

WORKING SESSION 5B: TOBACCO CONTROL

A CLINICIAN'S GUIDE TO THE MEDICAL CONSEQUENCES OF SMOKING AND EVIDENCE-BASED STRATEGIES FOR TOBACCO CESSATION

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INTRODUCTION

Tobacco use is an ancient social and cultural habit that unfortunately has become the leading cause of preventable, premature death in the United States today. While this may have never been anticipated, Tobacco Use Disorder, including Tobacco Dependence, is now officially recognized as a clinical diagnosis. The currently used ICD-9 diagnosis code for this disorder is 305.1.¹ According to the Year 2000 Public Health Service Guidelines, "Treating Tobacco Use and Dependence," clinicians encounter at least 70% of all smokers in the United States each year during ambulatory visits. This means that clinicians have a unique opportunity to intervene and change the natural history of tobacco-related disorders, especially since as many as 70% of all smokers report wanting to quit.² Unfortunately, clinicians do not always take the opportunity to actively treat this serious and prevalent disorder. A recent population-based survey found that less than 15% of smokers who saw a physician in the past year were offered any type of assistance in quitting smoking, and that only 3% had a follow up appointment to address tobacco use.² Even fewer received specific advice on how to quit smoking successfully. Screening to identify tobacco users is the first step toward treating tobacco use and dependence, as identification itself increases the rate of clinician intervention. Preventing tobacco use in children and adolescents, reducing tobacco use in adults, and reducing non-smokers' exposure to environmen-

tal tobacco smoke are essential public health objectives.

BURDEN OF DISEASE

Most smokers start their habit by age 18,³ developing a true nicotine dependence that is comparable to drug dependence caused by opiates or cocaine.⁴ According to the Centers for Disease Control and Prevention (CDC), in 1999, tobacco use was reported to be the single most prominent contributor to mortality in the United States, accounting for an annual number of 442,532 tobacco-related deaths, approximately 20% of all deaths in the United States that year. In McGinnis and Foege's landmark article, "Actual Causes of Death in the United States," tobacco use ranked number one above physical inactivity, diet, alcohol, or environmental toxins as the number one preventable cause of death in 1990.⁵

Investigators at the CDC analyzed data from the 2000 National Health Interview Survey Adult Core questionnaire, which was administered by personal interview to 32,374 adults who served as a nationally representative sample of the US non-institutionalized civilian population aged ≥ 18 years. According to that analysis, 23.3% of adults were current smokers in 2000, compared with 25.0% in 1993, reflecting a modest but statistically significant decrease in prevalence among US adults. However, this means that the US adult prevalence of smoking still must be cut nearly in half before the end of the de-

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cade if we intend to meet the Healthy People 2010 objective of less than 12% current smokers. Based on this survey data as well, the CDC estimates 15.7 million Americans had stopped smoking for one or more days during the preceding 12 months because they were trying to quit.⁶ Among racial/ethnic groups, 36.0% of American Indians/Alaska Natives, 23.2% of Black/African Americans, 18.6% of Hispanics, and 14.4% of Asians reported current smoking. Of note, the majority of smokers were interested in quitting, and the percentage of ever smokers who had quit was highest for Whites (51.0%) and lowest for non-Hispanic Blacks (37.3%).⁶ These higher-than-average risk groups raise greater concern and offer some excellent opportunities for targeted interventions. For instance, ethnic/racial and occupational groups known for having a smoking rate greater than the general population are African Americans living in the inner city, with a smoking rate as high as 45%,⁷ and construction workers and their household members who have an estimated smoking rate of 40%.⁸ Poverty has also been found to be associated with current smoking. Nearly one third (31.7%) of adults living below the poverty level reported smoking, while only 22.9% of adults at or above the poverty level reported the same. By education level, adults who had earned

a General Educational Development (GED) diploma were more than twice as likely as persons with graduate degrees to currently smoke. Current smoking was highest among persons aged 18–44 years and lowest among those aged ≥ 65 years. Interest in quitting and attempts to quit decreased with age.⁶

Secondhand smoke accounts yearly for 3,000 deaths from lung cancer in non-smokers. If current smoking patterns continue, 25 million people, including 6.4 million children, who are alive today will die prematurely of smoking-related causes.⁹ Hence, the burden of tobacco-related disease is enormous. Among others, tobacco-related diseases include cancer, coronary artery disease, cerebrovascular disease, chronic obstructive pulmonary disease, and peripheral vascular disease. According to the American Cancer Society, cancers of the lung, mouth, larynx, bladder, kidney, cervix, esophagus, and pancreas are all related to tobacco use.¹⁰

Pregnant smokers pose a threat to themselves and their fetuses directly, and to others around them via secondhand smoke. They are more likely than non-smokers to have spontaneous abortions, stillbirths, placental abruption and premature low birth-weight infants. Their children are more likely to experience sudden infant death syndrome (SIDS), cleft palate and lips, and childhood cancers.^{2,9} 300,000 children suffer from respiratory tract infections each year in the United States as a result of secondhand smoke.⁹

There are also tremendous economic consequences from tobacco-related disease. In 1998, the direct medical costs associated with smoking were more than \$75 billion—about 8% of the personal healthcare expenditure in the United States. These costs are the result of a loss of the workforce capacity when persons with tobacco-related illness are absent from work, and also include medical bills for doctor's visits, prescription medication and hospitalization. With the progression of disease and onset of

disability, there is increased demand for home health care, as well as loss of personal income. The cost of smoking to Medicaid in 1998 was more than \$24 billion, or 14% of all Medicaid expenditures.⁹

GENERAL MECHANISMS OF SMOKING-RELATED DISEASE

The lungs are the main portal of entry for tobacco smoke into the human body, and they are directly susceptible to its harmful effects. Each cigarette smoked exposes the lungs to over 6,000 harmful substances and up to 20 mg of tar, a demonstrated carcinogen.¹¹ Exposure to these toxic substances can cause the release of free radicals, which are direct irritants, and trigger inflammatory-mediated cell injury, activating neuroendocrine cells, which causes excessive secretion of neuropeptides that are growth factors for both normal and malignant cells.¹² These cellular changes can result in the development and progression of diseases such as asthma, chronic bronchitis and bronchiectasis, emphysema, and lung cancer.^{6, 13–15}

Direct irritants, such as nitrogen oxide, ammonia, and tar, invoke a direct inflammatory response in the lungs. The inflammatory response may be also accompanied by an immunologic response that is characterized by the presence of eosinophils in the airways and peripheral blood, elevated serum Ig E levels, and the development of atopy, especially in children.^{15–18} Although the mechanisms are not clearly understood, these are key factors that may result in the development and exacerbation of chronic cough and asthma. Furthermore, patients with previously existing lung disease are often more susceptible to these effects, and have a higher risk for the pulmonary complications of tobacco smoke exposure.

Furthermore, the free radicals can cause abnormal DNA formation that

can lead to malignancy in the lungs and in other organ systems throughout the body.¹¹

As a result of smoking, more people die of cardiovascular disease than lung cancer.¹⁹ According to the American Heart Association, smoking is a strong independent risk factor for ischemic heart disease.²⁰ Several mechanisms explain smoking-induced cardiovascular disease. First, tobacco smoke induces activation of neutrophils, monocytes and platelets, which can promote atherosclerosis. Second, it affects lipid metabolism through alterations in triacylglycerol metabolism resulting in elevated LDL and decreased HDL levels that are strongly associated with an increased risk of atherosclerosis and ischemic heart disease. Third, tobacco smoke has also been shown in studies to predispose to myocardial ischemia by altering the oxygen supply/demand relationship in the myocardium and through alpha adrenergic mediated, nicotine-induced vasoconstriction of the coronary arteries.¹⁹

SYNERGY OF SMOKING AND ENVIRONMENTAL EXPOSURES

Both children and adults who are exposed to secondhand smoke are susceptible to the deleterious effects of tobacco smoke.⁹ In addition, there are important interactions between environmental toxins and smoking in both the development and the progression of human disease, especially within the respiratory system. Most studies suggest an additive effect of "dust" exposure and smoking. Occupational exposure in the work place is usually the main source of exposure, but environmental "indoor air" exposure in homes is another cause for concern with certain toxins such as radon.²¹ Asbestos, arsenic, and coal dust are inorganic dusts that are strongly associated with an increased risk and incidence of lung cancer, and smoking increases that risk. Radon exposure, which

is most deleterious indoors, increases the risk of lung cancer, especially in homes with poor ventilation and small space.²¹⁻²³ In fact, as many as 10% of houses in the United States may have an increased risk of lung cancer.²¹ The latency period before onset of disease is variable and the risk of lung cancer continues to rise until at least 30 years after first exposure for asbestos and even up to 56 years later with arsenic.²³ Asbestos exposure is commonly seen in coal miners, asbestos factory workers, pipe fitters, and boiler makers. Asbestos can cause either a restrictive or obstructive pattern of lung disease, as well as lung cancer or mesothelioma. Any patient with a history of exposure to asbestos should be encouraged to stop smoking since these 2 factors have a synergistic effect in the development of lung cancer.¹¹ Arsenic exposure, which is commonly seen in miners, vineyard pickers, arsenic pesticide workers, copper smelters, fur handlers, and manufacturers of sheep dip compounds can result in cancer and mucous hypersecretion.^{21,23} Other inorganic dusts that have a weaker association with smoking, with regard to the risk of lung cancer, include silica and beryllium.²³ Organic dusts such as cotton dust (byssinosis) and grain dust can cause mucous hypersecretion and airway obstruction. Each of these exposures seem to have a synergistic effect with smoking in the evolution and symptomatology of pulmonary disease.²¹

In 2001, 169,500 new cases of lung cancer were predicted to occur.²³ Based on epidemiologic data, approximately 15% (25,000 cases) would be caused by occupational or environmental exposures that occurred during the past 20-40 years.²¹ Checking if a patient has an occupational or environmental exposure history can be done quickly and efficiently. In fact, in order to facilitate this interrogation, Drs. Goldman and Peters have suggested a single screening question, "Have you had any exposure to fumes, dusts, chemicals, loud noise, or radiation?"²⁴

Occupational exposures, even carcinogenic ones, that interact with tobacco smoke, are not often recognized by employees or their clinicians. Every work site is federally mandated to provide a Material Safety Data Sheet (MSDS) to all employees or clinicians who ask. More information regarding the MSDS can be obtained over the internet at the CDC website, www.atsdr.cdc.gov. Each MSDS contains a list of hazardous materials used at that work site. Healthcare professionals can always consult local or regional poison control centers to help with the assessment of human risk associated with a particular case.²⁵

Having considered the scope and magnitude of this challenge, there are various ways for clinicians to intervene and reduce the burden of tobacco-related disorders. These strategies can be generally divided into clinician-specific strategies, office-based strategies, and population-based strategies.

EVIDENCE-BASED STRATEGIES FOR TOBACCO CESSATION

Clinician Specific Strategies

For the Patient Willing to Quit

According to the Year 2000 Public Health Service Guidelines, "Treating Tobacco Use and Dependence," there are 5 major steps to intervention in the primary care setting, often referred to as the 5 As, and these strategies are designed to be brief, requiring 3 minutes or less of direct clinician time.²

- **Ask about tobacco use.** Identify and document tobacco use status for every patient at every visit.^{2,17}
- **Advise to quit.** In a clear, strong, and personalized manner urge every tobacco user to quit. Emphasize the impact of tobacco use on current health/illness or its social and economic costs and its effect on other household members especially children.
- **Assess willingness to make a quit**

attempt. Is the tobacco user willing to make a quit attempt at this time? If yes, provide assistance, otherwise provide a motivational intervention, and if the patient is a member of a special population (eg, adolescent, pregnant smoker, racial or ethnic minority, etc) consider providing additional information to supplement, such as educational materials produced by government and non-profit agencies which should be made readily available at every clinician's work station.

- **Assist in quit attempt.** For the patient willing to make a quit attempt, use counseling and pharmacotherapy to help him or her quit. A quit plan is recommended which includes setting a quit date (ideally within 2 weeks), providing intra-treatment (clinic/office staff) and extra-treatment (family, friends, and co-workers) social support, emphasizing the need for total abstinence and identifying challenges from past quit experiences and upcoming attempts, such as alcohol and other household smokers.² It is helpful for patients to encourage housemates to quit with them or not smoke in their presence.

Offer recommended pharmacotherapy and explain how it could increase smoking cessation success and reduce withdrawal symptoms. First line pharmacotherapy medications include bupropion SR (Zyban) and nicotine replacement therapy (nicotine gum, nicotine inhaler, nicotine nasal spray, and nicotine patch), while clonidine and nortriptyline are second line.² Of note is the fact that the intensity of clinical intervention is directly proportional to overall tobacco abstinence rate, and optimal abstinence rate is derived from person to person contact greater than 10 minutes per session and delivered for 4 or more sessions.² There is no evidence that more than 90 minutes of total contact time increases abstinence rates further.²

- **Arrange followup.** Schedule follow-up contact, preferably within the

first week after the quit date. A second follow-up contact is recommended within the first month and further follow-up contact can be scheduled as indicated. Contact may be in person or by telephone. At time of follow-up contact, congratulate patient on success so far, review encountered problems, and anticipate challenges in immediate future, emphasize that a lapse can be used as a learning experience and review and establish recommitment to total abstinence. Refer to more intensive treatment if necessary.

For the Patient Unwilling to Quit

Clinicians should use a brief intervention designed to promote the motivation to quit, evaluate, and identify barriers such as ignorance about harmful effects of tobacco, financial limitations, fears or concerns about quitting, or psychological impact of previous relapse.² There are 5 major steps often referred to as the 5 Rs.²

- **Relevance.** Encourage the patient specifically. Motivational information has the greatest impact if it is relevant to a patient's disease status, risk, health concerns, or other important characteristics (eg, prior quitting experience, personal barriers to cessation).

- **Risks.** Ask the patient to identify potential negative consequences of tobacco use. Highlight those most relevant to the patient and emphasize that lowering the tar content of cigarettes or substituting other forms of tobacco (smokeless tobacco, cigars, and pipes) does not eliminate these risks. Risks may be acute (asthma exacerbation), long term or environmental (increased respiratory infections in children of smokers).

- **Rewards.** Ask patients to identify and highlight potential benefits of stopping tobacco use (eg, improved health and saving money).

- **Road blocks.** Ask patients to identify barriers or impediments to quitting and note elements of treatment that can address barriers (eg, withdrawal symp-

toms, weight gain, depression, and fear of failure).

- **Repetition.** The motivational intervention should be repeated every time an unmotivated patient visits the clinic setting. Inform previous unsuccessful patients that most people make repeated quit attempts before succeeding.

For the Patient who has Recently Quit

Prevention of relapse is the goal. Although most relapse occurs early in the quitting process, some relapse occurs months or even years after the quit date and so even former tobacco users who no longer consider themselves as engaged in the quitting process should also get relapse prevention interventions.² Because of the chronic relapsing nature of tobacco dependence, whenever clinicians encounter a patient who has quit tobacco use recently, they should reinforce the patient's decision to quit, review the benefits of quitting and assist the patient in resolving any residual problems arising from quitting. Relapse prevention can be delivered by means of scheduled clinic visits, telephone calls, or anytime an ex-tobacco user is encountered by the clinician. A systematic, institutionalized mechanism to identify recent quitters and contact them is essential for effective delivery of relapse prevention messages. Minimal practice relapse prevention intervention should be part of every encounter with a recent quitter, and this entails congratulating patient success and encouraging to remain abstinent, and reviewing benefits, success, and problems encountered (lack of support, depression) or anticipated threats to maintaining abstinence (weight gain, alcohol use, other tobacco users in the household).

Intensive clinical interventions are more effective than brief treatment and are appropriate for any tobacco user willing to participate in them.² There is no evidence that the efficacy or cost-effectiveness of intensive interventions is

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limited to a subpopulation of tobacco users (eg, heavily dependent smokers).² These interventions are mostly provided by clinicians who specialize in treatment of tobacco dependence.

The Guide to Community Preventive Services, more commonly known as the Community Guide, aims to evaluate the quality of community- and population-based interventions for the purpose of improving the health of Americans. The Community Guide summarizes what is known about the effectiveness of population-based interventions designed to promote health, prevent disease, injury, disability, and premature death as well as reduce exposure to environmental hazards. The CDC scientists systematically review and summarize the evidence about interventions selected by an independent Task Force on Community Preventive Services.²⁶ This Task Force is composed of 15 multi-disciplinary experts from academia, public health departments, and the private sector who address a variety of health topics important to diverse communities within the United States. Based on the quality and quantity of scientific evidence presented, the Task Force either strongly recom-

mends, recommends, or finds insufficient evidence to make a recommendation for the effectiveness of each intervention.

The question is, *what works to make tobacco use prevention and control at the population or community level?* The Guide to Community Preventive Services addresses the effectiveness of community-based interventions for 3 strategies to promote tobacco use prevention and control: 1) reduce exposure to environmental tobacco smoke, also known as secondhand smoke; 2) prevent tobacco product use initiation; and 3) increase cessation.

OFFICE-BASED INTERVENTIONS

Doctor's offices, hospitals, HMOs, health insurers, and purchasers of employee health care benefits can all benefit and promote the treatment of tobacco dependence through a systems' approach.² These groups can develop and implement supportive systems, policies, and environmental prompts that will make tobacco use treatment an integral part of health care. Clearly, research shows that systems-level change can reduce smoking prevalence among enrollees of managed healthcare plans and that smoking cessation treatments are cost-effective.² In fact, smoking cessation treatment has been referred to as the "gold standard" of preventive interventions²⁷ and it compares quite favorably with other preventive interventions like periodic mammography and routine medical interventions such as the treatment of hypertension and hypercholesterolemia.² For this reason, the *Healthy People 2010* objective has been modified to state: "Increase insurance coverage of evidence-based treatment for nicotine dependency to 100%."² This effort should ensure reimbursement of clinicians for delivery of effective tobacco dependence treatments and emphasize tobacco cessation as a routine

duty of the clinician. The following are beneficial recommendations, which will further enhance quitting and abstinence rates. These strategies are complementary and supportive of the classic clinician-patient counseling.

Based on the evidence-based reviews, the Community Guide recommends clinician reminders. Clinician reminders may take the form of chart stickers, vital signs stamps, medical records flow sheets or checklists. The Community Guide strongly recommends clinician reminders plus clinician education. Clinician Education can be achieved by participation of clinicians in workshops and seminars as part of a continuing medical education program.

Reducing Patient Out-of-Pocket Costs for Effective Cessation Therapies

Hospitals should carry all FDA approved pharmacotherapy medications on their drug formulary and HMOs/health insurance should extend services provided to cover treatment of tobacco dependence by all proven modalities (counseling and pharmacotherapy) currently available.^{2,14}

POPULATION-BASED STRATEGIES

In selecting and implementing interventions, it is recommended that communities develop and maintain a comprehensive, multifaceted strategy to reduce exposure to environmental tobacco smoke (ETS), reduce tobacco use initiation and increase tobacco use cessation.¹⁷ If we (clinicians) can demonstrate that certain strategies exist that have been proven to reduce the use of tobacco and therefore lower the burden of illness associated with this behavior, then perhaps additional resources might be provided.

Strategies to Reduce Exposure to Secondhand Smoke

The Community Guide strongly recommends smoking bans and restric-

tions. Smoking bans and restrictions are policies, regulations, and laws that limit smoking in workplaces and other public areas. Smoking bans prohibit smoking entirely; smoking restrictions limit smoking to designated areas.

According to the Guide's evidence-based review, studies that evaluated the effect of smoking bans in workplaces observed an average reduction of 72% in worker exposure to components of secondhand smoke. Smoking bans were more effective in reducing secondhand smoke exposures than were smoking restrictions. Smoking bans were effective in a wide variety of public and private workplaces and healthcare settings. Their effectiveness should extend to most indoor workplaces in the United States.

Mass Media Campaigns and Increasing the Unit Price of Tobacco

The Community Guide strongly recommends the combination of anti-tobacco mass media campaigns and increasing the unit price of tobacco for the prevention and control of tobacco use. According to the Guide's evidence-based review, price increases were an effective tool to prevent and reduce tobacco use among some adolescents and young adults in the United States. Increases in the price of tobacco products also reduce tobacco use in older adults. The median estimates from the reviewed studies suggest that a 10% increase in the price of tobacco products will result in a 3.7% decrease in the number of adolescents who use tobacco and 4.1% decrease in the amount of tobacco used by the general population. In 7 of 8 studies reviewed, increases in the price of tobacco products resulted in decreases in both the number of people who use tobacco and the quantity they consume.

The unit price for tobacco products, such as the price of a pack of cigarettes, can be increased by raising the product excise tax through legislation at the state or national level. In several states, such

as California, Massachusetts, and Oregon, excise tax increases have also provided revenue for comprehensive tobacco use prevention and control programs.

Mass media campaigns have clearly been documented to affect consumer tobacco use, especially when coupled with increasing the unit price of tobacco. Specific messages for mass media campaigns are developed through marketing research, and are conveyed through television, radio, billboards, or print media. Campaigns are conducted over long periods of time and employ brief, recurring messages to inform and motivate individuals to quit or remain tobacco-free. Seven studies, which lasted 2 years or longer, evaluated campaigns to reduce tobacco use initiation. They observed a median decrease in tobacco initiation of 8.0 percentage points compared with groups not exposed to the campaign. Studies, which evaluated the effectiveness of mass media campaigns in reducing tobacco consumption in statewide populations as measured by statewide sales of cigarettes, found a median decrease of 15 packs per capita per year.

CLOSING STATEMENT

In "Reducing Tobacco Use—A Report of the Surgeon General, 2000," Dr. David Satcher writes, "our lack of greater progress in tobacco control is more the results of failure to implement proven strategies than the lack of knowledge about what to do."

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