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Tobacco

Michigan State University Extension Service

Fitness 7

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Issued April 1983

12 pages

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TOBACCO

What impact does smoking have on our national health?

What can we do about it?

It is estimated that cigarette smoking is responsible for 325,000 early deaths each year from heart and circulatory diseases and cancer, as well as other diseases of the lungs. Over 37 million people—one of every six Americans alive today—will die from cigarette smoking years before they otherwise would. If tobacco-related deaths were eliminated, there would be:

- 300,000 Americans each year who would not die prematurely.
- 1/3 fewer men dying between the ages of 35 and 59 years.
- 85 percent fewer deaths from bronchitis or emphysema.
- 1/3 fewer deaths from arteriosclerosis and heart disease.
- 90 percent fewer deaths from cancer of the trachea and lungs.
- 50 percent fewer deaths from cancer of the bladder.

Cigarette smoking, the most harmful form of tobacco smoking, is the largest preventable cause of premature death, illness, and disability we have. To deal with this major health

problem, the public as well as health professionals, smokers as well as non-smokers, must understand the many-sided nature of cigarette smoking. Some explanation of the historical, chemical, pathological, social, and psychological aspects of smoking is needed to bring about better understanding of the problem and possible solutions.

Tobacco, as defined by Webster, is a tall broad-leaved herb related to the potato whose leaves are prepared for smoking and chewing. This vegetable product was once believed to be a cure for many diseases. But it has now been identified as the primary factor contributing to the occurrence of the major diseases which plague man today: cardiovascular disease, chronic pulmonary disease, and cancer in various parts of the body. It represents a major barrier to many people who wish to attain true fitness.

There have been reports of smoking materials other than tobacco (including cow dung for the treatment of melancholy!), but tobacco smoking



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goes all the way back to the Indians of the New World.

When Columbus discovered America in 1492 he observed the Indians smoking. The use of tobacco spread as he and other explorers returned to their original homelands with cargos of tobacco. As trade between Europe, Africa, Asia, and Australia expanded, tobacco was introduced to these various continents. Probably one of the reasons tobacco was adopted all over the world is that the plant grows vigorously under a wide range of climate and soil conditions.

During the 16th Century a number of publications by Europeans and English physicians praised the medicinal properties of tobacco. They claimed it as a cure for everything from headaches to syphilis. It wasn't until early in the 17th Century that publications against the use of tobacco began to appear. In 1605, King James I of England organized the first public debate on the effects of tobacco. And in 1642, Pope Urban VIII condemned the use of tobacco in general and in holy places in particular and excommunicated all offenders. As history tells us all too well, though, tobacco survived the King's policies, the ousting by church leaders, and the warnings of physicians.

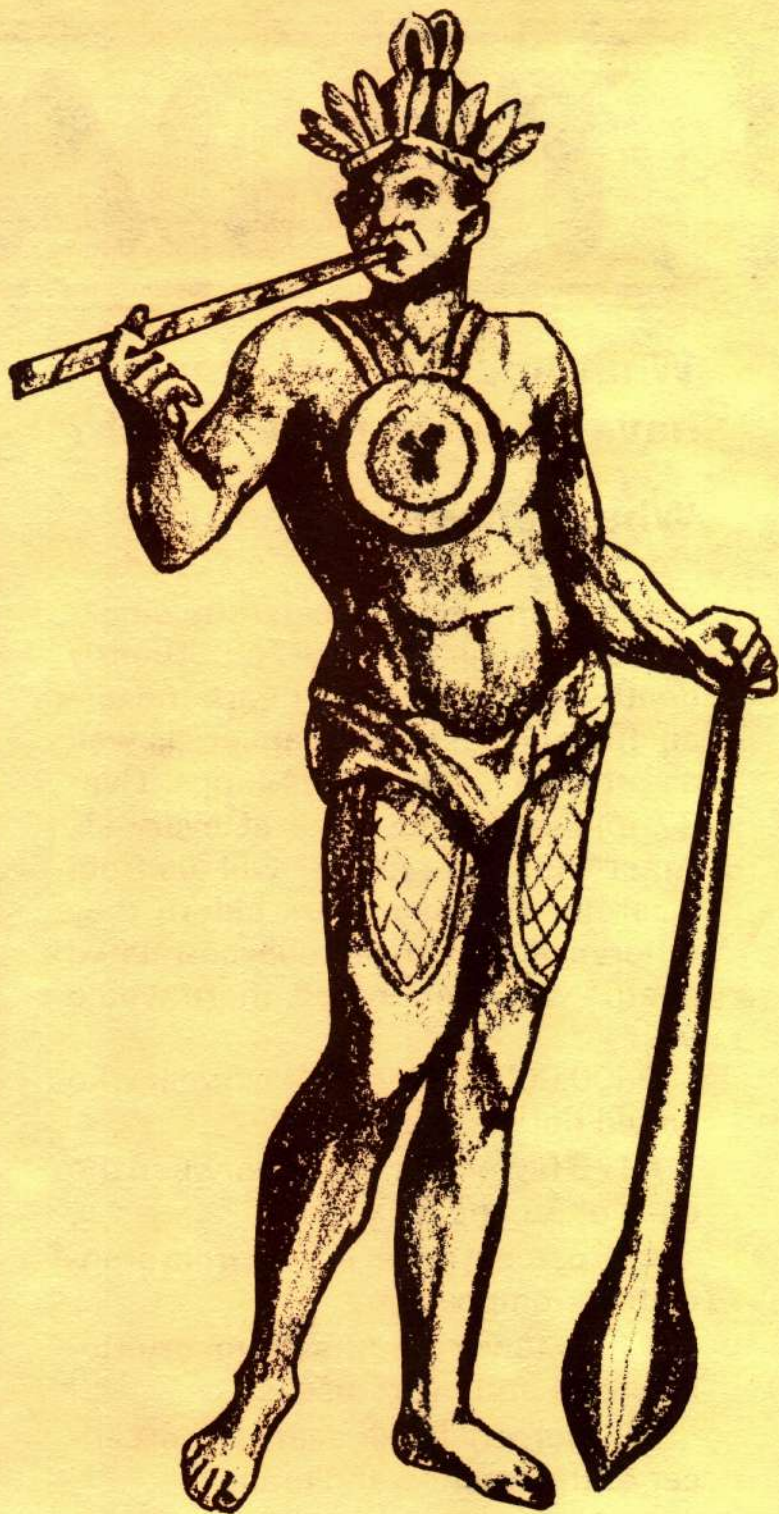
Tobacco chemicals and their effects

A number of chemical substances can be found in tobacco leaves and smoke. Nicotine, a substance produced by the root, is found throughout the plant and especially in the leaves. It is generally understood to be the addictive element in tobacco.

Nicotine exists in tobacco as an organic salt. When tobacco is burned, the salt is converted to a gas which is easily absorbed. The amount of nicotine present in the smoke depends on the brand of the tobacco product and its humidity. Nicotine is generally believed to cause the immediate symptoms that develop after smoking—a rise in blood pressure and an increased heart rate. From 79 to 88 percent of the nicotine in the smoke is absorbed into the lungs and distributed to the brain and throughout the body in seconds.

Burning one cigarette produces approximately 800 cc of gas. Two major components of the gas are carbon dioxide and carbon monoxide. The faster you smoke, the greater the volumes of CO₂ and CO produced and inhaled.

Carbon monoxide is a colorless, poisonous gas formed by burning carbon with very little oxygen. Its toxic, or poisonous, nature in the body is the effect it has on the hemoglobin in the



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blood. Normally our red blood cells, which contain hemoglobin, have the important function of carrying oxygen throughout the body. However, the hemoglobin has a 200-times-greater attraction to carbon monoxide than to oxygen. Thus, repeated exposure to even small amounts of carbon monoxide can greatly reduce the amount of hemoglobin available to combine with oxygen in the blood. Carbon monoxide also restricts the process whereby the oxygen that *is* picked up by the blood is released to other parts of the body. The result is a loss of a rich oxygen supply to all of the body's tissues.

The heart and brain are heavily dependent on aerobic respiration, which is the use of oxygen for function. Therefore, they are the first victims of a decreased oxygen supply. It should be noted that filter tips are helpful in removing solid particles in the smoke—not these gaseous products. In fact, some research studies indicate that levels of carbon monoxide are greater with filter tips.

Studies have shown that a nonsmoker inhaling smoke in an unventilated room for 78 minutes absorbs the same amount of carbon monoxide that would occur from smoking one cigarette. Federal Air Quality Standards required for

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of the particles a smoker
inhales stays in the lungs.***

industrial situations state that carbon monoxide levels may not exceed 50 ppm, which is considered to be hazardous. For air in nonindustrial situations, that level is less than 9 ppm. In a normally-ventilated conference room where six cigarettes per hour are smoked, the concentration of carbon monoxide reaches 80 ppm. In a closed car during open country driving and with ten cigarettes per hour being smoked, the carbon monoxide concentration reaches 120 ppm. These levels will increase the carbon monoxide level of the nonsmoker's blood four to five fold. So, under these common conditions, the nonsmoker is at significant risk because of the smoker. This condition could be dangerous for persons with serious heart or lung disorders. For the smoker, the concentration in the air he breathes plus the smoke he inhales approaches 400 ppm; so again, he is at greater risk.



The solid particles in cigarette smoke are easily inhaled; they are small enough to penetrate to the farthest recesses of the lung. Seventy percent of the particles a smoker inhales stays in the lungs. Tar is made up of hundreds of chemicals which comprise most of the known cancer-causing agents, or carcinogens, that are in cigarette smoke. Filters which screen out some of these particles have had some effect in reducing the number of cases of lung cancer in men, but the risk in women is increasing in spite of filters.

Not only are the chemicals in smoke harmful to your health, but the temperature of the smoke also is important. The faster tobacco is smoked, the higher the temperature. For instance, if a cigarette approximately 2½ inches long is smoked in a period of 2 minutes, the temperature of the smoke may rise to 110°C. But the temperature will only rise to 46°C if it takes 11 minutes to smoke. The temperature of burning in a pipe varies with the type of pipe as well as the strength of inhalation.

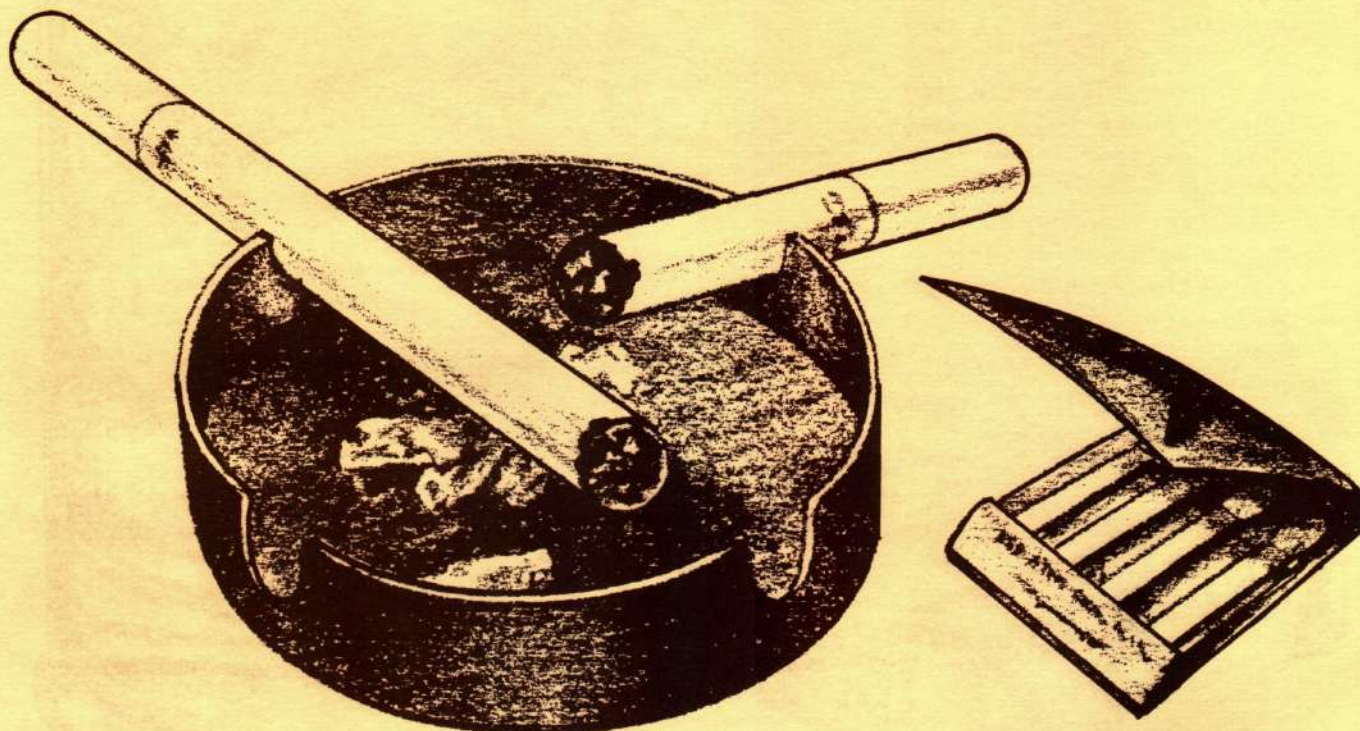
***...smokers have twice
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Diseases caused by smoking

CARDIOVASCULAR DISEASE. The health problem caused by cigarette smoking that affects the greatest number of people is the development of premature coronary heart disease—the single most important cause of death among cigarette smokers.

Studies have proven that cigarette smokers have twice the risk of death from coronary heart disease as nonsmokers. The amount of the risk increases directly with the number of cigarettes smoked and the age at which the habit began. Smoking increases risk not only for heart attack but for sudden death. One research study indicated a man smoking more than one pack a day not only had twice the risk of heart attack as a nonsmoker but five times the risk of sudden death.

Nicotine and carbon monoxide are the toxic chemicals in cigarette smoke that affect the cardiovascular system. Nicotine has a triple effect. First, it acts on the adrenal glands and certain heart tissues to release powerful chemical stimulants which raise blood pressure and increase heart rate, causing the heart to work harder and require larger amounts of oxygen. But as the smoker takes in nicotine, he is also inhaling carbon monoxide which attaches itself to the hemoglobin and decreases the amount of oxygen in the blood. Thus, while the smoker's heart needs more oxygen, it gets less. Second, experimental



studies have shown that exposure to nicotine also increases circulation of the free fatty acids in the blood. Nicotine and carbon monoxide also damage the artery walls so that fatty materials get into them more easily. Thus, the incidence and extent of atherosclerosis and thrombosis is increased. And third, nicotine causes platelets, that part of the blood which causes clots, to clump together. This action may lead to increased thrombosis or clot formation in the smoker.

Arteries which have been blocked or narrowed by fatty deposits can also lead to a condition called intermittent claudication. These narrowed arteries cause a decreased blood supply to the muscles of the legs.

When you stop smoking, the benefits to the heart are almost immediate. There is a sharp decrease in the risk of heart attack after one year. After ten years, ex-smokers have almost the same low risk for developing heart disease (no matter how long they had the habit) as people who have never smoked at all.

CANCER. The use of tobacco in any form has often been suspected to cause cancer at various sites in the body: lips, tongue, tonsils, larynx, lungs, stomach, intestine, pancreas, and bladder. The incidence of cancer of the lips is high among those who keep a cigar or cigarette in their mouths all the time and who smoke them to the end.

High temperatures of burning tobacco are considered to have a major relationship to the occurrence of cancer of the lip, mouth, and throat.

Lung cancer strikes more than 100,000 persons in the United States each year. It is the leading cause of cancer deaths among men, and the death rate among women is steadily rising.

Unlike heart disease, we do not understand the exact mechanism by which cigarette smoke causes cancer. Research has shown that the incidence of cancer of the lung is linked closely to the number of cigarettes smoked, the degree

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of inhalation, and the duration of the smoking habit. The risk for developing cancer of the lung is greater among smokers who start at a young age than among those who start later.

Air pollution, repeated exposure to asbestos, and excessive alcohol intake combine their effects with smoking to increase the risk of developing cancer of the lung. These factors have little effect on the risk of lung cancer among nonsmokers. High-risk people for lung cancer are those over 40 who have smoked two packages of cigarettes a day for ten years or more—one out of ten will have lung cancer. Most lung cancer is not curable.



Fortunately, lung cancer is a largely preventable disease. The number of deaths from lung cancer can be reduced significantly if a large number of smokers can be persuaded to stop smoking and if the number of young people who take up smoking can be reduced.

The important thing to remember is that if you quit smoking at any age, you reduce your risk of lung cancer considerably even after one year. After ten years, an ex-smoker has a risk only slightly greater than a person who has never smoked.

CHRONIC OBSTRUCTIVE LUNG DISEASE. The body's respiratory system has a special transport mechanism which protects the lungs against small particles breathed in with air. The two major components of this system are the mucus-producing glands found in the bronchi, or air tubes, and the tiny hairs which line the tubes. These bronchi serve as the passageway for air to reach the lungs. Glands in the bronchi produce mucus which sticks to the small particles breathed in with air. The tiny hairs, called cilia, provide a constant sweeping motion used to move the mucus from the lungs into the nose and throat where it can be discharged. Irritation of the lining of the bronchi or interference with the ciliary movement can result in bronchitis. Continuous interference with this mechanism can lead to chronic bronchitis or can progress to permanent changes in the lung tissue, which results in emphysema.

Cigarette smoking is the major cause of chronic bronchitis and emphysema. These diseases are jointly referred to as chronic obstructive lung disease. The hot cigarette smoke irritates the lining of the bronchi. In addition, the mucus glands enlarge because they are forced to work harder to produce increased amounts of mucus required to cleanse the lungs of irritating particles from the smoke. The cilia can't cope with large amounts of mucus. They eventually become swamped and can't move the mucus effectively. This results in inadequate clearance of the inhaled particles which may include viruses and bacteria. Thus, the smoker is also more susceptible to respiratory infections. If this situation

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is allowed to continue, mucus finally begins to back up and collect in the lungs. The smoker cannot completely clear his lungs, has a continuing cough, and develops respiratory diseases often and easily.

The continued buildup of mucus causes the air sacs to break or burst from the pressure, leaving large holes in the lungs. The result is emphysema—a lifetime sentence to misery. The body is constantly starved for oxygen because the damaged lungs aren't able to function adequately. Destroyed lung tissue cannot be replaced. *If an individual stops smoking before this permanent damage occurs, most symptoms disappear. The inflammatory changes associated with bronchitis improve within 8 to 12 weeks. This is true for any age group.*



Tobacco and pregnancy

Concern about the effects of smoking during pregnancy upon maternal health, pregnancy outcome, and infant well-being dates back at least a hundred years. Initially, smoking itself was not in question since it was not a common habit among women at the time. However, reports of women who worked in tobacco factories in the late 1800's cited large numbers of abortions and deaths of newborns in these women.

Studies show the unborn child of a smoking mother is directly exposed to the poisons from cigarettes. Women who smoke during pregnancy are twice as likely as nonsmokers to lose their babies by miscarriage. Researchers feel this may be due to two facts: smoking women eat

less than nonsmokers, and the unborn baby is deprived of an adequate oxygen supply. Remember that the carbon monoxide in cigarette smoke replaces the oxygen in the blood. Also, the oxygen that is picked up and carried by the blood isn't given up easily. In the case of a pregnant woman, this happens not only to her blood but also to the blood of her unborn baby.

In addition to the increased risk of miscarriage, research indicates smoking mothers also have more stillborn babies and more babies who die in infancy. The babies that are born to these mothers are twice as likely to weigh less at birth. Studies also reveal that physical growth, mental development, and behavioral characteristics of these low-birth-weight babies are affected at least up to the age of eleven. *The woman who quits smoking in the beginning of pregnancy will not expose her baby to any of the dangers associated with smoking and pregnancy. Her baby will have the same chance as a nonsmoker's of being born alive, well, and strong.*

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Who smokes and why

From the studies which have been done on smoking to date we have learned something about the social and behavioral characteristics of people who smoke.

AMONG ADULTS. Smoking among adults is on the decline. But most of the decline is in adult men. Research has indicated that women have greater difficulty giving up the habit than do men. There appear to be no differences in smoking behavior between males and females who are married. The highest smoking rates are among those who are divorced or separated. Among males, the better educated, white collar workers and those in middle and upper income levels are much less likely to be current smokers than those opposite to these characteristics. On the other hand, women who are better educated, white collar workers, and in upper middle income levels are more likely to be the current smokers.

***Smoking by parents
influences teenagers
to smoke.***

AMONG TEENAGERS. Since smoking is an acquired habit, it is obvious that teenagers smoke less than persons over 20 years of age. However, smoking among teenagers is increasing. The percentage of teenage boys who smoke has remained the same over the past 20 years. The number of teenage girls who smoke has risen to the point that equals teenage boys. Until recently, all studies have indicated that girls have been taking up smoking more readily than boys.

Several studies of teenagers have documented a relationship between academic achievement and starting the smoking habit. The data suggest that those who make poorer grades in school are more likely to be smokers. These studies also indicate that smokers more often are enrolled in vocational or non-college preparatory courses.



According to surveys conducted for the National Clearinghouse on Smoking and Health, teenagers who live in single-parent homes are much more likely to be cigarette smokers than those in households where both parents live in the home. Smoking by parents influences teenagers to smoke. Both boys and girls are more likely to start smoking if their mothers smoke than if the fathers smoke, but this is somewhat more applicable to girls than boys. Both boys and girls with older brothers and sisters who smoke are more likely to smoke than if none of them do. And studies have consistently revealed that teenage smokers have friends who smoke and nonsmokers have friends who do not.

The data on parents, brothers and sisters, and friends suggest several factors that cause teenagers to start smoking. First, there is what sociologists call role-modeling of behavior. It is a fundamental part of socialization from earliest childhood through adulthood. Second, there is a tendency among teenagers to try to conform to the behavior of those who are important in their lives, such as parents, older siblings, peers, and older teenagers. In the social structure of a school, the group to which the teenager belongs usually determines his actions.

A great deal more research is needed to clearly determine the relationships of the social and cultural factors related to smoking behavior. However, the information we have now should give some guidelines for planning education programs in regard to specific personal characteristics associated with smokers.

What we can do

The underlying principle of any approach to dealing with smoking in a preventive manner has to be a change in society's attitude toward cigarettes and smoking from enjoyment, tolerance, and acceptance to displeasure, disapproval, and rejection.

FOR NONSMOKERS. Nonsmokers are a majority in this country and, as such, can provide the social and political pressure needed to establish local, state, and national policies which effectively deal with the smoking problem. There are many opportunities for nonsmokers to assert themselves both on an individual basis and as a majority group.

National legislation currently in effect which has had far-reaching impact on encouraging nonsmokers to assert their rights include the Interstate Commerce Commission and Civil Aeronautics Board restrictions on seating smokers.

...tax dollars pay for the costly health consequences of smoking.

Recently, under this legislation, a major airline company was fined \$10,000 for not providing a nonsmoking section for passengers. Unfortunately, the majority of the public remains largely apathetic in supporting these rulings and, in many instances, enforcement becomes relaxed.

There are also several pieces of legislation being proposed at the national level which deal with ending or reducing government tobacco subsidies, identifying alternatives which offer tobacco farmers an equivalent income, and increasing government regulation of cigarette advertising. At the state and local levels, legislation banning or severely limiting smoking in establishments open to the public, even if privately owned, is being introduced.

To pass legislation of this type is going to require active support by strong constituencies committed to prevention. Nonsmokers must take an active part in supporting this type of legislation on an individual basis and as a majority population. After all, their tax dollars pay for the costly health consequences of smoking behavior.



***...studies indicate
most smokers want
to quit.***

In addition to becoming involved in legislation which promotes a smoke-free environment, non-smokers should be promoters and supporters of anti-smoking campaigns. It is clear that getting involved in the early teenage years, and perhaps even sooner, is the single most important project for primary prevention. Therefore, it is especially important that innovative smoking education continue to be developed and included in school curriculum.

The nonsmoker can also help the ex-smoker. A nonsmoking friend can give encouragement and social support to reinforce the ex-smoker's decision to quit and his ability to stick to it.

FOR SMOKERS. Many studies indicate that

most smokers want to quit. Many have tried; some were successful while others failed. Every smoker should realize the problems of quitting is not the same for everyone and is more difficult for some. So far, no one system or strategy has been found to work for everybody. Different personalities require different methods. If one method fails, smokers should continue to try others until they find the one that works for them.

In addition to participating in stop-smoking programs, smokers should also support legislative actions which decrease smoking opportunities and make them less desirable. If a smoker is indeed serious about wanting to quit, supporting legislation which promotes a smokeless environment would help him/her avoid the temptations of restarting the habit. Since role-modeling and peer pressure seem to be so important in teenage smoking, parents who smoke should be more concerned about participating in anti-smoking campaigns for themselves as well as supporting smoking education aimed at their children.

METHODS BEING USED TO STOP SMOKING

Method	Sponsor	Program
Group therapy	American Cancer Society American Heart Association American Lung Association	Groups are made up of 8 to 18 participants; physicians, psychiatrists, and ex-smokers provide volunteer services; positive reinforcement and group interaction are stressed.
Five-day plans	Seventh Day Adventist Church	Program consists of lectures, inspirational messages, films, and group interaction; some scare tactics and aversion therapy may be used; participants are urged to keep personal records, force fluids, stay in frequent contact with "buddies," avoid alcohol, caffeine, other smokers, and tension-causing situations; special diets and exercise programs are often recommended.
	Schick Laboratories	Programs are available at 22 centers; aversion therapy is stressed, including over-exposure to smoke, rapid smoking, and electric shock applied to the smoker's arm.
Graduated filters	Venturi Five-Week Stop Smoking System	Consists of four reusable filters which reportedly reduce tar and nicotine by 95 percent in the fourth filter.
	Water Pic One-Step-At-A-Time	Same as above.
	Nu Life Stop-Smoking Kit	Consists of 44 disposable filters that reportedly gradually remove up to 96 percent of the cigarette tar and 88 percent of the nicotine.
	Aqua-Filter	Ten filters to a package reportedly remove all but an average of 3 mg of tar and less than 1 mg of nicotine from each cigarette.

Summary

Since the release of the Surgeon General's Report on Smoking and Health in 1966, many activities have been started to deal with the smoking problem. However, there is still much to do if we are to control this serious public health problem. Research efforts to discover the exact mechanisms whereby cigarettes cause disease, to understand why people smoke and what prevents them from quitting, and to explore the development of a "safe" cigarette must be pursued and supported at a level equal to the size of the problem. Nonsmokers must become more assertive and speak out about cigarette smoking. And smokers, nonsmokers, health professionals, politicians, and consumers must all work together if further progress is to be made against the threat of smoking to health.

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Extension Bulletin E-1719

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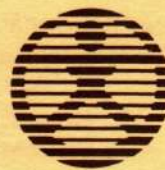
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NUTRITION
AND WEIGHT
STRESS
EXERCISE
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ALCOHOL



FITNESS 7

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