Women, Tobacco, and Cancer:

An Agenda for the 21st Century

July 2004

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
National Institutes of Health
National Cancer Institute

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Reports from the Breakout Sessions that were held during the February 2004 Women, Tobacco, and Cancer Working Group, as well as the meeting agenda and a roster of participants, are available at:

http://planning.cancer.gov/whealth/reports/wtobacco.htm

From the Leadership

We are very pleased to submit the Report of the Women, Tobacco, and Cancer Working Group. Currently, in the United States, 170,000 women die each year from smoking, and lung cancer has surpassed breast cancer as the leading cause of cancer death in women since 1986. The burden of tobacco use is especially high for certain populations of women, including women with low levels of education and in certain ethnic groups, such as American Indians. Ominously, rates of tobacco use are rising among women in economically developing countries, where women's tobacco use has traditionally been very low. Despite this, tobacco use has not generally been considered a "women's issue."

The 2001 Surgeon General's report, *Women and Smoking*, presented a comprehensive overview of the health effects of smoking on women and girls, and provided a framework and direction on what is needed to reduce smoking. The Working Group builds on the Surgeon General's report by articulating a set of strategies in five areas: discovery, development, delivery, partnerships, and evaluation and surveillance.

This Report represents the collaborative efforts of the dedicated scientists, clinicians, and advocates who participated in the Working Group. We believe that it is possible to reduce and ultimately eliminate tobacco use and tobacco-caused disease in the United States and abroad. With sustained, focused efforts that include partnerships and collaborations among researchers, practitioners, community advocates, and policy makers, we can implement these recommendations and help make this goal a reality.

Respectfully,

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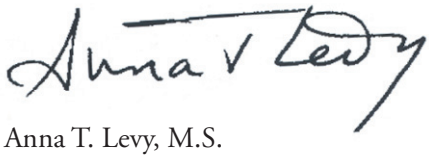

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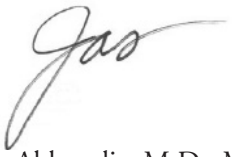

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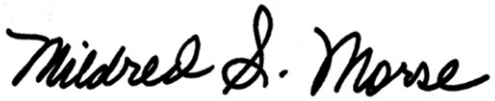

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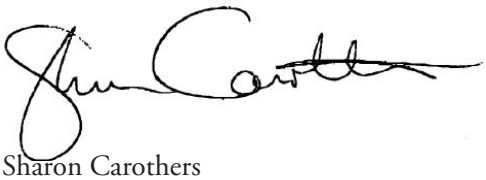

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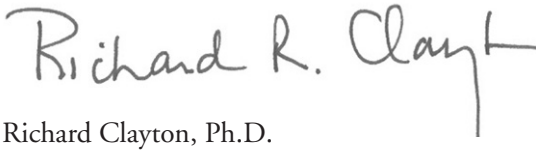

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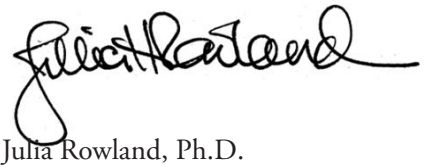

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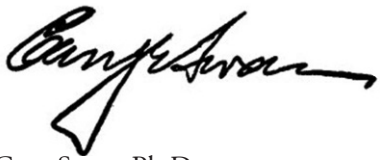

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Executive Summary

For far too long, tobacco use has been viewed as a men's issue, but the use of tobacco among women around the world is now common. As a result, women have experienced a dramatic upsurge in cancers, cardiovascular and lung disease, and other life-threatening conditions caused by tobacco use. Currently, it is estimated that approximately 1 in 5 U.S. women smoke and 170,000 U.S. women die each year from smoking.

The 2001 report of the Surgeon General, *Women and Smoking*, identified several strategies to reduce smoking among women. In addition, in 2001, the National Cancer Institute (NCI) highlighted research on tobacco and tobacco-related cancers in its annual budget document. The Department of Health and Human Services' (DHHS) *Healthy People 2010* continues to make smoking cessation and prevention a priority.

The Women, Tobacco, and Cancer Working Group was formed to respond to the priorities identified in these and other plans and reports. The group focused on identifying ways to stimulate scientific research and suggesting approaches to translate knowledge into interventions to prevent tobacco-related cancers in women in the United States and other countries. The Working Group, a public/private partnership led by NCI, met in Houston, Texas, in February 2003. This Report summarizes the recommendations of the breakout groups at the February 2003 Women, Tobacco, and Cancer Working Group meeting (see the *Summary of Recommendations*, pages 3-4).

Implementing the strategies described in the report will advance our progress toward the following goals:

Discovery

Increase our understanding of sex and gender differences* across the broad range of research on women, tobacco, and cancer.

A better understanding of the biological, psychological, and behavioral mechanisms and processes associated with women's and men's responses to nicotine exposure is critical to develop better prevention and cessation interventions for addiction and to prevent and treat tobacco-related cancers. Research on genetic factors and hormonal variations throughout the life cycle should be emphasized in elucidating women's susceptibility to tobacco-related diseases and addiction, as well as responses to pharmaceutical and behavioral interventions. We need to understand how the interaction of gender, culture, race and ethnicity, and socioeconomic status affects women's and girls' use of tobacco products, perceptions of risk, and responses to relevant health messages. To conduct research that can be translated into effective applications, we must validate and standardize sex- and gender-appropriate definitions and measures of addiction, exposure, injury, and recovery.

Development

Develop new and more effective interventions to prevent and treat tobacco use and environmental tobacco smoke (ETS) exposure among women and girls, especially in populations at greatest risk.

We must translate basic and applied research into effective, evidenced-based prevention and treatment programs by using knowledge from animal studies, pilot projects, and small-scale clinical and community-based trials. By using or modifying existing mechanisms, we can rapidly evaluate promising interventions, programs, and policies—such as the World Health Organization Framework Convention on Tobacco Control—on tobacco use by women and girls, both nationally and globally. We need to evaluate and monitor the impact of tobacco control policies on tobacco use by women and girls, both nationally and globally. State-of-the-art, audience-tailored communication strategies should be used to develop and disseminate evidence-based messages that target women and girls.

* "Sex and gender differences" are defined as follows in the 2001 Institute of Medicine (IOM) report *Exploring the Biological Contributions to Human Health—Does Sex Matter?:* "The committee defines sex as the classification of living things, generally as male or female according to their reproductive organs and functions assigned by the chromosomal complement, and gender as a person's self-representation as male or female, or how that person is responded to by social institutions on the basis of the individual's gender presentation. Gender is shaped by environment and experience." (16)

Delivery

Ensure the widespread delivery of effective interventions to prevent and treat tobacco use and ETS exposure among women and girls.

The reach and impact of evidence-based tobacco control programs, policies, and counter-advertising campaigns must be expanded by increasing the appeal, access, affordability, and use of effective interventions, particularly among women and girls in populations at greatest risk. We need to identify and use targeted strategies to involve individuals, communities, policy makers, and organizations, especially women's organizations and those that have not previously been involved in tobacco control.

Partnerships

Harness and expand partnerships, networks, and innovative research platforms to design and launch broad-based strategies to eliminate the harms of tobacco use and ETS exposure.

Successfully implementing the discovery, development, and delivery recommendations will require capitalizing on existing collaborations and developing new partnerships. To maximize the development and dissemination of effective interventions, partners must be involved from the beginning, and knowledge gained from practice should be used to inform future research. We need to encourage researchers to investigate common pathways of tobacco-related disease mechanisms by fostering networks of clinical and translational researchers. Community-based participatory research needs to be conducted through partnerships between research institutions and community-based organizations, especially those that serve populations at greatest risk. Because of the magnitude and persistence of the tobacco use problem in American Indian/Alaska Native populations, it is particularly important to develop partnerships between research institutions and tribal colleges, tribal health departments, and/or American Indian health care and community settings. Similarly, partnerships with organizations that serve women with low levels of education and women of low socioeconomic status are also a key priority.

Evaluation and Surveillance

Improve national and global evaluation and surveillance of the harms of tobacco use and ETS exposure and of women's and girls' knowledge, attitudes, and behaviors related to tobacco use and harms.

It is essential to monitor and evaluate progress toward reducing tobacco use and the impact of tobacco-related cancers on women. This will require further development of standardized measures and surveillance systems to ensure that data are comparable within and across nations. Information obtained will help strategically target funding to ensure that gains are maintained while expanding support for tobacco control among the general public, including policy makers. Identification and dissemination of best practices will inform researchers and practitioners about which prevention and cessation interventions are the most effective and help determine how to tailor core interventions to specific populations.

The Working Group believes that reducing and ultimately eliminating the harmful effects of tobacco use on women requires integrating advances in our understanding of basic biologic, behavioral, and social factors to develop new prevention and treatment interventions and ensure the delivery of new evidence-based interventions to all women who need them. As interventions are delivered, their impact on individual and public health must be evaluated and monitored to inform future research and development. Successful implementation of all of the recommendations of the Women, Tobacco, and Cancer Working Group will require many collaborations and partnerships between Federal and non-Federal organizations. Such efforts have the potential to rapidly decrease tobacco use and ETS exposure and, ultimately, morbidity and mortality.

Summary of Recommendations

DISCOVERY	DEVELOPMENT	DELIVERY
OVERALL GOAL: Increase our understanding of sex and gender differences* across the broad range of research on women, tobacco, and cancer.	**OVERALL GOAL:** Develop new and more effective interventions to prevent and treat tobacco use and ETS exposure among women and girls, especially in populations at greatest risk.	**OVERALL GOAL:** Ensure the widespread delivery of effective interventions to prevent and treat tobacco use and ETS exposure among women and girls.
A better understanding of sex and gender differences is critical to eliminating tobacco use and tobacco-related cancer morbidity and mortality in women and men. Multidisciplinary research is needed on: ■ Sex differences in the mechanisms and processes associated with: ◆ All phases of tobacco addiction—from experimentation to regular use and addiction to cessation—including the natural history of the progression between phases and the effects of environmental tobacco smoke (ETS) exposure. This includes genetic, molecular, cellular, neurobiological, biobehavioral, and hormonal factors that play a critical role in tobacco addiction and in the etiology of cancers and other diseases caused by tobacco. ◆ The etiology of cancers caused by tobacco, especially those related to gene-hormone-environment interactions involved in carcinogenic and other disease pathways. ◆ Methods of prevention and treatment of tobacco addiction. ■ Gender-specific factors in tobacco use and the components of effective prevention and treatment interventions for women and girls, especially in populations at greatest risk, to: ◆ Identify behavioral, psychosocial, sociocultural, and environmental influences on tobacco use, exposure to ETS and disease risk, and prevention and treatment interventions. ◆ Assess women's and girls' knowledge of the harms of tobacco use and ETS exposure and the benefits of quitting. Multidisciplinary research is needed to: ■ Validate and standardize sex- and gender-appropriate definitions and measures of addiction, ETS exposure, tissue injury, and recovery.	Translating basic and applied research into effective, evidence-based prevention and treatment programs and broad public health tobacco control policies will require: ■ Using evidence from animal studies, pilot projects, and small-scale clinical and community-based studies to develop, refine, and evaluate promising sex- and gender-appropriate interventions for prevention, cessation, and treatment. ■ Using or modifying existing infrastructures to rapidly evaluate the efficacy of promising treatments and the effectiveness and cost-effectiveness of proven small-scale interventions, programs, and policies. ■ Developing and disseminating evidence-based cessation, prevention, and advocacy messages targeted to women using state-of-the-art, audience-tailored communication strategies. ■ Conducting research to explore and strengthen the positive health impacts of public and private tobacco control policies on women and girls, especially in populations at greatest risk, and improving the adoption of evidence-based policies and strategies by policy and decision makers. ■ Monitoring the harmful effects of tobacco marketing targeted to diverse populations of women and girls domestically and globally.	Expanding the reach and impact of evidence-based tobacco control programs and policies will require: ■ Increasing the appeal, access, affordability, and use of effective interventions, particularly among women and girls in populations at greatest risk. ■ Identifying and using targeted messages and strategies to involve and activate individuals and organizations in effective, sustained advocacy for evidence-based tobacco control programs and policies. ■ Making data from surveillance and policy research, as well as social, economic, and cultural studies, available to the health care community, policy makers, and the general public in a timely and effective fashion. ■ Supporting research and demonstration projects to better understand how to convert women's broad-based support for tobacco control policies and programs into more active involvement in their communities.

* See footnote on page 1.

Summary of Recommendations (continued)

PARTNERSHIPS	EVALUATION AND SURVEILLANCE
OVERALL GOAL: Harness and expand partnerships, networks, and innovative research platforms to design and launch broad-based strategies to eliminate the harms of tobacco use and ETS exposure among women and girls.	**OVERALL GOAL:** Improve national and global evaluation and surveillance of the harms of tobacco use and ETS exposure, and of women's and girls' knowledge, attitudes, and behaviors related to tobacco use and harms.
Successfully implementing the discovery, development, and delivery recommendations will require capitalizing on existing collaborations and developing new partnerships. To maximize the development and dissemination of effective interventions, partners must be involved from the beginning, and knowledge gained from practice should be used to inform future research. Partnerships are especially needed between: ■ Established networks of clinical and translational researchers that can provide the resources and infrastructure needed to foster cross-disciplinary interactions and rapidly evaluate treatments and interventions. ■ Research institutions and community-based organizations that serve populations at greatest risk to conduct community-based participatory research. These partners must be committed to joint decision making in designing research, sharing ownership of the products of research, and disseminating and implementing research results. ■ Research institutions and tribal colleges, tribal health departments, and/or American Indian health care and community settings to develop effective, culturally appropriate individual, family, and community-level tobacco prevention and cessation initiatives. ■ Public and private funding agencies to fully and efficiently support the implementation of successful interventions.	It is essential to monitor and evaluate progress toward reducing tobacco use, ETS exposure, and the impact of tobacco-related cancers on women and to make midcourse adjustments as needed. This will require further development of standardized measures and surveillance systems to ensure that data are comparable within and across countries. Local, national, and global evaluation and surveillance will be critical for: ■ Monitoring and measuring national and global trends and patterns in tobacco use and exposure to ETS using standardized measures. ■ Ensuring that research and programmatic funding are strategically targeted and, where appropriate, tailored to specific populations. ■ Assessing whether progress has been made and whether it is due to specific interventions and policies. ■ Identifying effective interventions through success stories and rigorous case studies to inform researchers, encourage broader dissemination, and increase public support.

Introduction

For far too long, tobacco use has been viewed as a men's issue, but the use of tobacco among women around the world is now common. As a result, women have experienced a dramatic upsurge in cancers, cardiovascular and lung disease, and other life-threatening conditions caused by tobacco use. For example, between 1950 and 1997, lung cancer mortality for white women in the United States increased by over 600 percent (1). Women who smoke also experience higher rates of cancers of the mouth, pharynx, esophagus, larynx, bladder, pancreas, kidney, and cervix—and possibly other sites. In addition, these women have an increased risk of developing and dying from cardiovascular disease and chronic obstructive pulmonary diseases, including chronic bronchitis and emphysema with airflow obstruction. Currently, it is estimated that 1 in 5 U.S. women smoke and 170,000 U.S. women die each year from smoking (1).

Smoking prevalence decreased among U.S. women from 34 percent in 1965 to 20 percent in 2002, but most of this decline happened between 1974 and 1990; prevalence declined more slowly in the 1990s (1, 2). Smoking rates remain alarmingly high among certain U.S. populations. In 2002, approximately 22 percent of white women in the United States were current smokers, but the rate among American Indian/Alaska Native women was 41 percent (2). Moreover, smoking prevalence is almost three times higher among women who did not finish high school than among those with a college degree (3). Smoking rates are significantly lower among women in economically developing countries (about 9 percent) than in economically developed countries, where the average rate is 22 percent (4).

As might be expected in economically developing countries where smoking rates among women are relatively low, lung cancer death rates are also low (1). With increased female autonomy, increased marketing of tobacco products to women, and changes in women's roles, smoking uptake and ensuing disease are expected to increase in economically developing countries (5). In addition, women's use of traditional forms of tobacco is already widespread in many economically developing countries (6). Reflecting this, a recent article notes that "curtailing the increase in tobacco use among women in developing countries represents one of the greatest opportunities for disease prevention in the world today" (7).

Impetus for This Report

The 2001 report of the Surgeon General, *Women and Smoking*, identifies five strategies to reduce smoking among women:

- Increase awareness of the impact of smoking on women's health and counter the tobacco industry's targeting of women.
- Support women's antitobacco advocacy efforts and publicize that most women are nonsmokers.
- Continue to build the science base on gender-specific outcomes and on how to reduce disparities among women.
- Act now: we know more than enough.
- Stop the epidemic of smoking and smoking-related diseases among women globally.

In addition, in 2001, NCI began to highlight research on tobacco and tobacco-related cancers as an Extraordinary Opportunity for Research in its annual budget document, *Plans and Priorities for Cancer Research*. The Department of Health and Human Services' *Healthy People 2010* continues to make smoking cessation and prevention a priority. Relevant goals include reducing smoking prevalence and decreasing death rates from both lung cancer and cancer overall.

Working Group on Women, Tobacco, and Cancer

The Women, Tobacco, and Cancer Working Group was formed to respond to the priorities identified in these and other plans and reports. In particular, the group focused on identifying ways to stimulate scientific research and suggesting approaches to translate knowledge into action to prevent tobacco-related cancers in women in the United States and abroad. The Working Group, a public/private partnership led by NCI, is a multidisciplinary group of experts from Federal and non-Federal research and advocacy organizations.

The Working Group meeting held in Houston, Texas, in February 2003 and this Report are the culmination of the dedicated efforts of the Breakout Group Co-Chairs and the Working Group's Steering Committee. A more detailed description of the Working Group process, a meeting agenda, and the Steering Committee and Working Group rosters can be found in the appendices following the Report.

Organization of This Report

This Report summarizes the recommendations of the breakout groups at the February 2003 Women, Tobacco, and Cancer Working Group meeting. These summary recommendations are organized under five cross-cutting goals in the following areas:

- Discovery
- Development
- Delivery
- Partnerships
- Evaluation and Surveillance

These goals reflect the themes of the breakout group discussions, as well as the framework adopted by NCI in 2001 to meet its Challenge Goal of eliminating the suffering and death due to cancer by 2015.

The recommendations discussed in this Report are drawn from the deliberations of the seven breakout groups at the Working Group meeting:

- Biology and Cancer
- Addiction
- Epidemiology and National Surveillance
- Interventions for Prevention and Treatment
- Awareness, Risk Perception, and Communications
- Community and Policy Interventions
- Global Issues

Complete breakout group summaries are included in the appendices at the end of the Report.

We believe that to reduce and ultimately eliminate the harmful effects of tobacco on women, we must integrate advances in our understanding of basic biologic, behavioral, policy, and social factors. This will lead to the development of new prevention and treatment interventions and help ensure that the interventions delivered to women are evidence based. As interventions are delivered, their impact on individual and public health must be monitored and evaluated to inform future research and development. Strong Federal, state, local, and private partnerships will also be needed to implement the recommendations.

Recommendations

Discovery

Overall Goal: **Increase our understanding of sex and gender differences across the broad range of research on women, tobacco, and cancer.**

A better understanding of sex and gender differences* is critical to eliminating tobacco use and tobacco-caused cancer morbidity and mortality in women and men.

Research suggests that women differ from men in their biological responses to nicotine, progression to nicotine dependence, and patterns of intake and that women have higher rates of relapse and greater risk of health problems caused by smoking (8-15). However, the effects of oral contraceptives, menopause, hormone replacement therapy, and other sex-related factors on smoking rates, craving, and relapse are not well understood. The menstrual cycle, puberty, pregnancy, and menopause should be primary foci of research on nicotine dependence and tobacco use to determine, for example, whether nicotine has a disruptive effect on hormone levels and whether sex hormones can affect craving and rates of relapse. Ovarian hormones may modulate response to medications, which may account for women's lower success rates in quitting in response to certain pharmacotherapies.

Discovery refers to the process that generates new knowledge about fundamental disease processes at the genetic, molecular, cellular, organ, individual, and population levels.

Some case-control studies suggest that women are more susceptible to tobacco-induced carcinogenesis than men, after taking into account baseline exposure, body weight, body height, and body mass index (17). However, cohort studies have not supported this observation (18). Estrogen or menopausal status has an impact on lung cancer risk in women, and some evidence indicates a positive interaction between menopausal estrogen therapy, smoking, and the development of adenocarcinoma of the lung (19). A better understanding of the role of estrogens in premalignant and malignant disease progression may lead to the development of antiestrogen therapies for lung cancer prevention and treatment.

Depression, which is more common in women than in men, is associated with higher dependency on smoking (20). Women are more likely than men to smoke in response to stress and negative affect (1, 21, 22). However, the underlying mechanisms of the relationships among tobacco use, negative affect, and stress are not fully understood. Research aimed at testing interventions to help women with depression quit smoking must take into account the multiple demands and unique stressors in the daily lives of women.

Differences in smoking prevalence and patterns of use among women belonging to different subgroups (as defined by socioeconomic status, race, culture, and ethnicity) may affect initiation and cessation. It is important that cultural and, potentially, biological differences inform prevention and cessation programs targeting particular groups (23). Concurrently, understanding what cultural and social factors protect women from tobacco is also valuable, particularly in cultural groups where traditional roles for women are changing in ways that may facilitate tobacco use.

Discovery Recommendations

1.a Multidisciplinary research is needed on sex differences in the mechanisms and processes associated with all phases of tobacco addiction—from experimentation to regular use and addiction to cessation—including the natural history of the progression between phases and the effects of environmental tobacco smoke (ETS) exposure. This includes genetic, molecular, cellular, neurobiological, biobehavioral, and hormonal factors that play a critical role in tobacco addiction and in the etiology of cancers and other diseases caused by tobacco.

Multidisciplinary research integrates technologies and knowledge from a variety of interrelated fields.

* See footnote on page 1.

Research is needed to address:

- *Environmental, behavioral, genetic, molecular, cellular, neurobiological, and hormonal sources of variation in nicotine use and addiction.* Sex differences must also be studied at different stages of life, taking into consideration biological, behavioral, and environmental factors.
- *The interactions of the different sources of variation in animals and humans during all phases of nicotine addiction, including initiation, maintenance, withdrawal, and relapse.* In particular, the genetic influences on different stages of tobacco use require further investigation because these influences may vary. In addition, a better understanding of how genes and the environment interact to increase susceptibility to tobacco use is needed.
- *The natural history of tobacco use, including initiation, maintenance, cessation, and relapse* (24). Some recent data indicate that the patterns of initiation and maintenance may be changing (25), and these apparent changes may affect tobacco use prevalence and the incidence and prevalence of tobacco-related morbidity and mortality in the future. It is not known whether the observed patterns are similar or different for different subpopulations. Variation in the natural history of tobacco use across populations within a nation and across nations should be more fully explored.

1.b Multidisciplinary research is needed on sex differences in the mechanisms and processes associated with the etiology of cancers caused by tobacco, especially those related to gene-hormone-environment interactions involved in carcinogenic and other disease pathways.

Research is needed to address:

- *Cross-disciplinary research on mechanisms of tobacco-related disease.* Estrogen status, for example, is recognized as a factor that affects lung cancer risk in women. Estrogen or one of its metabolites may be a weak carcinogen, but studies have not addressed this in depth, particularly in relationship to tobacco use. An understanding of the role of estrogens in the pathogenesis of lung cancer should facilitate the selection and evaluation of antiestrogen therapies for the treatment of this disease. Further insight into sex-specific pathways for lung carcinogenesis may be gained through the use of proteomic and genomic approaches in the analysis of early lesions and established tumors obtained from both women and men.
- *Common pathways between inflammation and tobacco-caused disease*. To date, relatively little research has focused on the interplay between inflammation and the development of lung cancer. Further understanding is needed of the effects of oxidative stress on lung biology and the mechanisms controlling the expression and release of pro-inflammatory mediators in the lung. Transdisciplinary investigations are also needed to understand common pathways of cancer, heart disease, and lung disease caused by tobacco.

> In ***transdisciplinary research***, teams from a variety of relevant fields collaborate to address a common problem using shared concepts and approaches.

- *The variety of cellular processes regulated by nicotine and other tobacco smoke constituents to identify new therapeutic targets for intervention in tobacco-related diseases.* Further understanding of the mechanisms by which nicotine alters cell growth is also important to further guide pharmacologic therapy.

1.c Multidisciplinary research is needed on sex differences in the mechanisms and processes associated with methods of prevention and treatment of tobacco addiction.

Research is needed to address:

- *Whether sex and gender differences exist in prevention and treatment efficacy.* Studies have produced conflicting results as to whether women have the same, less, or more difficulty quitting smoking than men (26-32). Methodological limitations may account for the uncertainty.
- *Whether physiological, psychological, and/or behavioral factors mediate or moderate differences between men and women in responses to treatment and tobacco use cessation.* These differences may be due to a number of factors, including depression, nicotine dependence, withdrawal, demographics, social support, coping styles, expectancies, and weight concerns. To date, research has not adequately addressed these issues.
- *The influence of factors unique to women—such as the menstrual cycle, pregnancy, and menopause—on tobacco use*

behavior and treatment efficacy. While some factors, such as pregnancy, have been associated with increased quit rates, others have not been well explored. Targeting these events will make it possible to capitalize on potential windows of opportunity.

- *Effective strategies for tailoring interventions to women.* Identifying whether sex and gender differences exist and the factors through which they affect tobacco use will lead to the targeting and tailoring of prevention and intervention efforts.

2.a Multidisciplinary research is needed on gender-specific factors in tobacco use and the components of effective prevention and treatment interventions for women and girls, especially in populations at greatest risk, to identify behavioral, psychosocial, sociocultural, and environmental influences on tobacco use, exposure to ETS and disease risk, and prevention and treatment interventions.

> ***Populations at greatest risk for tobacco use and tobacco-related disease*** include women with low income and/or low levels of education, members of certain racial and ethnic groups, pregnant women, and women with mental health or other substance abuse disorders.

Research is needed to address:

- *Tobacco use among different populations.* Tobacco use varies among population subgroups, and increasingly, the devastating health effects of tobacco are concentrated in certain populations. Race, ethnicity, socioeconomic status, age, sexual orientation, disability, and culture may all play a role in initiation, maintenance, and cessation of tobacco use. Yet, adequate data on tobacco use are lacking for many population subgroups. To more precisely identify disparities, it is necessary to assess the interrelationships of specific population characteristics as they influence tobacco use, exposure to ETS, and disease risk. Understanding how these differences affect tobacco use behaviors will allow us to identify social and contextual factors that could aid in prevention and treatment for all women and help reduce health disparities.
- *The role of gender issues and the interaction of gender, culture, and ethnicity in the continuum from experimentation to addiction.* Experimentation with and initial exposure to tobacco occur early, and the time from experimentation to addiction is very brief (33, 34). Factors that contribute to experimentation and regular tobacco use are not well understood.
- *Social contextual factors, such as partner and household tobacco use, social networks, social ties, and discrimination.* Interest in cessation and vulnerability to relapse may be influenced by these factors. Family, social, and cultural factors may be especially important for minority and underserved women who have limited access to care and may depend on existing social networks for support.

2.b Multidisciplinary research is needed on gender-specific factors in tobacco use and the components of effective prevention and treatment interventions, especially in populations at greatest risk, to assess women's and girls' knowledge of the harms of tobacco use and ETS exposure and the benefits of quitting.

Research is needed to address:

- *Women's current levels of knowledge of the risks of tobacco use and their assessment of their personal risk.* More research is needed to determine accuracies and inaccuracies in women's knowledge about tobacco use, prevention, and cessation and the interplay of affective, experiential, and cognitive approaches to assessing risk and deciding what course of action to take. This research should identify mechanisms to which women will respond and focus on different ethnic, socioeconomic, and health status groups across the lifespan.
- *Women's perceptions of the addictiveness of tobacco and their understanding of the process by which people become addicted.* Further research is needed to explore how beliefs about the addictiveness of tobacco are formed and how prevention messages can counteract inaccurate impressions of individual control.
- *Culturally relevant messages and entry points that respond to women's perceived needs.* It is important to understand the meaning of tobacco use to women in its historic social context, especially in economically developing countries, where tobacco use is frequently linked to emancipation and "Western" culture. Investigation of the knowledge, attitudes, and practices of women who use smokeless

and traditional forms of tobacco is also important, particularly in some economically developing countries where these products are commonly used by women. The role of men as positive or negative influences on women's health also needs further investigation.

3. Multidisciplinary research is needed to validate and standardize sex- and gender-appropriate definitions and measures of addiction, ETS exposure, tissue injury, and recovery.

Research is needed to further develop:

- *The definition of nicotine addiction/dependence.* Reasons for tobacco use vary among individuals and, probably, across population subgroups, time, and situations. A more precise definition of nicotine addiction will make it possible to better define sex-relevant experimental parameters.
- *Appropriate instruments for assessing nicotine dependence.* Addiction/dependence appears to be multidimensional and may include physical, behavioral, and physiological components (35-38). To date, none of the instruments commonly used to measure nicotine dependence assesses all aspects, and the intercorrelation of these instruments is surprisingly low (38). Therefore, better measures need to be developed to identify differences in nicotine dependence between men and women and between adults and adolescents.
- *Validated, biologically relevant measures of tobacco smoke exposure, injury, and recovery.* Validating these measures includes linking measures of exposure to those of injury in biological models, linking measures of injury to outcomes, examining modifying factors of injury from exposure, and investigating new tobacco products. Intermediate markers between injury and disease must be identified. Although several good models are available, identifying the effects of tobacco exposure in these models is time consuming, pointing to the need for accelerated models as well as for mixture and single-agent models (39). The biomarkers identified can be used to provide a more specific and efficient tool for assessing biological exposure and effect and, thus, identifying persons at risk.

Development

***Overall Goal:* Develop new and more effective interventions to prevent and treat tobacco use and ETS exposure among women and girls, especially in populations at greatest risk.**

To eliminate the harms caused by tobacco use and ETS exposure among women and girls, especially those in populations at greatest risk, basic and applied research must be translated into effective, evidence-based prevention and treatment programs and broad public health tobacco control policies.

Knowledge gained from research is critical to developing effective interventions for both smoking and disease prevention for women and girls, as well as for cessation and disease treatment. This is especially important because evidence indicates that women respond differently to treatments than men. For example, research has found that women are more responsive than men to telephone quit-line use and support (40). Research has also shown that women are more concerned about their weight than men. Unfortunately, smoking cessation often leads to weight gain, and some evidence suggests that women are less likely than men to seek treatment or attempt to quit smoking on their own because of this issue (41, 42). Other factors that are unique to women and girls that may influence smoking behaviors and treatment efficacy include phase of menstrual cycle, pregnancy, menopausal status, and use of hormone therapies. Knowledge of sex and gender differences and the sequelae of these unique factors will provide a better understanding of how treatments should be designed for women and girls.

Development refers to the process of creating and evaluating tools and interventions using knowledge gained through research, to reduce the cancer burden through the prevention, early detection, diagnosis, and treatment of cancer and its consequences.

Research findings must be shared between the basic and applied research communities and integrated into the development and refinement of interventions. Understanding the effects of such variables as sex and gender, culture, ethnicity, educational level, and socioeconomic status is critical in designing effective interventions. Community intervention research and community-based research have provided valuable insights for the design of state- and community-level interventions that have helped reduce tobacco use (43-45). Examples include the NCI Community Intervention Trial for Smoking Cessation (COMMIT) and the American Stop Smoking Intervention Study (ASSIST) (46).

Increasing communication between researchers and practitioners will help ensure that research designs are informed by practitioners' constraints and that researchers are investigating issues that reflect population needs. Increased multidisciplinary collaboration will also aid in the development of the most cost-effective and efficient practices possible. Best practices in the United States should be shared with other countries, but they must be adapted to the cultural, social, and economic needs of local communities. For example, mass media campaigns should be modified in communities and countries where community leaders have more influence than print media among illiterate women. Given the need to strengthen leadership in economically developing countries, greater effort must also be made to exchange knowledge and success stories between the economically developed and developing worlds. We have much to learn from each other.

Development Recommendations

1. Translating basic and applied research into effective, evidence-based prevention and treatment programs and broad public health tobacco control policies will require using evidence from animal studies, pilot projects, and small-scale clinical and community-based studies to develop, refine, and evaluate promising sex- and gender-appropriate interventions for prevention, cessation, and treatment.

Evidence from the following should be used:

- *Animal studies, pilot projects, and small-scale clinical and community-based studies.* Animal studies may be useful in understanding the role of behavioral, hormonal, genetic, neurobiological, and environmental factors in nicotine addiction. These models will help in the development of potential behavioral and pharmacologic interventions

for the prevention and cessation of nicotine addiction. For example, pharmacological interventions from the field of depression and other psychiatric comorbidities could be tested in animal models and perhaps provide data to begin pilot clinical and community-based studies. In addition, menstrual cycle effects on craving and withdrawal symptomatology and cognitive behavioral therapy regarding weight gain concerns can be studied in pilot or small-scale settings.

2. Translating basic and applied research into effective, evidence-based prevention and treatment programs and broad public health tobacco control policies will require using or modifying existing infrastructures to rapidly evaluate the efficacy of promising treatments and the effectiveness and cost-effectiveness of proven small-scale interventions, programs, and policies.

Promising interventions that need to be evaluated include:

- *Nicotine replacement therapy (NRT).* Existing infrastructures, such as the National Institute on Drug Abuse Clinical Trials Network, may be used for investigations on how to maximize the effectiveness of NRT for women because women may have different sensitivity to nicotine than men during withdrawal. Hormonal effects may alter nicotine sensitivity, but few studies have examined hormonal influences on the responsiveness to NRT. Additional studies are needed to determine whether the menstrual cycle should be taken into consideration to maximize the effectiveness of NRT.

> ***Translational research*** is the bidirectional exchange between basic and clinical science to move research findings to applied settings involving patients and populations.

- *Bupropion, the only non-NRT drug treatment that is currently approved for smoking cessation.* This treatment may be especially useful for women because it may reduce withdrawal symptoms and weight gain, a major concern for women. Similar research will be needed for other pharmacologic agents under development for cessation.
- *Combinations of medications and behavioral treatments, which may be more effective than single treatments.* Women who smoke and have a history of depression are less likely to quit. Existing research infrastructures should be used to examine the application of treatments for other disorders, such as depression, to nicotine dependence.

3. Translating basic and applied research into effective, evidence-based prevention and treatment programs and broad public health tobacco control policies will require developing and disseminating evidence-based cessation, prevention, and advocacy messages targeted to women using state-of-the-art, audience-tailored communication strategies.

Strategies should include:

- *Advancing the social marketing agenda using qualitative and quantitative research methods and focusing on the psychological, sociocultural, and economic segmentation of women.* Simply recognizing the personal health risks of tobacco use does not often lead to cessation (47). Awareness of risk needs to be combined with decreased benefits from tobacco use, increased barriers to tobacco use, and social and environmental support for not using tobacco. The key is to identify sets of attitudes and values of women that can be targeted for prevention, cessation, and advocacy messages for environmental change. Further research is needed to explore how tobacco products fit into women's views of affordable routine pleasure, as well as their perceptions of addiction.
- *Using lifestyle risk factors, sociodemographics, and health perceptions to create target audiences for health messages.* Understanding the diversity of tobacco users' representations of explanations for their own tobacco use may also play a role in developing effective antitobacco messages. Comprehensive models of tobacco addiction that take into account the various influences in women's lives are clearly needed.
- *Methods to decode and debunk tobacco industry messages and counter their persuasive power.* Redefining women's emancipation should be based on women's own perceptions. The tobacco industry must be prevented from "owning" gender images of modernity. The ultimate goal is to use media and communication

strategies to increase the demand for prevention and cessation among women.

- *Developing antitobacco campaigns that are based on at least the same level of systematic and extensive research as tobacco company campaigns.* Although some focus group research has helped elucidate the benefits of and barriers to smoking cessation for particular groups of women (48), few large-scale studies have examined the "hot buttons" that motivate women to take action against tobacco. The research to inform antitobacco campaigns should provide a clear picture of the attitudes, values, and needs of target groups, including those at risk for tobacco use, current tobacco users, and women's health advocates.
- *A comprehensive feedback system to help researchers hone new research quickly and effectively.* Although message concepts are routinely tested among target audiences, large-scale trials of media messages and intervention results are not as commonly catalogued and monitored. The system should include surveillance and monitoring to determine the effectiveness of the messages among various segments of the population.

4. Translating basic and applied research into effective, evidence-based prevention and treatment programs and broad public health tobacco control policies will require conducting research to explore and strengthen the positive health impacts of public and private tobacco control policies on women and girls, especially in populations at greatest risk, and improving the adoption of evidence-based policies and strategies by policy and decision makers.

Policy-related research will help to:

- *Reinforce the positive effects of tobacco control policies on the health of women and girls, especially those at greatest risk.* This will fill major knowledge gaps regarding gender differences in attitudes, behavior, and the impact of tobacco policies. Research can also clarify the policy development process, including models by which policies alter social norms and behaviors, and optimal strategies for collaboration with policy makers.
- *Educate policy makers in economically developing countries about the utility of tobacco control measures.* Two major areas of concern should be the implementation of the World Health Organization (WHO) Framework Convention on Tobacco Control (Framework Convention) and multicountry studies of national and local policies designed for international comparisons. For example, research might address the impact on women's health of a total ban on tobacco advertising or the impact of comprehensive ETS restrictions.
- *Increase levels of awareness among women.* Awareness varies widely by social, economic, and cultural context, even within a country. Subgroups of women to target for raising awareness should be identified in policy-related research.
- *Build feasibility studies and evaluation and monitoring of policies resulting from enforcement of the Framework Convention into a gender-specific tobacco strategy.* Multicountry studies that measure the impact of specific measures on women's tobacco use will provide important comparative data. Accurate evaluations are also needed of new legislation, such as bans on tobacco use in workplaces and public places.
- *Improve legal and governance structures for tobacco control.* Monitoring and evaluating existing and new laws is necessary to ensure compliance and identify reasons for lack of enforcement.
- *Help advocates work with governments to implement the Framework Convention.* Nongovernmental organizations (NGOs) can also use information to persuade governments to take action and increase public awareness of the importance of gender-sensitive tobacco strategies. Tobacco control programs could target advocacy toward policies that work best to reduce tobacco use among women and girls.

5. Translating basic and applied research into effective, evidence-based prevention and treatment programs and broad public health tobacco control policies will require monitoring the harmful effects of tobacco marketing targeted to diverse populations of women and girls domestically and globally.

Monitoring needs to include:

- *Tobacco advertising and promotion targeted to diverse populations of women in the United States and internationally.* This information will enhance counter-marketing programs to educate women and girls and policy and program planning to counter tobacco industry messages that promote tobacco use. In addition,

information on tobacco company advertising and promotion activities could be used to show women that options are available for becoming emancipated and independent other than using tobacco.

- *The perception developed by marketers that tobacco use is an affordable pleasure for women.* Many women smokers report that tobacco use is a positive and meaningful part of their lives (49). Further research is needed to explore this positive association, including how women experience tobacco use as an affordable pleasure. This research can assist in understanding the benefits women associate with tobacco use, provide ways to counter these benefits, and identify complementary benefits associated with quitting tobacco use.

Delivery

Overall Goal: **Ensure the widespread delivery of effective interventions to prevent and treat tobacco use and ETS exposure among women and girls.**

The reach and impact of evidence-based tobacco control programs and policies must be expanded to reduce the harms of tobacco use and ETS exposure.

Relatively few women receive formal smoking cessation assistance because of lack of interest, time, and resources and low availability. Minorities and those of lower socioeconomic status are disproportionately affected. Women with little education are far more likely to smoke than those with more education, emphasizing this population's enormous need for services (50). The Surgeon General's report on tobacco use among U.S. racial and ethnic minority groups concluded that members of minority groups were less likely than other groups to participate in smoking cessation programs and receive cessation advice from health care providers due to barriers such as lack of transportation, money, and access to health care (51).

Delivery refers to the process of disseminating, facilitating, and promoting evidence-based prevention, early detection, diagnosis, and treatment practices and policies to reduce the burden of cancer in all segments of the population.

Research is the key to developing best practices to prevent and reduce women's tobacco use (52, 53), and these best practices must be promptly disseminated to public health practitioners and consumers. In addition, mechanisms must be in place so that practitioners and consumers can provide researchers with feedback to ensure that research is useful and applicable in the real world. Researchers and public health professionals have a responsibility to translate basic research into effective smoking cessation and prevention messages that can be disseminated by the media and by women's organizations for broad public impact.

Much research demonstrates that women do not fully understand or appreciate the impact of tobacco use on their health (54, 55). Effective ways to communicate accurate health messages may vary depending on a woman's age, race and ethnicity, tobacco use status, socioeconomic status, and other factors. Meta-analyses of gender-specific interventions demonstrate that these factors are significantly related to how women approach cessation (56-58).

Long-term, sustained, and coordinated strategies must be devised for incorporating tobacco control into the women's health agenda and engaging women's and girls' organizations in tobacco control issues. Initiatives are needed that will convert women's support for tobacco control efforts into active involvement in and advocacy for comprehensive tobacco control programs and policies.

As a result of these efforts, key information will be disseminated more rapidly and completely to the general public and decision makers. Partnerships will open communication channels from consumers back to researchers to help inform and shape future research agendas and to refine and improve current best-practice interventions. Partnerships will also increase accountability through media attention, link local and international networks, help decrease tobacco use through better treatments, and promote strong national and local legislation.

Delivery Recommendations

1. Expanding the reach and impact of evidence-based tobacco control programs and policies will require increasing the appeal, access, affordability, and use of effective interventions, particularly among women and girls in populations at greatest risk.

Increasing the use of effective interventions will require:

- *The development of tobacco control policies and counter-advertising campaigns.* Such policies and campaigns can substantially increase quitting motivation and demand for and use of evidence-based treatments. Effective tobacco control policies include increased excise taxes on cigarettes, smoke-free indoor air laws, and public and private insurance coverage for tobacco dependence treatment.
- *Finding ways, other than through actual experience, of encouraging women to view the dangers of tobacco use as personally relevant.* Some tobacco users may not be aware of the connection between tobacco use and their health. Even when women are aware of the health risks of tobacco use, they often have a perception of personal safety or "self-exemption" from the consequences of tobacco use.

- *Increasing demand for interventions, which must be attractive, affordable, and accessible to all women.* Campaigns aimed at women tobacco users should highlight the unique risks to women of tobacco use, risks to infants and children from exposure to ETS, and benefits of quitting related to reproductive and general health. Campaigns should also address common misconceptions about the effects of quitting on women's long-term health.
- *Increasing access to care.* It is critical to broaden the help offered to women through the health care system. Every woman should receive evidence-based tobacco use assessment, and women who smoke should receive cessation counseling during visits with health care providers. Cost barriers must be reduced, and new treatments that use technologies such as telephone quit lines or the Internet may expand access for many. However, interventions that rely on access to Web-based resources—or even the telephone—may not reach some populations at greatest risk.

2. Expanding the reach and impact of evidence-based tobacco control programs and policies will require identifying and using targeted messages and strategies to involve and activate individuals and organizations in effective, sustained advocacy for evidence-based tobacco control programs and policies.

Targeted messages and strategies should address:

- *Ways to more effectively communicate the devastating impact of smoking on women's health.* The most effective ways may vary depending on a woman's age, tobacco use status, socioeconomic status, and other factors. Studies should segment priority audiences and provide insights into appropriate channels and tactics to reach them. To ensure progress, translation and outreach efforts must be appropriately tracked and evaluated so that best practices can be identified and replicated.
- *Ways to increase outreach to young women* (59). Research is needed to increase our knowledge of young women's receptiveness to tobacco industry messages and effective countermarketing messages and to identify appropriate channels and tactics to reach young women. We also need a better understanding of the role tobacco plays in girls' and young women's self-perception and desired self-image to help women define these attributes in alternative ways.
- *Ways to engage women in tobacco cessation and advocacy.* Long-term, sustained, and coordinated strategies are needed to engage women's and girls' organizations in tobacco issues and to incorporate the issue of tobacco into the women's health agenda. Women's and girls' organizations are appropriate partners in determining how best to communicate to women the importance of the problem of tobacco use and their potential role in addressing it.

3. Expanding the reach and impact of evidence-based tobacco control programs and policies will require making data from surveillance and policy research, as well as social, economic, and cultural studies, available to the health care community, policy makers, and the general public in a timely and effective fashion.

Strategies should include:

- *Development of a mechanism to identify individual and/or policy-relevant tobacco control research findings and use state-of-the-art communication strategies to maximize dissemination to relevant audiences.* Materials may come from peer-reviewed journal articles, conference abstracts, polling and marketing research reports, and other sources.
- *Outreach to health professional organizations to assist them in providing training at national, state, and local meetings.* Primary care providers, including nurses, nurse practitioners, social workers, family practitioners, obstetrician/gynecologists, internists, dentists, and others can benefit from training in best practices for prevention and cessation.
- *Close cooperation between researchers and tobacco control activists.* General principles of good project planning apply, such as ensuring that policy makers and women's leaders are involved from the beginning in identifying research priorities and planning programs.
- *Briefings to educate and inform the media so that they understand the context in which new findings are released.* The briefings would not only explain the new research findings, but would also describe the expected impact or use of the findings.
- *Use of the Internet, one of the most cost-effective techniques for rapidly disseminating information.* Local groups can use new information technologies to receive training in how to better use research results. This is especially

important in regions where training opportunities are limited, such as in the economically developing world.

4. Expanding the reach and impact of evidence-based tobacco control programs and policies will require supporting research and demonstration projects to better understand how to convert women's broad-based support for tobacco control policies and programs into more active involvement in their communities.

Strategies should include:

- *Educating women's organizations about the toll tobacco use takes on women and engaging organizations in tobacco control activities.* Systemic change requires involvement of a wide cross-section of society. Women's organizations have an enormous impact on how society views and acts upon what are considered "women's issues" (60).
- *Funding pilot or demonstration projects to determine how to effectively engage women leaders and create effective grassroots programs.* Research on competing issues and the overall agenda of various women's organizations will provide insights into how to approach these groups to consider adding tobacco control to their agendas.
- *Developing appropriate messages and materials for reaching out to organizations that have not previously been involved in tobacco control*. By positioning tobacco cessation as a primary factor in overall women's health and economic well-being and showing that coordinated efforts can lead to declines in women's tobacco use, women's engagement with tobacco issues may be increased.

Partnerships

Overall Goal: **Harness and expand partnerships, networks, and innovative research platforms to design and launch broad-based strategies to eliminate the harms of tobacco use and ETS exposure among women and girls.**

Successfully implementing the discovery, development, and delivery recommendations will require capitalizing on existing collaborations and developing new partnerships. To maximize the development and dissemination of effective interventions, partners must be involved from the beginning, and knowledge gained from practice should be used to inform future research.

New and expanded partnerships are needed to make progress in tobacco use prevention, control, and treatment. Partners should identify existing funding mechanisms and increase awareness among various organizations that tobacco control is part of their charge. Using models of well-organized activist communities, such as those for breast cancer and HIV/AIDS, might yield strategies to provide additional funding for tobacco control research and implementation of proven strategies.

Partnerships should also be formed with national agencies in economically developing countries, such as the Center for Disease Control in China and the National Cancer Institute of Brazil, as these agencies both use and sponsor research. A stimulus for global cooperation concerning gender and tobacco will also come from the Framework Convention, because the countries that ratify the treaty will be required to report on their progress. The linkages between these countries, U.S. partners, the international women's movement, and research centers will be critical to monitoring and evaluating programs. However, more effort must be made to include women's NGOs, health care professionals, national ministries for women's affairs, national centers of excellence that teach gender studies, and women's studies centers—particularly in economically developing countries. Furthermore, many international development and funding agencies, such as the WHO, United Nations regional economic and social commissions, and the World Bank, can cooperate to advance tobacco control and prevention among women.

> ***Partnerships*** are working relationships between government agencies, nongovernmental organizations, private foundations, corporations, academic institutions, and community groups to accelerate progress.

Existing infrastructures, such as the National Institute on Drug Abuse Clinical Trials Network, may be used to quickly evaluate the efficacy of promising treatments and the effectiveness and cost-effectiveness of proven small-scale interventions. Partnerships among Institutes and Centers of the National Institutes of Health (NIH) can also make possible cross-disciplinary research in a broad range of tobacco-related disease mechanisms, including gene-hormone-environment interactions, sex differences in carcinogenic and disease pathways, and inflammation. Moreover, partnerships between U.S. Department of Health and Human Services agencies that conduct research (such as NIH and the Centers for Disease Control and Prevention [CDC]) and Federal and state agencies that deliver health care, as well as community and advocacy organizations, will be needed to bring the knowledge gained through research to the development and dissemination of effective, evidence-based interventions.

> ***Innovative research platforms*** are the support structures (e.g., Cancer Centers, Centers of Excellence, Special Populations Networks for Cancer Awareness and Training, Transdisciplinary Tobacco Use Research Centers) and collaborations with other government agencies, academic institutions, and industry that make it possible to pursue rapidly evolving discoveries.

Partnership Recommendations

1. **Partnerships are especially needed between established networks of clinical and translational researchers that can provide the resources and infrastructure needed to foster cross-disciplinary interactions and rapidly evaluate treatments and interventions.**

These partnerships should:

- *Encourage transdisciplinary investigations of common pathways of tobacco-caused cancer, heart disease, and*

lung disease. Smoking causes 140,000 premature deaths from cardiovascular disease each year (61). Although progress is being made in understanding its pathogenesis, the precise mechanisms by which tobacco causes cardiovascular disease have not yet been fully elucidated. Epidemiologic data support the notion that common mechanisms may exist for cigarette smoke-induced carcinogenesis and cardiovascular disease. Recent studies have defined common biological pathways that may be important to the pathogenesis of tobacco-caused diseases (62). Further characterization of these common pathways, combined with the use of mouse models with disruptions in genes that confer disease susceptibility, may allow for the development of targeted intervention and treatment strategies for multiple tobacco-caused diseases.

- *Support further research into cross-disciplinary interactions in tobacco-caused disease mechanisms.* Estrogen may play a role in both premalignant disease and malignant disease progression. An understanding of the role of estrogens in the pathogenesis of lung cancer should facilitate the selection and evaluation of potential antiestrogen therapies for the treatment of this disease. An exploration of mechanisms should also include the early preinvasive stage and chemoprevention so that pharmaceutical agents can be developed to treat these early stages of tobacco exposure.

2. Partnerships are especially needed between research institutions and community-based organizations that serve populations at greatest risk to conduct community-based participatory research. These partners must be committed to joint decision making in designing research, sharing ownership of the products of research, and disseminating and implementing research results.

These partnerships should:

- *Support research institutions that partner with community-based organizations, especially those that serve populations at greatest risk.* These organizations may include community health centers, other community-based organizations, and educational institutions that serve minority populations. True partnerships will include training of community-based collaborators in research methodologies and training of academic researchers in ways to culturally tailor interventions. Such partnerships will also include a commitment to shared ownership of the products of research and joint decision making regarding protocol development, program implementation, data analysis, and dissemination of findings. True partnerships are bidirectional: Community-based collaborators are trained in research methodology, and academic researchers are trained in culturally and community-tailored interventions. These partnerships also require a commitment to joint decision making and shared ownership of the problem.
- *Involve NCI and other NIH Institutes and Centers*. These collaborations should study such issues as tobacco use in people with diabetes, cancer, hypertension, or other comorbid conditions and the interaction between alcohol and tobacco prevention and control policies.
- *Ensure that those who are the subjects of research have a voice in determining future research funding allocations*. Involving people who smoke, community-based organizations, and communities of color in funding allocation decisions will help maximize the impact of research and help counter discrimination based on race and ethnicity, gender, and social class.

3. Partnerships are especially needed between research institutions and tribal colleges, tribal health departments, and/or American Indian health care and community settings to develop effective, culturally appropriate individual, family, and community-level tobacco prevention and cessation initiatives.

These partnerships should:

- *Incorporate culturally competent approaches and language.* Because of the magnitude and persistence of the tobacco use problem in American Indian/Alaska Native populations, tribal colleges, tribal health departments, and other institutions that serve these communities should be especially targeted for research partnerships.

4. Partnerships are especially needed between public and private funding agencies to fully and efficiently support the implementation of successful interventions.

These partnerships should:

- *Consider replicating the applied research model used for NCI's American Stop Smoking Intervention Study (ASSIST) project*. Lessons learned from the ASSIST project could be applied to the development of public/private partnerships to decrease women's tobacco use. For

example, clinics in the U.S. Department of Agriculture's Women, Infants, and Children (WIC) program might be an appropriate setting for a public-private partnership to design and implement women's quit-smoking programs and reduce children's ETS exposure. Successful projects could then be considered for nationwide dissemination.

- *Conduct research and demonstration projects to understand how to convert broad community support, especially women's and girls' support, for tobacco control policies into active community involvement in their development and enforcement*. Researchers, practitioners, and community advocates must work together to identify ways to effectively mobilize communities to reduce the burden of tobacco-caused cancers. This will require a collaborative effort to understand why some communities are poised for change and others are not. Participatory research methodologies can help us understand how to increase women's and girls' involvement. The community should be involved from the earliest stages, and research designs should reflect diversity in age, language, and sociocultural and economic status.

Evaluation and Surveillance

Overall Goal: **Improve national and global evaluation and surveillance of the harms of tobacco use and ETS exposure and of women's and girls' knowledge, attitudes, and behaviors related to tobacco use and harms.**

It is essential to monitor and evaluate progress toward reducing tobacco use, ETS exposure, and the impact of tobacco-related cancers on women and to make midcourse adjustments as needed. This will require further development of standardized measures and surveillance systems to ensure that data are comparable within and across countries.

Surveillance data are needed to monitor tobacco use and ETS exposure among women and to trace the epidemic as it develops globally. A comprehensive surveillance system would include information about the tobacco user or potential tobacco user, tobacco products, tobacco industry activities, and the economic, cultural, political, and historical activities and interventions that support or discourage tobacco use (63, 64).

In addition, current surveillance systems focus largely on the smoker and do not systematically collect other important information, such as the natural history of smoking or factors influencing tobacco use in diverse populations globally (64). Surveillance data are important because they provide the basis for designing program and policy interventions and health communication messages. For example, information on product constituents, product marketing, and tobacco use prevalence is crucial for monitoring tobacco-related disease incidence and prevalence. In many cases, however, the methods for such a comprehensive surveillance system still need to be developed.

To determine "best practices" for tobacco control interventions, we must understand the levels and types of interventions being implemented and their effects.

To better measure the extent of state and local tobacco control activities, tobacco use surveillance must be enhanced at the state and local levels, and creative, user-friendly measures must be developed to report the impact of tobacco control interventions on tobacco use and exposure to ETS. Tobacco control programs must also monitor existing and new laws to ensure compliance and identify reasons for lack of enforcement, where applicable. This information can be used to improve legal and governance structures for tobacco control.

Standardized monitoring of state and local tobacco control activities will provide the information needed for optimal program development, implementation, and evaluation. These measures can then be linked with measures of tobacco use to document pre- and postintervention behavior changes (65). These measures must be easy to use to ensure that they will be applied.

Global surveillance is needed of tobacco use and exposure to ETS among adults and children, by sex, using standardized measures so that cross-country comparisons are available. Because of the range of support, both cultural and financial, and the differences in infrastructure for surveillance activities in different countries (66), this is critically important for cross-national programs. Ensuring that surveillance and monitoring are comparable across countries is a complex and difficult task (67). Particularly in economically developing countries, surveillance systems for monitoring tobacco use and its health consequences are very limited at present.

Evaluation and Surveillance Recommendations

Local, national, and global evaluation and surveillance will be critical for:

- Monitoring and measuring national and global trends and patterns in tobacco use and exposure to ETS using standardized measures.
- Ensuring that research and programmatic funding are strategically targeted and, where appropriate, tailored to specific populations.
- Assessing whether progress has been made and whether it is due to specific interventions and policies.
- Identifying effective interventions through success stories and rigorous case studies to inform researchers, encourage broader dissemination, and increase public support.

Global evaluation and surveillance should address:

- *Trends in tobacco use, changing patterns of use, and factors that affect use.* Basic information concerning the variety of tobacco products used by women, such as chewing

tobacco and hookah, is generally absent, as are data on changing patterns of use in relation to marketing. Little information is available on tobacco use among female nurses, physicians, and other health professionals. Research that maps national trends is vital to developing gender-sensitive counter-advertising campaigns. Although using common definitions is often complex, the effort to do so will improve comparability on a global basis and the ability to perform meta-analyses.

- *Those who do not use tobacco, by gender and age, to obtain data on initiation, quitting, and acceptable prevention methods*. An important supplement to conventional epidemiological surveillance is monitoring cultural and social factors that protect women against tobacco use. These data are needed to maintain as an integral part of public policies the current relatively low prevalence rates among women and girls in many economically developing nations.
- *The impact of tobacco production and processing on women tobacco workers*. In many tobacco-producing countries, women and girls who work on tobacco farms are exposed to serious environmental hazards. Epidemiological and surveillance data, as well as social, economic, and cultural research, are needed to develop appropriate health policies and programs for these workers. Priority should be given to their knowledge, attitudes, and practices related to risk behavior.
- *The creation of baselines for monitoring the progress and impact of the Framework Convention and establishing global indicators for gender and tobacco*. The number of high-quality research projects on gender and tobacco in economically developing countries could increase as more data become available on measurable outcomes. Better data can also help persuade children's rights organizations, women's organizations, and others to undertake tobacco control and prevention efforts.
- *The scope of the tobacco epidemic*. The prevalence of tobacco use in different subgroups of women must be assessed to identify high-risk groups of women who can be targeted by health education and intervention programs. Collecting information on prevalence levels can also assist tobacco control advocates in their activities in support of tobacco control policies. By collecting data on prevalence before and after a tobacco control policy is implemented, for example, advocates can demonstrate the impact (or lack of impact) of the policy.
- *The patterns, extent, and trends in tobacco use among women, health and economic consequences of tobacco use for women, and underlying sociocultural factors*. This information can help support the development of tobacco control policies and programs.
- *Tobacco use within specific populations of women*. This information is needed to increase the effectiveness of policies and programs for reducing overall tobacco use and subsequent health consequences among women. In particular, data need to be collected on women and girls of different ages and socioeconomic status levels.
- *Morbidity and mortality*. Although economically developed countries typically have complete and reliable vital registration data on causes of death, their data on morbidity are much less complete. In economically developing countries, data on mortality and morbidity are very limited. If reliable data on the health hazards of tobacco use for a given population are not available, they need to be collected.
- *Ways to maximize the efficiency and completeness of existing surveys while minimizing their costs*. A number of surveys conducted periodically at the national and state levels include questions on individual tobacco use behavior. Although these surveys serve distinct and useful purposes, gaps remain in what is being monitored. The efficiency and appropriateness of survey designs and sampling strategies must also be improved, and information must be generated more quickly to inform and shape the policy agenda.
- *Global surveillance of tobacco use and exposure to ETS among adults and children, by sex, using standardized measures so that cross-country comparisons are available*. Because of the range of support, both cultural and financial, and the differences in infrastructure for surveillance activities in different countries, collecting standardized surveillance data is critically important for cross-national programs. Ensuring that surveillance and monitoring are comparable across countries is a complex and difficult task. Particularly in economically developing countries, surveillance systems for monitoring tobacco use and its health consequences are very limited.

Conclusion

Forty years after the first Surgeon General's Report conclusively linked smoking to lung cancer in men, tobacco use *remains* the nation's leading cause of preventable, premature death in both women and men. Currently, approximately 170,000 American women die from smoking each year, and in the late 1980s, lung cancer surpassed breast cancer as the leading cause of cancer death in women. Despite this, tobacco use is not generally considered a "women's issue."

The nation has made enormous progress in reducing tobacco use, especially among affluent, educated women; indeed, the *Healthy People 2010* goal of reducing smoking prevalence to 12 percent has already been reached by this group of women. In stark contrast, economically disadvantaged, poorly educated women and members of some racial and ethnic groups, among others, smoke at very high levels. Smoking rates are especially high and persistent among American Indian/Alaska Native women and girls.

The 2001 Surgeon General's Report, *Women and Smoking*, which focused on the devastating toll of tobacco use for women, highlighted the importance of continuing to build the science base on gender-specific research. The Women, Tobacco, and Cancer Working Group has identified numerous priority research issues across the spectrum of tobacco control and prevention disciplines. However, generating new knowledge is not sufficient. Greater emphasis must be placed on translating knowledge into effective program and policy interventions that can be applied to all populations, especially populations of women at greatest risk for tobacco use and tobacco-caused disease.

Tobacco use and tobacco-caused cancers are already common among women in most economically developed countries. However, smoking rates among women in economically developing countries are still generally low. There is broad agreement that preventing the epidemic of tobacco use and tobacco-caused cancers from spreading to women and girls in economically developing nations is a critical public health priority. Accomplishing this will require generating new knowledge and using what we already know to put into place effective prevention programs and policies.

Successful implementation of all of the recommendations of the Women, Tobacco, and Cancer Working Group will require sustained and focused efforts, including collaborations and partnerships among many public and private-sector organizations. Reducing, and ultimately eliminating, tobacco use and tobacco-caused disease among women is possible, and it is a goal worth striving for.

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