which includes asking patients about their tobacco use, advising patients to make a quit attempt, assessing the patient's willingness to make a quit attempt, assisting in the quit attempt, and arranging follow-up to contact patients on their progress (Table 2). Alternatively, the "2A and R" approach can be used: Ask, Advise, and Refer to a separate cessation assistance program [58].

Despite the major health threat of tobacco use and the availability of evidence-based approaches for tobacco cessation, there are a number of barriers preventing widespread use of tobacco cessation treatment. Unfortunately, many clinicians—including primary care providers, nurses, and oncologists—are reluctant to identify and address tobacco use by their patients [56, 59, 60]. Oftentimes, patient tobacco use status is not assessed in clinician encounters, and many clinicians do not refer patients to cessation programs. Some clinicians may also be reluctant to treat a patient's tobacco dependence if he or she is undergoing cancer treatment, although some cessation medications have been used for decades in cancer patients, and quitting smoking can have a marked effect on a patient's survival. Involving a broad range of clinicians in the assessment and treatment of tobacco use is also important, as the more types of clinicians involved, the more likely the quitting success [56].

Importantly, there is a lack of accountability for assessing tobacco use in patients and providing associated cessation treatment—it is not a requirement for accreditation or for receiving a cancer center designation. A recent survey of National Cancer Institute-designated cancer centers found

Table 2. The 5A's model for treating tobacco use and dependence

5A's	Description	Strategies for implementation
Ask about tobacco use	Identify and document tobacco use status for every patient at every visit.	Expand vital signs to include tobacco use or use an alternative universal identification system (e.g., indicating tobacco use by stickers on patient charts or via electronic medical records labeling).
Advise to quit	In a clear, strong, and personalized manner, urge every tobacco user to quit.	<p>Advice should be:</p> <p>Clear "It is important that you quit smoking (or using chewing tobacco, snuff, or other tobacco products) now, and I can help you." "Cutting down while you are ill is not enough." "Occasional or light smoking is still dangerous."</p> <p>Strong "As your clinician, I need you to know that quitting smoking is the most important thing you can do to protect your health now and in the future. The clinic staff and I will help you."</p> <p>Personalized Tie tobacco use to current symptoms and health concerns, and/or its social and economic costs, and/or the impact of tobacco use on children and others in the household. For example: "Continuing to smoke makes your asthma worse, and quitting may dramatically improve your health." "Quitting smoking may reduce the number of ear infections your child has."</p>
Assess willingness to make a quit attempt	Assess whether the tobacco user is willing to make a quit attempt this time.	<p>Assess willingness to quit: "Are you willing to give quitting a try?"</p> <p>If the patient is willing to make a quit attempt at the time of the clinic visit, provide assistance in the next step (Assist). If the patient clearly states that he or she is unwilling to make a quit attempt at this time, provide an intervention to increase future quit attempts (e.g., motivational interviewing).</p>
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.	<p>Help the patient establish a quit plan.</p> <p>Set a quit date.</p> <p>Tell family, friends, and coworkers about quitting, and request understanding and support.</p> <p>Anticipate challenges to the upcoming quit attempt.</p> <p>Remove tobacco products from your environment.</p> <p>Recommend the use of medication, except when contraindicated or with specific populations in which there is insufficient evidence (i.e., pregnant women, smokeless tobacco users, light smokers, and adolescents).</p> <p>Provide practical counseling (problem-solving and skills training).</p> <p>Provide a supportive clinical environment while encouraging a patient in his or her quit attempt.</p> <p>Provide supplemental materials, including information on quitlines (1-800-QUIT-NOW).</p> <p>For the patient unwilling to quit at this time, use motivational interviewing techniques to increase the likelihood of future quit attempts.</p>
Arrange follow-up	<p>For the patient willing to make a quit attempt, arrange for follow-up contacts, beginning with the first week after the quit date.</p> <p>For patients unwilling to make a quit attempt at the time of the provider visit, address tobacco dependence and willingness to quit at next clinic visit.</p>	<p>Timing: Follow-up contact should begin soon after the quit date, preferably during the first week. A second follow-up contact is recommended within the first month. Schedule further follow-up contacts as indicated.</p> <p>Actions during follow-up contact: For all patients, identify problems already encountered and anticipate challenges in the immediate future. Assess medication use and problems. Remind patients of quitline support (1-800-QUIT-NOW).</p> <p>Address tobacco use at next clinical visit (treat tobacco use as a chronic disease).</p> <p>For patients who are abstinent, congratulate them on their success.</p> <p>If tobacco use has occurred, review circumstances and elicit recommitment to total abstinence. Consider use of or link to more intensive treatment.</p>

Adapted from Fiore et al., 2008, pages 39–43 [56].

that only 62% of centers routinely provide tobacco education materials, and just more than half of centers reported effective identification of patient tobacco use; 20% of centers had no tobacco cessation services, and less than half of the cancer centers had personnel designated to provide tobacco cessation treatment [61].

Lastly, a lack of insurance coverage and other incentives prevents the use of tobacco cessation treatment; however, the Patient Protection and Affordable Care Act (ACA) will expand coverage for these services, as discussed below.

Importantly, there is a lack of accountability for assessing tobacco use in patients and providing associated cessation treatment—it is not a requirement for accreditation or for receiving a cancer center designation. A recent survey of National Cancer Institute-designated cancer centers found that only 62% of centers routinely provide tobacco education materials, and just more than half of centers reported effective identification of patient tobacco use; 20% of centers had no tobacco cessation services, and less than half of the cancer centers had personnel designated to provide tobacco cessation treatment.

TOBACCO CONTROL POLICY, ADVOCACY, AND EDUCATION

In addition to recognizing and treating tobacco dependence as a serious medical problem, strong tobacco control policy, advocacy, and education are also needed to confront the population health consequences of tobacco use, as well as those impacting cancer patients who use tobacco.

Federal and State Tobacco Policy

In 2010, the federal government launched a national strategic action plan, *Ending the Tobacco Epidemic*, to coordinate tobacco control activities [62]. The Centers for Disease Control and Prevention (CDC) is the lead agency for comprehensive tobacco prevention and control, but tobacco control efforts also involve FDA, Centers for Medicare and Medicaid Services, and other agencies. CDC supports state tobacco control efforts by providing funding for infrastructure and training, running antismoking media campaigns, and helping support the national network of state quitlines.

The Family Smoking Prevention and Tobacco Control Act (Public Law 111-31), passed in 2009, provides FDA with the authority to regulate the manufacture, distribution, and marketing of tobacco products to protect public health. One of the provisions of the Act was to require larger, more prominent health warnings for cigarettes. These graphic warning labels have been challenged in the courts by the tobacco industry, and the warnings as promulgated were deemed unconstitutional by the U.S. Court of Appeals for the District of Columbia Circuit [63]. In March 2013, FDA dropped its legal fight over the graphic warning labels and will instead propose new cigarette warning labels [64].

The ACA expands the coverage for tobacco cessation treatment. New private health insurance plans must provide

beneficiaries with high-value preventive services that receive an “A” or “B” rating from the U.S. Preventive Services Taskforce at no cost to plan members, which includes tobacco cessation treatment. The ACA also calls for coverage of tobacco cessation treatment for pregnant women in Medicaid without cost sharing, and in 2014 will forbid state Medicaid programs from excluding coverage of tobacco cessation medication for all beneficiaries [65]. When states created their essential health benefits packages established by the ACA, the U.S. Department of Health and Human Services suggested that states look to the Federal Employee Health Benefits Plan, which started covering comprehensive tobacco cessation treatment as part of its national strategic action plan on tobacco.

In addition to federal efforts, states are undertaking a number of strategies to reduce tobacco use, including smoke-free environments and taxes. Tobacco control efforts in three states—California, New York, and Massachusetts—were featured at the workshop. California reduced the incidence of lung and bronchus cancers by nearly 30% between 1988 and 2009 (Fig. 2A), about twice the decline in the rest of the U.S., attributing much of that decline to state policies and educational efforts aimed at changing social norms for tobacco. The state and city of New York have passed laws mandating smoke-free workplaces and public places and increased funding for tobacco prevention and cessation programs that contributed to a 50% decline in the rate of youth smoking and a 19% decline in adult smoking from 2002 to 2007 (Fig. 2B) [66, 67]. By providing tobacco cessation treatment benefits to its Medicaid beneficiaries, Massachusetts has dramatically decreased tobacco use and has documented a 46% drop in annual hospital claims for heart attacks among Massachusetts Medicaid beneficiaries [68]. Researchers found that the tobacco cessation benefit has an estimated return on investment of \$2.12 for every dollar spent on program costs [69].

Advocacy and Education

Advocacy and education are important contributions to advancing tobacco control policies, preventing tobacco use, and promoting cessation. The tobacco industry has been incredibly effective at encouraging smoking through its advertising and promotions [70]. However, extensive evidence illustrates that antitobacco media campaigns are an effective mechanism to discourage tobacco use [70–74]. For example, more than one-fifth of the decline in youth smoking that occurred from 1999 to 2002 could be attributed to the *Legacy truth* campaign [75]. CDC’s media campaign, *Tips from Former Smokers*, was linked to a doubling of calls to quitlines and a tripling of unique visits to the website. With the evolving modes of communication and entertainment, tobacco education efforts are also expanding to the Internet, cell phone apps, social networking sites, video game kiosks, and computer tablets [76–79].

The involvement of clinicians, clinician organizations, businesses, and patients in promoting tobacco control is also critical. Although a number of oncology organizations have issued supportive statements, tobacco cessation treatment is not part of standard cancer care [80–83], and many workshop participants stressed that more could be done to advance tobacco control efforts and more widely promote tobacco cessation

Figure 2. Impact of tobacco control measures in California and New York City. **(A):** With a 15-year investment of \$1.8 billion in tobacco control, lung and bronchus cancer incidence rates declined faster in California compared with the rest of the U.S. from 1988 to 2009. Source: California Department of Public Health, California Tobacco Control Program. **(B):** Impact of tobacco taxes and smoke-free laws on adult and youth smoking prevalence in New York City, 2002–2006. Source: Ellis et al. [66]; New York City Department of Health and Mental Hygiene [67].

treatment in the cancer care community. To promote cancer risk reduction, C-Change encourages clinicians, businesses, and cancer centers to become leaders in tobacco control advocacy within their own communities [84].

CHALLENGES TO ADVANCING TOBACCO CONTROL

A number of challenges hamper tobacco control efforts, including actions by the tobacco industry to continue to undermine effective tobacco control strategies, such as media campaigns to oppose tobacco tax increases and legal challenges at the local, state, and federal levels. Defending legal challenges brought by the tobacco industry can be financially insurmountable, especially for small communities. A major problem is the extreme asymmetry of tobacco industry funding compared with the amount of public health funding allocated to tobacco control, with the tobacco industry outspending state tobacco prevention efforts by 23 to 1 [85]. In addition, because of budget pressures, state funding for

tobacco control programs, approximately \$500 million, is far below the CDC-recommended spending level of \$3.7 billion and has been declining in recent years [86, 87].

MOVING FORWARD

Workshop participants suggested a number of potential high-value strategies to (a) integrate tobacco assessment and cessation treatment in clinical practice; (b) facilitate access to and use of tobacco cessation treatment; (c) advance tobacco control advocacy and policy; and (d) leverage research to improve tobacco control.

Integrating Tobacco Assessment and Cessation Treatment in Clinical Practice

Clinicians play a vital role in reducing the burden of tobacco-related cancers by recognizing and treating nicotine dependence as a serious chronic medical condition that influences

both the development of cancer and the outcomes of cancer treatment. Clinicians can make substantial contributions to reducing tobacco-related health burdens by incorporating tobacco assessment and cessation support as a standard part of clinical care for all patients. This includes discussing the health consequences of ongoing tobacco use and the health benefits associated with cessation, providing consistent and repeated counseling for tobacco cessation, and recommending or providing evidence-based counseling and medication for all patients who use tobacco at every patient encounter.

Cancer care could be improved by accurately identifying tobacco use in cancer patients during and following cancer treatment using structured tobacco assessments and/or biochemical confirmation methods. To improve treatment outcomes and reduce cancer treatment toxicity and complications, oncologists can incorporate tobacco cessation treatment as the standard of care for all patients who use tobacco products. This change could be rapidly implemented by mandating that all institutions treating cancer patients must have or refer patients to evidence-based tobacco cessation treatment as a requirement for Commission on Cancer accreditation or for designation as a National Cancer Institute cancer center or comprehensive cancer center, and by asking other accrediting bodies to do the same.

Facilitating Access to and Use of Tobacco Cessation Treatment

Several changes could facilitate access to and advance tobacco cessation treatment. Payment incentives could encourage clinicians to assess tobacco use and refer to cessation treatment. Assessment and referral could also be mandated as a condition of reimbursement for standard medical procedures, such as a wellness office visit. Electronic medical records (EMRs) could facilitate tobacco assessment, cessation referrals, and cessation treatment, but not all EMRs have fields consistent with the PHS tobacco dependence treatment guideline [88]. Increased funding for tobacco cessation programs and enhanced training for health care professionals in providing evidence-based tobacco cessation treatment in a manner that personalizes treatment to prioritize patient preferences and needs would also be beneficial. Given the high return of investment for tobacco cessation treatment and programs [69], ensuring that all insurance plans provide coverage for evidence-based tobacco cessation treatment would also increase access. Enhancing coordination among health care systems and tobacco cessation treatment providers in the community, such as quitlines, may also expand referrals to tobacco cessation services.

Advancing Tobacco Control Advocacy and Policy

Tobacco control advocacy and policy could be improved through better coordination of institutional, local, state, and national tobacco control efforts and oversight. A major factor is ensuring that tobacco control programs have sufficient resources to achieve their missions. Additionally, ensuring that communities have the capacity to defend legal challenges from the tobacco industry is also critical. Engaging clinicians and national clinician societies to join with the public health community could also generate powerful synergies in promoting tobacco control measures. Tobacco control policy and

advocacy efforts also need to rapidly adapt to the trends of tobacco marketing and product use, including the dual use of noncombustible and combustible products, as well as the use of new products (e.g., e-cigarettes).

Reductions in tobacco use could be achieved by using FDA regulatory authority to reduce the amount of nicotine in tobacco products to nonaddicting levels so that consumers who would like to discontinue use can do so more readily. In addition, enabling consumers to make informed decisions about tobacco product use could be accomplished by rapidly assessing and effectively communicating the relative health risks of new, combined, and alternative tobacco products, using evidence-based approaches with FDA oversight. Other strategies to reduce tobacco use include advancing effective policies and advocacy efforts, such as taxes, smoke-free laws, and media campaigns.

Leveraging Research to Improve Tobacco Control

The role for health research to improve tobacco cessation treatment and tobacco control efforts is also extensive. Improving the capacity for rapid research to assess the use and health effects of new tobacco products is needed, as well as providing more funding for research on lung cancer and tobacco cessation treatment. To better understand the impact of tobacco use and cessation on cancer treatment, all cancer clinical trials could include measures to assess tobacco use and cessation [59, 89]. In addition, research could maximize the impact of FDA oversight by informing product standards and other regulations. More research on effective communication strategies, including the roles of emerging social media and other communication innovations, to inform the public about the risks of tobacco use and to promote quitting attempts is also needed. Finally, prioritizing behavioral and social science research on tobacco use and cessation, along with interventional health research efforts, could also inform future tobacco control strategies and enhance the impact of tobacco cessation treatment that may ultimately reduce tobacco-related cancer incidence and mortality.

ACKNOWLEDGMENTS

The responsibility for the content of this article rests with the authors and does not necessarily represent the views of the Institute of Medicine, its committees, or its convening activities. The activities of the Institute of Medicine's National Cancer Policy Forum are supported by its sponsoring members, which currently include the National Cancer Institute, Centers for Disease Control and Prevention, Association of American Cancer Institutes, American Association for Cancer Research, American Cancer Society, American Society of Clinical Oncology, American Society for Radiation Oncology, Bristol-Myers Squibb, C-Change, CEO Roundtable on Cancer, GlaxoSmithKline, LIVESTRONG Foundation, Novartis Oncology, Oncology Nursing Society, and Sanofi Oncology. We thank the speakers and participants for their contributions to the workshop.

AUTHOR CONTRIBUTIONS

Conception/Design: Erin P. Balogh, Carolyn Dresler, Ellen R. Gritz, Thomas J. Kean, Sharyl J. Nass, Brenda Nevidjon, Benjamin A. Toll, Roy S. Herbst
Collection and/or assembly of data: Erin P. Balogh, Carolyn Dresler, Sharyl J. Nass, Benjamin A. Toll, Graham W. Warren, Roy S. Herbst

Data analysis and interpretation: Erin P. Balogh, Carolyn Dresler, Mark E. Fleury, Matthew L. Myers, Benjamin A. Toll, Roy S. Herbst
Manuscript writing: Erin P. Balogh, Carolyn Dresler, Mark E. Fleury, Ellen R. Gritz, Thomas J. Kean, Matthew L. Myers, Sharyl J. Nass, Brenda Nevidjon, Benjamin A. Toll, Graham W. Warren, Roy S. Herbst
Final approval of manuscript: Erin P. Balogh, Carolyn Dresler, Mark E. Fleury, Ellen R. Gritz, Thomas J. Kean, Matthew L. Myers, Sharyl J. Nass, Brenda Nevidjon, Benjamin A. Toll, Graham W. Warren, Roy S. Herbst

DISCLOSURES

Benjamin A. Toll: Pfizer (RF); **Matthew Myers:** California Light Cigarette Class Action Case (ET). The other authors indicated no financial relationships.
 Section Editor: Powel Brown: None.
 Reviewer "A": None
 (C/A) Consulting/advisory relationship; (ET) Expert testimony; (RF) Research funding; (E) Employment; (H) Honoraria received; (OI) Ownership interests; (IP) Intellectual property rights/inventor/patent holder; (SAB) Scientific advisory board

REFERENCES

- Centers for Disease Control and Prevention (CDC). Smoking-attributable mortality, years of potential life lost, and productivity losses—United States, 2000–2004. *MMWR Morb Mortal Wkly Rep* 2008;57:1226–1228.
- American Cancer Society. Cancer Facts & Figures 2012. Available at <http://www.cancer.org/acs/groups/content/@epidemiologysurveillance/documents/document/acspc-031941.pdf>. Accessed November 26, 2013.
- Institute of Medicine. Reducing Tobacco-Related Cancer Incidence and Mortality: Workshop Summary. Washington, D.C.: The National Academies Press, 2012.
- Centers for Disease Control and Prevention (CDC). Figure 8.1. Prevalence of Current Smoking Among Adults Aged 18 and Over: United States, 1997–2011. Available at http://www.cdc.gov/nchs/data/nhis/earlyrelease/earlyrelease201206_08.pdf. Accessed November 26, 2013.
- Centers for Disease Control and Prevention (CDC). Tobacco use—United States, 1900–1999. *MMWR Morb Mortal Wkly Rep* 1999;48:986–993.
- Centers for Disease Control and Prevention (CDC). Current cigarette smoking prevalence among working adults—United States, 2004–2010. *MMWR Morb Mortal Wkly Rep* 2011;60:1305–1309.
- Lasser K, Boyd JW, Woolhandler S et al. Smoking and mental illness: A population-based prevalence study. *JAMA* 2000;284:2606–2610.
- Gierisch JM, Straits-Tröster K, Calhoun PS et al. Tobacco use among Iraq- and Afghanistan-era veterans: A qualitative study of barriers, facilitators, and treatment preferences. *Prev Chronic Dis* 2012;9:E58.
- Bray RM, Hourani LL. Substance use trends among active duty military personnel: Findings from the United States Department of Defense Health Related Behavior Surveys, 1980–2005. *Addiction* 2007;102:1092–1101.
- HHS. 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.
- Giovino GA. The tobacco epidemic in the United States. *Am J Prev Med* 2007;33:S318–S326.
- O'Connor RJ. Non-cigarette tobacco products: What have we learnt and where are we headed? *Tob Control* 2012;21:181–190.
- Centers for Disease Control and Prevention (CDC). Consumption of cigarettes and combustible tobacco—United States, 2000–2011. *MMWR Morb Mortal Wkly Rep* 2012;61:565–569.
- HHS. The Health Consequences of Smoking: 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, 2004.
- Secretan B, Straif K, Baan R et al. A review of human carcinogens—Part E: Tobacco, areca nut, alcohol, coal smoke, and salted fish. *Lancet Oncol* 2009;10:1033–1034.
- IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. IARC monographs on the evaluation of carcinogenic risks to humans. Tobacco Smoke and Involuntary Smoking. Vol 83. Lyon, France: IARC, 2004.
- IARC. World Cancer Report 2008. Lyon, France: IARC, 2008.
- Yu GP, Ostroff JS, Zhang ZF et al. Smoking history and cancer patient survival: A hospital cancer registry study. *Cancer Detect Prev* 1997;21:497–509.
- Kvale E, Ekundayo OJ, Zhang Y et al. History of cancer and mortality in community-dwelling older adults. *Cancer Epidemiol* 2011;35:30–36.
- Warren GW, Kasza KA, Reid ME et al. Smoking at diagnosis and survival in cancer patients. *Int J Cancer* 2013;132:401–410.
- Gajdos C, Hawn MT, Campagna EJ et al. Adverse effects of smoking on postoperative outcomes in cancer patients. *Ann Surg Oncol* 2012;19:1430–1438.
- Gillison ML, Zhang Q, Jordan R et al. Tobacco smoking and increased risk of death and progression for patients with p16-positive and p16-negative oropharyngeal cancer. *J Clin Oncol* 2012;30:2102–2111.
- Richards CH, Platt JJ, Anderson JH et al. The impact of perioperative risk, tumor pathology and surgical complications on disease recurrence following potentially curative resection of colorectal cancer. *Ann Surg* 2011;254:83–89.
- Kenfield SA, Stampfer MJ, Chan JM et al. Smoking and prostate cancer survival and recurrence. *JAMA* 2011;305:2548–2555.
- Waggoner SE, Darcy KM, Fuhrman B et al. Association between cigarette smoking and prognosis in locally advanced cervical carcinoma treated with chemoradiation: A Gynecologic Oncology Group study. *Gynecol Oncol* 2006;103:853–858.
- Kenfield SA, Stampfer MJ, Rosner BA et al. Smoking and smoking cessation in relation to mortality in women. *JAMA* 2008;299:2037–2047.
- Bittner N, Merrick GS, Galbreath RW et al. Primary causes of death after permanent prostate brachytherapy. *Int J Radiat Oncol Biol Phys* 2008;72:433–440.
- Li CI, Daling JR, Porter PL et al. Relationship between potentially modifiable lifestyle factors and risk of second primary contralateral breast cancer among women diagnosed with estrogen receptor-positive invasive breast cancer. *J Clin Oncol* 2009;27:5312–5318.
- Park SM, Lim MK, Jung KW et al. Prediagnosis smoking, obesity, insulin resistance, and second primary cancer risk in male cancer survivors: National Health Insurance Corporation Study. *J Clin Oncol* 2007;25:4835–4843.
- van den Belt-Dusebout AW, de Wit R, Gietema JA et al. Treatment-specific risks of second malignancies and cardiovascular disease in 5-year survivors of testicular cancer. *J Clin Oncol* 2007;25:4370–4378.
- Travis LB, Gospodarowicz M, Curtis RE et al. Lung cancer following chemotherapy and radiotherapy for Hodgkin's disease. *J Natl Cancer Inst* 2002;94:182–192.
- Obedian E, Fischer DB, Haffty BG. Second malignancies after treatment of early-stage breast cancer: Lumpectomy and radiation therapy versus mastectomy. *J Clin Oncol* 2000;18:2406–2412.
- Hoening MJ, Botma A, Aleman BM et al. Long-term risk of cardiovascular disease in 10-year survivors of breast cancer. *J Natl Cancer Inst* 2007;99:365–375.
- Wright CD, Kucharczuk JC, O'Brien SM et al. Predictors of major morbidity and mortality after esophagectomy for esophageal cancer: A Society of Thoracic Surgeons General Thoracic Surgery Database risk adjustment model. *J Thorac Cardiovasc Surg* 2009;137:587–595; discussion 596.
- Cooke DT, Lin GC, Lau CL et al. Analysis of cervical esophagogastric anastomotic leaks after transhiatal esophagectomy: Risk factors, presentation, and detection. *Ann Thorac Surg* 2009;88:177–184; discussion 184–185.
- Land SR, Cronin WM, Wickerham DL et al. Cigarette smoking, obesity, physical activity, and alcohol use as predictors of chemoprevention adherence in the National Surgical Adjuvant Breast and Bowel Project P-1 Breast Cancer Prevention Trial. *Cancer Prev Res* 2011;4:1393–1400.
- Weaver KE, Rowland JH, Augustson E et al. Smoking concordance in lung and colorectal cancer patient-caregiver dyads and quality of life. *Cancer Epidemiol Biomarkers Prev* 2011;20:239–248.
- Jang S, Prizment A, Haddad T et al. Smoking and quality of life among female survivors of breast, colorectal and endometrial cancers in a prospective cohort study. *J Cancer Surviv* 2011;5:115–122.
- Khuri FR, Kim ES, Lee JJ et al. The impact of smoking status, disease stage, and index tumor site on second primary tumor incidence and tumor recurrence in the head and neck retinoid chemoprevention trial. *Cancer Epidemiol Biomarkers Prev* 2001;10:823–829.
- Warren GW, Arnold SM, Valentino JP et al. Accuracy of self-reported tobacco assessments in a head and neck cancer treatment population. *Radiother Oncol* 2012;103:45–48.
- Marin VP, Pytynia KB, Langstein HN et al. Serum cotinine concentration and wound complications in head and neck reconstruction. *Plast Reconstr Surg* 2008;121:451–457.
- Ang KK, Harris J, Wheeler R et al. Human papillomavirus and survival of patients with oropharyngeal cancer. *N Engl J Med* 2010;363:24–35.
- Dahlstrom KR, Calzada G, Hanby JD et al. An evolution in demographics, treatment, and outcomes of oropharyngeal cancer at a major cancer center: A staging system in need of repair. *Cancer* 2013;119:81–89.
- Jerjes W, Upile T, Radhi H et al. The effect of tobacco and alcohol and their reduction/cessation

on mortality in oral cancer patients: Short communication. *Head Neck Oncol* 2012;4:6.

45. Phipps AI, Baron J, Newcomb PA. Prediagnostic smoking history, alcohol consumption, and colorectal cancer survival: The Seattle Colon Cancer Family Registry. *Cancer* 2011;117:4948–4957.

46. Browman GP, Wong G, Hodson I et al. Influence of cigarette smoking on the efficacy of radiation therapy in head and neck cancer. *N Engl J Med* 1993; 328:159–163.

47. Joshi CE, Mondul AM, Meinhold CL et al. Cigarette smoking and prostate cancer recurrence after prostatectomy. *J Natl Cancer Inst* 2011;103:835–838.

48. Bjarnason GA, Mackenzie RG, Nabid A et al. Comparison of toxicity associated with early morning versus late afternoon radiotherapy in patients with head-and-neck cancer: A prospective randomized trial of the National Cancer Institute of Canada Clinical Trials Group (HN3). *Int J Radiat Oncol Biol Phys* 2009;73:166–172.

49. Cooley ME, Sarna L, Kotlerman J et al. Smoking cessation is challenging even for patients recovering from lung cancer surgery with curative intent. *Lung Cancer* 2009;66:218–225.

50. Gritz ER, Lam CY, Vidrine DJ et al. Cancer prevention: Tobacco dependence and its treatment. In: DeVita VT, Lawrence TS, Rosenberg SA, eds. *Cancer: Principles & Practice of Oncology*. Philadelphia, PA: Wolters Kluwer Lippincott Williams & Wilkins, 2011:529–542.

51. Tseng TS, Lin HY, Moody-Thomas S et al. Who tended to continue smoking after cancer diagnosis: The national health and nutrition examination survey 1999–2008. *BMC Public Health* 2012;12:784.

52. Walker MS, Vidrine DJ, Gritz ER et al. Smoking relapse during the first year after treatment for early-stage non-small-cell lung cancer. *Cancer Epidemiol Biomarkers Prev* 2006;15:2370–2377.

53. Cooley ME, Finn KT, Wang Q et al. Health behaviors, readiness to change, and interest in health promotion programs among smokers with lung cancer and their family members: A pilot study. *Cancer Nurs* 2013;36:145–154.

54. Bottorff JL, Robinson CA, Sullivan KM et al. Continued family smoking after lung cancer diagnosis: The patient's perspective. *Oncol Nurs Forum* 2009;36:E126–E132.

55. Centers for Disease Control and Prevention (CDC). Quitting smoking among adults—United States, 2001–2010. *MMWR Morb Mortal Wkly Rep* 2011;60:1513–1519.

56. Fiore MC, Jaen CR, Baker TB et al. Treating Tobacco Use and Dependence: 2008 Update. Clinical Practice Guideline. Rockville, MD: U.S. Department of Health and Human Services, 2008.

57. Legacy: Ex. A New Way to Think About Quitting Smoking. Available at <http://www.becomeanex.org/about-ex.php#>. Accessed November 26, 2013.

58. Schroeder SA. What to do with a patient who smokes. *JAMA* 2005;294:482–487.

59. Peters EN, Torres E, Toll BA et al. Tobacco assessment in actively accruing National Cancer Institute Cooperative Group Program clinical trials. *J Clin Oncol* 2012;30:2869–2875.

60. Warren GW, Peters EN, Torres E et al. Tobacco assessment in actively accruing Cooperative Group clinical trials. *Cancer Res* 72: 2012 (suppl; abstr 648)

61. Goldstein AO, Ripley-Moffitt CE, Pathman DE et al. Tobacco use treatment at the U.S. National Cancer Institute's designated Cancer Centers. *Nicotine Tob Res* 2013;15:52–58.

62. U.S. Department of Health and Human Services. Ending the tobacco epidemic: A tobacco control strategic action plan for the U.S. Department of Health and Human Services. Washington, DC: Office of the Assistant Secretary for Health, 2010.

63. Bayer R, Gostin L, Marcus-Toll D. Repackaging cigarettes—will the courts thwart the FDA? *N Engl J Med* 2012;367:2065–2067.

64. Dennis B. Government Quits Legal Battle Over Graphic Cigarette Warnings. Available at http://www.washingtonpost.com/national/health-science/government-quits-legal-battle-over-graphic-cigarette-warnings/2013/03/19/23053ccc-90d7-11e2-bdea-e32ad90da239_story.html. Accessed April 4, 2013.

65. Koh HK, Sebelius KG. Promoting prevention through the Affordable Care Act. *N Engl J Med* 2010; 363:1296–1299.

66. Ellis JA, Perl SB, Frieden TR et al. Decline in smoking prevalence—New York City, 2002–2006. *MMWR Morb Mortal Wkly Rep* 2007;56:604–608.

67. New York City Department of Health and Mental Hygiene. 2012. Youth Risk Behavior Survey. Available at https://a816-healthpsi.nyc.gov/SAS-StoredProcess/guest?_PROGRAM=%2FEpiQuery%2FYRBS%2FYRBSindex. Accessed November 26, 2013.

68. Land T, Rigotti NA, Levy DE et al. A longitudinal study of medicaid coverage for tobacco dependence treatments in Massachusetts and associated decreases in hospitalizations for cardiovascular disease. *PLoS Med* 2010;7:e1000375.

69. Richard P, West K, Ku L. The return on investment of a Medicaid tobacco cessation program in Massachusetts. *PLoS One* 2012;7:e29665.

70. National Cancer Institute. Tobacco Control Monograph 19: The Role of the Media in Promoting and Reducing Tobacco Use. Available at <http://cancercontrol.cancer.gov/brp/tcrb/monographs/19/index.html>. Accessed November 26, 2013.

71. Farrelly MC, Nonnemaker J, Davis KC et al. The Influence of the National truth campaign on smoking initiation. *Am J Prev Med* 2009;36:379–384.

72. Vallone DM, Duke JC, Cullen J et al. Evaluation of EX: A national mass media smoking cessation campaign. *Am J Public Health* 2011;101:302–309.

73. Vallone DM, Niederdeppe J, Richardson AK et al. A national mass media smoking cessation campaign: Effects by race/ethnicity and education. *Am J Health Promot* 2011;25:S38–S50.

74. Wakefield MA, Loken B, Hornik RC. Use of mass media campaigns to change health behaviour. *Lancet* 2010;376:1261–1271.

75. Farrelly MC, Davis KC, Haviland ML et al. Evidence of a dose-response relationship between “truth” antismoking ads and youth smoking prevalence. *Am J Public Health* 2005;95:425–431.

76. Prokhorov AV, Kelder SH, Shegog R et al. Impact of A Smoking Prevention Interactive Experience (ASPIRE), an interactive, multimedia smoking prevention and cessation curriculum for culturally diverse high-school students. *Nicotine Tob Res* 2008;10:1477–1485.

77. Prokhorov AV, Hudmon KS, Marani S et al. Engaging physicians and pharmacists in providing smoking cessation counseling. *Arch Intern Med* 2010;170:1640–1646.

78. Raiff BR, Jarvis BP, Rapoza D. Prevalence of video game use, cigarette smoking, and acceptability of a video game-based smoking cessation intervention among online adults. *Nicotine Tob Res* 2012;14:1453–1457.

79. Free C, Knight R, Robertson S et al. Smoking cessation support delivered via mobile phone text messaging (txt2stop): A single-blind, randomised trial. *Lancet* 2011;378:49–55.

80. Morgan G, Schnoll RA, Alfano CM et al. National Cancer Institute conference on treating tobacco dependence at cancer centers. *J Oncol Pract* 2011;7:178–182.

81. Oncology Nursing Society. Nursing Leadership in Global and Domestic Tobacco Control. Available at <http://www.ons.org/Publications/Positions/Tobacco>. Accessed November 26, 2013.

82. American Society of Clinical Oncology. American Society of Clinical Oncology policy statement update: Tobacco control—reducing cancer incidence and saving lives: 2003. *J Clin Oncol* 2003;21: 2777–2786.

83. Toll BA, Brandon TH, Gritz ER et al. Assessing tobacco use by cancer patients and facilitating cessation: An American Association for Cancer Research policy statement. *Clin Cancer Res* 2013; 19:1941–1948.

84. C-Change. Risk Reduction. Promoting a National Shift to Cancer Risk Reduction (Prevention and Early Detection). Available at <http://c-change-together.org/risk-reduction>. Accessed November 26, 2013.

85. Campaign for Tobacco-Free Kids. Spending vs. Tobacco Company Marketing. Available at <http://www.tobaccofreekids.org/research/factsheets/pdf/0201.pdf>. Accessed November 26, 2013.

86. Centers for Disease Control and Prevention (CDC). State tobacco revenues compared with tobacco control appropriations—United States, 1998–2010. *MMWR Morb Mortal Wkly Rep* 2012; 61:370–374.

87. Campaign for Tobacco-Free Kids. Broken Promises to Our Children. Available at http://www.tobaccofreekids.org/what_we_do/state_local/tobacco_settlement/. Accessed November 26, 2013.

88. Conroy MB, Majchrzak NE, Silverman CB et al. Measuring provider adherence to tobacco treatment guidelines: A comparison of electronic medical record review, patient survey, and provider survey. *Nicotine Tob Res* 2005;7(suppl 1):S35–S43.

89. Gritz ER, Dresler C, Sarna L. Smoking, the missing drug interaction in clinical trials: Ignoring the obvious. *Cancer Epidemiol Biomarkers Prev* 2005;14:2287–2293.

Editor's Note:

Fifty years after the first Surgeon General's Report on Smoking and Health [1], much progress has been made to reduce the impact of smoking on cancer risk and mortality. Smoking prevalence is now less than half what it was in 1964 among U.S. adults, and reduction in the smoking rate continues, although at a reduced rate [2]. Despite this progress, tobacco use continues to be the leading cause of preventable death in the United States [3].

This month, in three articles, *The Oncologist* explores the current role of tobacco use in cancer incidence and mortality, identifies potential improvements in tobacco policy, outreach, and advocacy, and assesses how active smoking can negatively affect health outcomes in cancer patients.

In their summary of an Institute of Medicine Workshop, Balogh et al. explore current issues surrounding tobacco use in the United States, as well as opportunities for policy makers and clinicians to improve health outcomes through the implementation of a variety of tobacco-control initiatives [4]. They identify clinicians as being on the front lines of the battle against nicotine addiction and offer suggestions for equipping them with the necessary tools to encourage smoking cessation in their patients.

On pages 17–22, Luke Clancy, Director General of Ireland's TobaccoFree Research Institute, summarizes progress in Europe in reducing tobacco consumption, including the success of smoke-free legislation throughout the European Union [5]. All member states have enacted some form of smoke-free legislation, with 14 member states enforcing bans on smoking in indoor workplaces, including restaurants, bars, and nightclubs. Clancy also explores barriers to treatment, and in agreement with the Balogh et al. study, finds that accountability for outreach to smokers is lacking among many clinicians, despite the availability of a number of treatment options.

Finally, on pages 52–62, Keizman et al. explore the impact active smoking has on response and survival in patients undergoing treatment with sunitinib for metastatic renal cell carcinoma [6]. In this international, multicenter, retrospective study, the investigators found that patients who continued to smoke while receiving sunitinib experienced worse outcomes, including significantly reduced progression-free survival (4 months vs. 11 months for past and never smokers) and overall survival (11 months vs. 26 months for past and never smokers). In this patient cohort, only smoking status, not BMI or the presence of diabetes mellitus or pretreatment hypertension, was associated with worse outcome.

We hope you will read these articles with interest and consider how to improve your own practice with respect to smoking cessation. As cancer care providers, we have a unique perspective and an obligation to be active participants in ongoing local and global discussions about tobacco. Public health policies and educational campaigns are vital to increasing societal smoking cessation rates and, ultimately, to decreasing cancer incidence, but our individual cancer patients and their treatment outcomes can also be negatively affected by continued smoking. Because cancer patients who smoke often harbor tremendous guilt and shame [7], improving access to supportive, multidisciplinary smoking cessation programs should be a high priority for all of us.

Lecia V. Sequist, *Deputy Editor*

Massachusetts General Hospital, Harvard Medical School, Boston, MA

REFERENCES:

1. United States Public Health Service. Smoking and Health: Report of the Advisory Committee to the Surgeon General of the Public Health Service. Washington, DC: U.S. Department of Health, Education, and Welfare, 1964.
2. U.S. Department of Health & Human Services. Ending the Tobacco Epidemic, Progress Toward a Healthier Nation. Washington, D.C.: U.S. Department of Health and Human Services, Office of the Assistant Secretary for Health, August 2012. Available at <http://www.hhs.gov/ash/initiatives/tobacco/tobaccoprogress2012.pdf>.
3. Centers for Disease Control and Prevention. Chronic Disease Prevention and Health Promotion: Tobacco Use, Targeting the Nation's Leading Killer. Available at <http://www.cdc.gov/chronicdisease/resources/publications/aag/osh.htm>.
4. Balogh EP, Dresler C, Fleury ME et al. Reducing tobacco-related cancer incidence and mortality: summary of an Institute of Medicine Workshop. *The Oncologist* 2013;19:23–34.
5. Clancy L. Reducing lung cancer and other tobacco-related cancers in Europe: Smoking cessation is the key. *The Oncologist* 2013;19:17–22.
6. Keizman D, Gottfried M, Ish-Shalom M et al. Active smoking may negatively affect response rate, progression-free survival, and overall survival of patients with metastatic renal cell carcinoma treated with sunitinib. *The Oncologist* 2013;19:52–62.
7. Shin DW, Park JH, Kim SY et al. Guilt, censure, and concealment of active smoking status among cancer patients and family members after diagnosis: a nationwide study. *Psychooncology* 2013 [Epub ahead of print].