This report focuses on topics and issues related to the global use of tobacco. It consists of an introduction and six major sections. These sections deal with: (1) the epidemic rate at which smoking is spreading, indicating that the global rate has grown nearly 75 percent over the past two decades and is growing at 2.1 percent per year, faster than world population growth; (2) health factors, indicating that lung cancer is predominantly a disease of smoking and showing the international correlation between cigarette consumption and lung cancer deaths after 20 years of smoking; (3) sidestream smoke (which wafts from a smoker's cigarette to an involuntary smoker) and its effects on others, indicating that passive smoking has been correlated with lung cancer in nonsmoking spouses of smokers in more than 10 studies; (4) effects on children, indicating that in one United States survey, smokers gave birth to underweight babies twice as often as other women did; (5) antismoking efforts to date; and (6) stronger measures, such as banishing tobacco by prohibiting tobacco from workplaces and public buildings. Data tables are included when applicable, for example, on cigarette use in selected countries (1984), and smoking among United States males by educational level (1982). (JN)
Worldwatch Institute is an independent, nonprofit research organization created to analyze and to focus attention on global problems. Directed Lester R. Brown, Worldwatch is funded by private foundations and United Nations organizations. Worldwatch papers are written for a worldwide audience of decision makers, scholars, and the general public.
Banishing Tobacco

William U. Chandler

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Tobacco causes more death and suffering among adults than any other toxic material in the environment. This has long been known, but now it is feared that involuntary exposure to cigarette smoke causes more cancer deaths than any other pollutant. Protecting nonsmokers from cigarette smoke will require a marked change in society’s treatment of tobacco, one that could also help eliminate its direct threat to users themselves.

No country is yet taking action against tobacco commensurate with the cost it imposes. The global use of tobacco has grown nearly 75 percent over the past two decades. In China, use has doubled. In only four countries are fewer cigarettes smoked now than in 1964. In the United States, the percentage of adults who smoke has fallen from 43 to 32 percent, but even there 20 percent more tobacco is used than when an antismoking campaign began in 1964, and the country still ranks third in the world in per capita cigarette use. The direct health costs, the health risks to passive smokers, and the economic costs have grown proportionally.

The worldwide cost in lives now approaches 2.5 million per year, almost 5 percent of all deaths. Tobacco kills 13 times as many Americans as hard drugs do, and 8 times as many as automobile accidents. Passive smokers (those who must inhale the smoke of others’ cigarettes) are perhaps three times likelier to die of lung cancer than they would be otherwise. The smoking of mothers diminishes the physical and mental capabilities of their children, and in many countries more than one fifth of children are exposed to smoke in this way. These statistics add up to a cost that is increasingly viewed—in countries where the information is available, at least—not only as unnecessary, but as intolerable.

I am grateful to Angela Coyle, who participated in the research for this paper, Jodi Johnson, who assisted in its preparation, Robert A. Bohm, who assisted with the statistical analysis, and Karl Kronebusch, R. T. Ravenholt, and James L. Repace, who reviewed earlier drafts of the manuscript.
Though the health consequences of tobacco are now well known, policies to avoid them lag far behind. Most efforts to control tobacco are merely attempts to control or color information about the product. Governments sometimes warn people that tobacco is unhealthy, forbid its advertisement, or restrict its use in theaters or buses, though often the effort is no stronger than the Japanese cigarette package warning: "For your health, let's be careful not to smoke too much." No national tobacco control effort has been launched with the vigor of antidrug campaigns, or even of campaigns against toxic chemicals, though hard drugs and chemicals claim far fewer victims than tobacco.

Health leaders in government, international organizations, and public interest groups have also failed in this fight—partly because tobacco is tenaciously addictive, partly because both governments and industry promote tobacco, but partly because the leadership of health and environmental authorities has been weak. This conclusion is borne out not only by the continued high levels of tobacco use in industrial countries, but by the explosive growth of cigarette smoking in Eastern bloc countries and in China. Yet the informational campaigns of concerned health leaders have at least succeeded in getting many analysts to recognize that tobacco is a high-priority, worldwide public health problem. And one that needs stronger medicine.

The Epidemic Spreads

Smoking is an epidemic growing at 2.1 percent per year, faster than world population. (See Figure 1.) Growth in tobacco use slowed briefly in the early eighties, primarily for economic reasons, but is resuming its rapid increase. Over a billion people now smoke, consuming almost 5 trillion cigarettes per year, an average of more than half a pack a day. Even in the United States, where smoking prevalence—the portion of a population who smoke—has declined, the 20 percent increase in tobacco use since 1964 indicates that those who smoke now smoke more heavily.

Greece leads the world in per capita cigarette consumption. (See Table 1.) Japanese, Americans, Canadians, Yugoslavs, and Poles fol-
"Smoking is an epidemic growing at 2.1 percent per year, faster than world population."

Tobacco is increasingly grown near where it is consumed. China is the world's leading producer, using all it grows. The United States, India, the Soviet Union, and Brazil rank second through fifth, with all but the Soviet Union being major exporters. Other major Third World exporters include Zimbabwe and Malawi.
# Table 1: Cigarette Use in Selected Countries, 1984

<table>
<thead>
<tr>
<th>Country</th>
<th>Cigarette Use Per Capita</th>
<th>Change in Total Consumption Since 1975¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greece</td>
<td>237</td>
<td>+ 25</td>
</tr>
<tr>
<td>Japan</td>
<td>232</td>
<td>+ 6</td>
</tr>
<tr>
<td>United States</td>
<td>227</td>
<td>0</td>
</tr>
<tr>
<td>Poland</td>
<td>216</td>
<td>+ 3</td>
</tr>
<tr>
<td>Australia</td>
<td>203</td>
<td>+ 9</td>
</tr>
<tr>
<td>South Korea</td>
<td>186</td>
<td>+ 45</td>
</tr>
<tr>
<td>East Germany</td>
<td>167</td>
<td>+ 23</td>
</tr>
<tr>
<td>Italy</td>
<td>162</td>
<td>+ 17</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>150</td>
<td>- 27</td>
</tr>
<tr>
<td>Soviet Union</td>
<td>150</td>
<td>+ 8</td>
</tr>
<tr>
<td>France</td>
<td>145</td>
<td>+ 6</td>
</tr>
<tr>
<td>Philippines</td>
<td>130</td>
<td>+ 24</td>
</tr>
<tr>
<td>Finland</td>
<td>128</td>
<td>+ 8</td>
</tr>
<tr>
<td>Sweden</td>
<td>124</td>
<td>- 3</td>
</tr>
<tr>
<td>Egypt</td>
<td>119</td>
<td>+138</td>
</tr>
<tr>
<td>Brazil</td>
<td>104</td>
<td>+ 17</td>
</tr>
<tr>
<td>China</td>
<td>102</td>
<td>+ 85</td>
</tr>
<tr>
<td>Mexico</td>
<td>77</td>
<td>+ 10</td>
</tr>
<tr>
<td>India</td>
<td>56</td>
<td>+ 33</td>
</tr>
<tr>
<td>Kenya</td>
<td>37</td>
<td>+ 48</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>35</td>
<td>- 35</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>19</td>
<td>+ 29</td>
</tr>
</tbody>
</table>

¹End points are three-year averages.

Change in tobacco use can be measured in two ways. Changes in the use of tobacco products, in absolute or per capita terms, and changes in smoking prevalence. Measuring the latter is often preferred by health educators as a sign of progress toward their primary goal, which is to get smokers to quit and nonsmokers not to start. Prevalence also provides an index of a key goal of tobacco control—to make smoking socially unacceptable.

But the absolute quantity of tobacco used provides an essential measure of total health costs that a society must bear. Indeed, the total number of cigarettes smoked over a lifetime is a more important health index than cigarettes used per day at any given time. Health risks increase in proportion to total amount of tobacco used. Moreover, the quantity of cigarettes smoked, when considered along with smoker-nonsmoker interaction and room ventilation rates, provides a measure of passive smoking.

In 63 countries, total cigarette use increased between 1975 and 1985. Half the global increase in tobacco use in the last decade has occurred in China, though the Chinese represent only one fifth the world’s people. The rest of the Third World, 54 percent of all humans, accounted for a little less than a third of the increase. Consumption in the West and in Eastern bloc nations increased in rough proportion to their shares of the world population.

In the second measure of change in use—smoking prevalence—Western nations have seen encouraging reductions during the last decade. In the United Kingdom, the percentage of males who smoke dropped by more than 25 percent. In the Netherlands and the United States, the equivalent reductions were more than a third. And in Norway, a nation often cited as having a model tobacco policy because it completely bans advertising, a one-fifth reduction in smoking among men with some higher education has been reported, though 42 percent of men still smoke. (See Table 2.)

In fact, rates of smoking remain quite high among men all around the world. In Bangladesh, two thirds of men smoke, spending on average 5 percent of their household income on tobacco. In Czechoslovakia, the prevalence figure is 57 percent, in south-central European Russia,
Table 2: Prevalence of Smoking Among Men and Women in Selected Countries, Circa 1980

<table>
<thead>
<tr>
<th>Country</th>
<th>Men</th>
<th>Women</th>
<th>All Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(percent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>70</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>Brazil</td>
<td>63</td>
<td>33</td>
<td>48</td>
</tr>
<tr>
<td>Ireland</td>
<td>54</td>
<td>36</td>
<td>45</td>
</tr>
<tr>
<td>Canada</td>
<td>44</td>
<td>36</td>
<td>40</td>
</tr>
<tr>
<td>Japan</td>
<td>66</td>
<td>14</td>
<td>40</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>67</td>
<td>1</td>
<td>37</td>
</tr>
<tr>
<td>Netherlands</td>
<td>41</td>
<td>33</td>
<td>37</td>
</tr>
<tr>
<td>France</td>
<td>49</td>
<td>25</td>
<td>37</td>
</tr>
<tr>
<td>Australia</td>
<td>40</td>
<td>31</td>
<td>36</td>
</tr>
<tr>
<td>Norway</td>
<td>42</td>
<td>30</td>
<td>36</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>38</td>
<td>35</td>
<td>36</td>
</tr>
<tr>
<td>Italy</td>
<td>54</td>
<td>17</td>
<td>35</td>
</tr>
<tr>
<td>East Germany</td>
<td>53</td>
<td>17</td>
<td>33</td>
</tr>
<tr>
<td>Soviet Union</td>
<td>65</td>
<td>11</td>
<td>33</td>
</tr>
<tr>
<td>United States</td>
<td>35</td>
<td>30</td>
<td>32</td>
</tr>
<tr>
<td>China</td>
<td>56</td>
<td>1</td>
<td>29</td>
</tr>
<tr>
<td>Sweden</td>
<td>31</td>
<td>26</td>
<td>28</td>
</tr>
<tr>
<td>India</td>
<td>46</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>Greece</td>
<td>41</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td>Egypt</td>
<td>40</td>
<td>1</td>
<td>21</td>
</tr>
</tbody>
</table>

Source. Worldwatch Institute, based on studies of prevalence in each country as reported in various medical journals and governmental publications.

two thirds of adult males smoke. Smoking among women, on the other hand, remains very low in many countries, including China, Bangladesh, and most of the Third World. Teenage girls in the United States, however, now smoke more than boys do.
"There is an inverse relationship between educational level and smoking in the United States, the Soviet Union, and elsewhere."

One ironic result of campaigns to reduce smoking in the absence of a more general effort to control tobacco has been the marked increase in the use of "smokeless" tobacco. The use of "chew" or "snuff" in the United States has increased by over 40 percent in the last two decades. Much of the new interest in these forms of tobacco comes from teenage boys who like the stimulus of the nicotine, perhaps feel "grown-up" when they try it, and believe that it is safer than smoking. Surveys in some localities show that 20-40 percent of high school boys chew tobacco or use snuff. Unfortunately, these forms of tobacco are strongly linked to oral cancer, an effect seen in India, where chewing—and oral cancer—is common.

Smoking prevalence among young people is changing, sometimes for the better, other times not. Although American, British, Norwegian, and Swedish children appear to be starting this habit later in life as well as being less likely to smoke, this is not the case elsewhere. More young people than adults smoke in Eastern bloc countries, Canada, and Egypt. In some schools surveyed in Santiago, Chile, two thirds of the students smoked. Even in developing societies—among Polynesians, for example—smoking rates reach levels exceeding 50 percent in children. Ironically, in the United Kingdom, a quarter of the children surveyed in one study reported being given their first cigarette by their parents, or at least smoking it in their presence, before age 12.

Measuring smoking by educational level also reveals trends with important implications for policy making. There is an inverse relationship between educational level and smoking in the United States (see Figure 2), the Soviet Union, and elsewhere. Over 60 percent of U.S. adult males with only a primary education smoke, while less than 20 percent of men with an advanced degree are smokers. This relationship appears to hold in most of Western and Eastern Europe. It is true for women as well, at least in the United States, with the exception that women who have only a grade-school education seldom smoke. In these countries, at least, smoking thus no longer symbolizes fashion, status, and upward mobility, but the opposite.
The Direct Cost of Addiction

No avoidable condition claims more adult lives than tobacco addiction. Between 2 million and 2.5 million smokers die worldwide each year from heart disease, lung cancer, and emphysema—smokers' disease, as it is called—caused by their addiction. Additional thousands die in fires caused by cigarettes and from cancers caused by tobacco consumed as snuff or chew. Almost one fifth of all U.S. deaths can be traced to cigarette smoke. (See Table 3.)
"No avoidable condition claims more adult lives than tobacco addiction."

Spanish settlers discovered 450 years ago that tobacco was "impossible to give up," even when they were reproached for "a disgusting habit." Despite common knowledge that smokers have "nicotine fits," scientific understanding of the addictive power of tobacco has progressed slowly. Much more remains to be known, but it seems certain that nicotine is the addictive agent in tobacco, although oral stimulation and the physical manipulation of smoking materials are also habituating to some degree.\textsuperscript{16}

The addictiveness of tobacco, in any case, is beyond question. British scientists A.C. McKennell and R.K. Thomas found in 1967 that only 15 percent of teenagers who experimented with tobacco were later able to quit. Others, notably W.A. Hunt and J.D. Matarazzo, have found that 75 percent who do quit smoking start again within six months. Quitters very often "crave" tobacco, probably nicotine, even several years after quitting. There is a withdrawal period of about two weeks, however, during which unpleasant physical symptoms arise as a result, it seems, of the brain's chemical dependence on nicotine.\textsuperscript{17}

Table 3: United States. Mortality Due to Tobacco and Selected Other Causes, 1984

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>Annual Deaths</th>
<th>Share of Total Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(number)</td>
<td>(percent)</td>
</tr>
<tr>
<td>Tobacco Use</td>
<td>375,000</td>
<td>18.8</td>
</tr>
<tr>
<td>Alcohol Use</td>
<td>100,000</td>
<td>4.7</td>
</tr>
<tr>
<td>Automobile Accidents</td>
<td>50,000</td>
<td>2.3</td>
</tr>
<tr>
<td>Use of Hard Drugs</td>
<td>30,000</td>
<td>1.4</td>
</tr>
<tr>
<td>Suicide</td>
<td>27,500</td>
<td>1.3</td>
</tr>
<tr>
<td>Homicide</td>
<td>19,000</td>
<td>.9</td>
</tr>
</tbody>
</table>

Withdrawal from tobacco differs from that of heroin only quantitatively, and it is satisfaction of the addiction itself that leads some smokers to believe that tobacco makes them more alert and clearer thinkers. It is more immediately rewarding than caffeine, for example, which takes almost 30 minutes to reach the brain when ingested as coffee. A “hit” of tobacco reaches the brain in 30 seconds.

Cigarette smoke contains, in addition to addictive nicotine, hundreds of mutagens, carcinogens, and cocarcinogens, some 4,000 other chemical compounds, and simple carbon monoxide. These chemicals, including radioactive polonium, not only attack the lungs but reach the bloodstream—where they circulate, causing or accelerating atherosclerosis (clogging of the arteries) and cancer in internal organs.

Heavy smoking can precipitate heart attacks when inhaled carbon monoxide displaces oxygen in the blood. Concentrations of up to 10 percent carbon monoxide in blood hemoglobin can, when coupled with reduced blood flow in heart arteries as a result of atherosclerosis, starve heart muscle of oxygen and damage or destroy the heart muscle—that is, cause a heart attack. The risk is serious at any age, but it is so clearly responsible for most heart attacks in young men that some scientists have called it a disease of smokers. The risk of heart attack among young men who smoke more than two packs per day is over seven times higher than for nonsmokers. (See Figure 3.) Fortunately, the risk diminishes rapidly in ex-smokers, approaching that of nonsmokers within one year after they quit.

Fifteen to 30 percent of all heart attacks in the United States and perhaps a third in the United Kingdom are caused by smoking. Smoking is also the leading cause of death from cardiovascular disease for those middle-aged or younger in West Germany, Scandinavian countries, and Australia. An estimate of such deaths worldwide due to smoking cannot be reliably made, however, because of the complicating factors of diet and life-style. This constraint may lead to an underestimate of overall mortality due to tobacco use.

A related cardiovascular disease caused by smoking is arteriosclerosis of the peripheral arteries. As in heart attack and stroke, smoking
Relative-Risk Estimate of a Heart Attack

Figure 3: Additional Risk of Heart Attack Due to Smoking, U.S. Males Aged 30-44

Smoking accelerates or precipitates blockage of arteries. Blockages in the limbs reduce blood supply to muscles and can cause gangrene, sometimes necessitating amputation of victims' legs. Peripheral vascular disease is also an important cause of death due to blood clots moving to the heart.21

Smoking carries special risks for young women. One study of women under age 50 found the risk of heart attack to be 10 times greater in...
women who smoked two packs per day. The authors attributed two thirds of the heart attacks in the group to smoking. A Canadian study found that females who smoked heavily were 7 to 34 times more likely to have a heart attack. Significantly, it also found that women who both smoked heavily and took birth control pills were 8 to 39 times more likely than non-smokers to have heart attacks. The authors concluded that women under 35 could safely take the pill without additional risk of heart attack, but only if they did not smoke. A review of the epidemiology of heart attacks in women found that female heart attack victims die on average 19 years earlier than other women.22 Unfortunately, in industrial nations young women are the group whose rate of smoking is increasing fastest.

Some observers have suggested that because carbon monoxide seems to play a role both in the development of atherosclerosis and in the precipitation of heart attacks, safer cigarettes can be developed by reducing their carbon monoxide production. Studies have demonstrated, however, that most cigarettes deliver similar levels of carbon monoxide, even when advertised (as required in a few European countries) as lower in carbon monoxide. Worse still, low tar and nicotine cigarettes may cause many people to smoke more cigarettes to satisfy their addiction, leading to ever greater carbon monoxide inhalation.23

Lung cancer is predominantly a disease of smoking. Active smoking habits account for an estimated 85 percent of lung cancer. The claims of the tobacco industry that some types of people are predisposed to lung cancer and that some unknown mechanism unrelated to smoking habits causes this condition are unlikely to prove true, because different rates of smoking in men and women over different periods of time produce different rates of lung cancer. When women in the United States did not smoke, for example, they rarely developed lung cancer. But as they took up the habit, lung cancer increased in proportion, after the lag of 20 years that it takes for cancer to develop following exposure to mutagens. In fact, in 1981 lung cancer was as prevalent as breast cancer in American women over age 55 for the first time.24
Canada
United Kingdom
Australia
Switzerland
Poland
New Zealand
Finland
Japan
France
Chile
Philippines
Spain
Sweden
Egypt
Thailand

Cigarette Consumption
(per person over 14 years old in 1960)

Lung Cancer Rate
(per 100,000 in 1980, ages 45-54)

Source: USDA
Source: WHO

Figure 4. International Correlation Between Cigarette Consumption and Lung Cancer Deaths After 20 Years of Smoking

International comparisons of lung cancer rates and earlier smoking habits show a strong correlation. (See Figure 4.) Nonindustrial societies with high smoking rates have high lung cancer rates, Poly-
nesians and New Zealanders have little industry, smoke heavily, and have high rates of lung cancer. Trends such as these across varied sections of the world population also tend to implicate smoking over industrial air pollutants as the cause of lung cancer. Smoking may even explain much of the lung cancer in nonsmokers. It should be noted, however, that lung cancer is a function of lifetime smoking habits, not just the use of cigarettes at one given point in time.\textsuperscript{26}

Cancer of the bladder, pancreas, lip, mouth, esophagus, and pharynx can also be traced to the use of tobacco, though alcohol plays a strong role in the last two types. The use of tobacco may be linked with cervical cancer and stomach cancer as well, although these connections are less clear.\textsuperscript{27}

Smoking causes two other serious lung diseases—bronchitis and emphysema, referred to together as Chronic Obstructive Lung Disease. Bronchitis is a condition of secretions in the large air passages of the lung system that reduces the lungs’ ability to expel germs and can lead to infection. In emphysema, the air sacs in the lungs coalesce and become less efficient in absorbing oxygen and releasing carbon dioxide. Smoking kills 52,000 Americans each year through Chronic Obstructive Lung Disease.\textsuperscript{28}

The link between tobacco and other causes of death must not be overlooked. Fires caused by cigarettes kill between 2,000 and 4,000 Americans each year. And passive smoking may cause 5,000 lung cancer deaths each year in the United States alone.\textsuperscript{29} Altogether, smoking causes 10-20 percent of deaths in Europe and the United States. (See Table 4.)

Several nations have attempted to estimate the direct economic cost of smoking. A major item, naturally, is health care. In the United States, smoking’s toll amounts to $123.5 billion per year—3-9 percent of all health care costs. Smoking claims a similar proportion of the total health care expenditures in Australia, Canada, Switzerland, and the United Kingdom.\textsuperscript{30}

But the cost of smoking extends beyond health care expenditures. Lost income due to death and lost work due to illness cost the United
Altogether, smoking causes 10-20 percent of deaths in Europe and the United States.

Table 4: Tobacco's Toll in Lives, Selected Countries, Circa 1982

<table>
<thead>
<tr>
<th>Country</th>
<th>Annual Deaths (number)</th>
<th>Share of Total Deaths (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Germany</td>
<td>140,000</td>
<td>21</td>
</tr>
<tr>
<td>United States</td>
<td>375,000</td>
<td>19</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>100,000</td>
<td>18</td>
</tr>
<tr>
<td>Canada</td>
<td>30,000</td>
<td>17</td>
</tr>
<tr>
<td>Italy</td>
<td>97,600</td>
<td>17</td>
</tr>
<tr>
<td>New Zealand</td>
<td>4,000</td>
<td>15</td>
</tr>
<tr>
<td>France</td>
<td>77,000</td>
<td>14</td>
</tr>
<tr>
<td>Australia</td>
<td>11,000</td>
<td>10</td>
</tr>
<tr>
<td>Denmark</td>
<td>5,000</td>
<td>9</td>
</tr>
<tr>
<td>Sweden</td>
<td>3,200</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: Derived by Worldwatch Institute from various medical journal and governmental reports.

States $27-61 billion a year. Thus, health expenditures plus economic losses in that country range from $38-95 billion, or $1.25-3.15 per pack. These totals do not include the cost of tobacco itself—about $30 billion per year. Nor do they include the suffering borne by victims and their families.

The economic costs of smoking have generated considerable attention and controversy. Policymakers concerned with budget deficits sometimes view the billions of dollars spent on publicly funded health care for dying smokers as an unnecessary expense. Some economists argue that these are merely financial costs that would be incurred anyway if smokers lived longer, became infirm, and needed medical care. This may be true financially, but from a benefit/cost point of view, smoking imposes unnecessary costs.

If smokers did not smoke, they would live longer and probably enjoy a better quality of life. These are the benefits of policies that reduce
and prevent smoking. The improvements in health are benefits in their own right, even if they do not lead to reduced health care costs. Some economists also argue that the jobs and incomes created by the tobacco business must be counted as benefits. Yet, even if other uses of land were not available, tobacco's economic costs alone would exceed its "benefits" by more than two to one.32

These costs, moreover, do not include the environmental and agricultural costs of tobacco production. Tobacco curing consumes 1-2 percent of all wood burned each year in Kenya and Tanzania, and one third of all wood harvested in Malawi, where harvesting far exceeds sustainable yields. Many agricultural countries, including Brazil, China, India, Pakistan, and Zimbabwe, dedicate the equivalent of between 0.5 percent and 7 percent of cropland to tobacco, with the United States and China using slightly less than 1 percent in this way. Though these percentages are small relative to global resources of land and firewood, in some countries they become significant. If planted in grain, the land would be sufficient to feed 10-20 million people—assuming, of course, that production and marketing conditions could be created to encourage food production on tobacco land.33

Tragically, the cost in lives and money can only be expected to grow. Seventy-three percent more tobacco is consumed now than 20 years ago, so without a sudden drop in smoking, lung cancer deaths, for example, will almost certainly increase by 50 percent by the turn of the century. Many such losses will occur in nations totally unprepared to deal with the new epidemic. But even in the West, where billions of dollars are spent in a fight to control lung cancer, fewer than 10 percent of such patients are cured of their disease. The prospects of surviving for even one year are dismal. Fortunately, the relative risk of lung cancer for ex-smokers, compared with people who never smoked, diminishes to below detectable levels 10-30 years after a smoker quits. Thus, if tobacco use could be halted, this projection would not materialize.34

It follows, too, that the incidence of bronchitis and emphysema will grow as tobacco use grows. At the current rate, the next 20 years would also witness an increase of 50 percent in these diseases.
"Without a sudden drop in smoking, lung cancer deaths will almost certainly increase by 50 percent by the turn of the century."

disease is far more complicated to predict, for it is influenced by hyper-tension, diet, and other factors.

Assuming current trends, the already devastating cost of tobacco is certain to increase over the next few decades. Ironically, it may take the growing realization of this habit’s high costs for passive smokers to actually bring about effective action. For no matter how convincing the direct costs may be to rational thinkers, smokers—being addicted—may not be able to act rationally to solve the problem of smoking.

Victims of Others’ Smoke

Sidestream smoke—which wafts from a smoker’s cigarette to an involuntary smoker—puts into the surrounding air 50 times the amount of carcinogens inhaled by the user. It contains several thousand other compounds, many of which cause irritation and allergic reactions in the eyes and nose. Cigarette contamination of indoor air has been linked to increased risk of lung cancer in nonsmoking spouses and to respiratory disease in infants. The scale of these effects has only recently attracted attention, and much more work is urgently needed to define their total impact.

Passive smoking has been correlated with lung cancer in nonsmoking spouses of smokers in more than 10 studies. One particularly important study was derived from other research designed to track lung cancer in smokers in Japan. This work lent itself to a consideration of passive smoking because careful records were kept of spousal smoking habits. Wives who did not smoke but who lived with heavy smokers were found to be almost twice as likely to die of lung cancer as wives of men who did not smoke. (See Figure 5.)

A parallel study in Greece yielded similar results. Lung cancer occurred over twice as often as expected among nonsmoking wives of Greek smokers. Several U.S. studies have now also shown such increased risk of lung cancer for nonsmokers whose spouses smoke. And in West Germany, a report on passive smoking risks showed that nonsmoking women with lung cancer were three times more
likely than average to have husbands who smoke. Moreover, a careful examination of their workplaces showed they had not been exposed to carcinogens on the job.37

Ambient tobacco smoke clearly carries a risk of cancer in nonsmokers. One recent effort to quantify this risk estimated that passive smoking in the United States causes more cancer deaths than all regulated industrial air pollutants combined. The cost in lives may be as high as
Ambient tobacco smoke clearly carries a risk of cancer in nonsmokers.

5,000 nonsmokers per year, or one third the cases of lung cancer not already directly attributable to smoking.38

Nonsmokers are quite likely to have no choice about breathing tobacco smoke. In the United States, people typically spend 90 percent of their time indoors. On the job, some 63 percent of U.S. workers are exposed to tobacco smoke, while at home over 60 percent of all households have at least one smoker. Altogether, only 14 percent of Americans escape being exposed to tobacco smoke in the home or at the workplace. The rest involuntarily "smoke" on average the equivalent of almost 1 cigarette per day. Some people—a musician, for example—who play in smoky bars and lives with a chain-smoker—passively smoke the equivalent of 14 cigarettes a day.39

Protecting the public from the carcinogens in passive cigarette smoke requires urgent action. Increasing the ventilation in a building appears to be impractical because it is prohibitively expensive. Reducing the risk of cancer due to cigarette smoke would require replacing the volume of air in the living space about 250 times more often than is currently the norm—and use, therefore, 250 times the heating, cooling, and pumping.39 The only certain way to make indoor air safe from cigarettes is to eliminate the source.

Effects on Children

Tobacco's effects on children—beginning with exposure before they are born—deserve special attention. Passive smoking places unborn children at serious risk. Nicotine, numerous toxic chemicals, and radioactive polonium may all interfere with fetal development, and the fetus can receive these substances through the mother's blood whether she smokes or chews tobacco. Furthermore, studies in both industrial and developing countries show that smoking by pregnant women reduces infants' weight at birth by roughly one tenth.37

In one U.S. survey, smokers gave birth to underweight babies twice as often as other women did. Research has found a strong, inverse relationship between birth weight and levels of cigarette residue (thiocyanate) in infants' umbilical cords. Low birth weight has also
been associated with tobacco chewing in India. (Thirty-nine percent of women in India chew tobacco.) Because birth weight is a key factor in infant mortality, tobacco use seriously endangers infants' lives.42

Nicotine also may be the culprit in spontaneous abortions among women who smoke. Epidemiologist R.T. Ravenholt estimates that smoking causes 50,000 miscarriages in the United States each year. This connection has been observed in Italy as well, where women who smoke miscarry in the first month of pregnancy at a rate of 2.4 percent, compared with 0.9 percent for nonsmokers. Smoking can also cause premature delivery. Nineteen percent of the firstborn infants of Italian women who smoke were premature, twice the rate for nonsmokers. The rate of premature delivery in the Italian study declined by almost 25 percent for the secondborn children of non-smokers, but it increased slightly for smokers.43

Unfortunately, women in many countries are smoking in record numbers, even while pregnant. Surveys in the United Kingdom suggest that about 40 percent of pregnant women smoke. A compilation by Ravenholt of surveys showed that in nations as disparate as Sweden and Chile over a quarter of pregnant women smoked. (See Table 5.) Each year, at least 3 million newborns—the estimated number of live births to women who smoke—are thus potentially handicapped by their mothers.44

Children with parents who smoke experience much higher rates of respiratory illness, including colds, influenza, bronchitis, asthma, and pneumonia. One British study published almost 10 years ago showed that children under age one whose mothers smoke more than one pack a day are twice as likely to get bronchitis and pneumonia. This finding has since been repeatedly corroborated.45

In addition, the evidence indicates that parental smoking retards child development. One study found that lung capacity in boys was reduced by 7 percent by their mothers’ smoking. If the teenage boys also smoked, their lung capacity was reduced by 25 percent. The effect of passive smoking in children can last a lifetime because it delays physical and intellectual development, and because the longer people are exposed to carcinogens, the more likely they are to develop lung cancer.46
Table 5: Smoking During Pregnancy, Selected Countries, Circa 1980

<table>
<thead>
<tr>
<th>Country</th>
<th>Share of Pregnant Women Who Smoke (percent)</th>
<th>Infants Exposed (number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ireland</td>
<td>36</td>
<td>26,000</td>
</tr>
<tr>
<td>Sweden</td>
<td>34</td>
<td>33,800</td>
</tr>
<tr>
<td>West Germany</td>
<td>32</td>
<td>211,700</td>
</tr>
<tr>
<td>Canada</td>
<td>26</td>
<td>104,400</td>
</tr>
<tr>
<td>Chile</td>
<td>25</td>
<td>31,600</td>
</tr>
<tr>
<td>Belgium</td>
<td>25</td>
<td>31,600</td>
</tr>
<tr>
<td>Venezuela</td>
<td>24</td>
<td>125,200</td>
</tr>
<tr>
<td>Brazil</td>
<td>20</td>
<td>715,800</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>20</td>
<td>73,900</td>
</tr>
<tr>
<td>United States</td>
<td>19</td>
<td>706,800</td>
</tr>
<tr>
<td>Colombia</td>
<td>19</td>
<td>150,600</td>
</tr>
<tr>
<td>Austria</td>
<td>18</td>
<td>15,700</td>
</tr>
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<td>Hungary</td>
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<td>21,500</td>
</tr>
<tr>
<td>Mexico</td>
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<td>227,300</td>
</tr>
<tr>
<td>Japan</td>
<td>8</td>
<td>130,800</td>
</tr>
<tr>
<td>Philippines</td>
<td>6</td>
<td>91,600</td>
</tr>
<tr>
<td>Bangladesh</td>
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<td>135,400</td>
</tr>
<tr>
<td>Egypt</td>
<td>1</td>
<td>17,700</td>
</tr>
<tr>
<td>India</td>
<td>1</td>
<td>96,900</td>
</tr>
</tbody>
</table>

1The percentage of women in India who chew tobacco may be high, however.


Parents who smoke may also reduce the intellectual development of their children. One study in Italy found that children whose mothers...
smoked learned to read more slowly than those of nonsmokers. In the United States, the learning ability of 11 year-olds whose mothers smoke has been shown to lag by six months.47

Antismoking Efforts to Date

When a recent medical journal editorial writer rhetorically asked "What if smoking killed baby seals?" he was making the point that environmental and health activists do not accord tobacco the priority it deserves. He suggested that "perhaps the entire antismoking campaign be turned over to Greenpeace."48 Health and environmental organizations have not moved to protect their constituents' well-being with the same vigor that the tobacco industry protects its pecuniary interests.

Nor have governments assumed their traditional role in protecting public health by acting decisively to reduce tobacco's threat. They move swiftly to remove from the market unsafe medicines. They conduct paramilitary operations to destroy fields of marijuana or opium, but not tobacco, a far deadlier crop. They pay for expensive cleanup operations to remove toxic chemicals from the human environment. But not only do they fail to take these actions for tobacco, which is often more deadly to both users and innocent—or passive—victims, they even support efforts to stabilize the tobacco industry. This sad state of affairs is possible both because the tobacco industry itself is so strong and because the opposition to tobacco is so weak. Health advocates in general have not insisted that governments take appropriate action. They have relied instead on informational programs alone to solve the problem.

Equating smokers with baby seals—as victims rather than willing participants—helps clarify some confusion that contributes to inaction on tobacco. Many people assume it is enough to warn tobacco users, through the media and with labels on tobacco products, of the risks they take and then leave to them the responsibility for their own health. They argue that if users choose to take tobacco's risk, in return for the pleasure or stimulation that it provides, that is their pre-
"Governments conduct paramilitary operations to destroy fields of marijuana or opium, but not tobacco, a far deadlier crop."

To some extent this is true. But the independence and voluntary nature of this choice can be called into question on three counts.

First, tobacco is strongly addictive. Studies have shown that only about one quarter of the people who try more than one cigarette ever succeed in quitting. Young people begin to smoke because of social pressure, curiosity, or a desire to feel "grown-up." But pharmacologically, tobacco acts like heroin in hooking its victims. They rapidly become dependent on nicotine, and then smoke to satisfy their addiction.

Second, smoke harms more than just the smoker. As indicated earlier, children of smokers get sick with respiratory illness twice as often as those of nonsmokers. Their growth and intellectual development as well as lung capacity can be stunted. Exposed for decades to others' smoke, their risk of lung cancer is at least tripled. Similarly, spouses and coworkers of smokers are at higher risk of lung cancer because of smokers' addictions.

Third, when governments act inconsistently in their management of tobacco with respect to other dangerous products that they ban, they confuse tobacco users. Asbestos, heroin, and DDT are banned to protect public health, tobacco is not. This implicitly signals that those responsible for health consider tobacco to be different, and as normal to use. Thus, teenagers can be forgiven for not taking seriously a tiny health warning on shiny new packs of cigarettes. The problem is, of course, made worse when governments actively encourage the production of tobacco.

The point at which society decides to take action on dangerous products is sometimes arbitrary, but it can be based consistently on estimates of risk. It is the overall risk carried by addictive products rather than their capacity to cause addiction per se that—along with economic interest, attitudes, and chance—decides society's treatment of them. Coffee, for example, is addictive but the evidence that it causes cancer or heart disease is mixed. Some studies have estimated that coffee can double the risk of pancreatic cancer, others have found no increased risk at all.
Alcohol is addictive and carries heavy costs for society, though these are at most half as costly as tobacco. Having one drink a day can be tolerated without instilling dependency in most people, so society permits its use. Alcohol, at least, does not quickly addict the majority of those who experiment with it, as do heroin and tobacco. Similarly, nonaddictive products that are carcinogens may be sufficiently low in overall risk to be permitted. Some artificial sweeteners, for example, fall above the level of acceptable risk, while others do not. They may both be carcinogenic, however.

Most U.S. federal regulatory agencies draw this arbitrary line at a level of risk of 1 death in 100,000 or, alternatively, 1 in 1 million people over a lifetime of exposure. The risks from passive smoking probably exceed this by a factor of 250. Active smoking, of course, exceeds the lower level by 100,000 because it causes cancer in 1 in 10—some would say 1 in 5—users. Thus, forbidding the sale of tobacco would be consistent with the prohibition of the sale of addictive drugs that harm the user and others. Banning tobacco would also be consistent with the control of strong carcinogens with very high risk factors.

Some people argue that individuals should be able to do whatever they want in the privacy of their own homes. This is an acceptable, even admirable attitude that favors civil liberties. But the limit to one person’s pursuit of happiness begins at the point where it clearly harms others. If smokers are to be permitted to harm themselves but forbidden to harm their children, spouses, and coworkers, they will have to smoke in their backyards. Because control of tobacco use in private homes is both politically and practically infeasible, the only realistic way to protect children—if parents fail to do so—is to control the product itself.

Societies urgently need to examine how to better control tobacco use, for the current strategy of informational campaigns is not working well. The basis of antitobacco action since the mid sixties has been information aimed at educating smokers about their health risks and discouraging nonsmokers from starting. The campaign seeks through media coverage of scientific studies to persuade smokers to quit and children never to start. It tries to change society’s attitude from a view
"Absolute cigarette consumption has fallen over the last 10 years in only a dozen countries."

of smoking as glamorous to one that sees the habit as socially unac-
ceptable. This approach has been tested in a few countries such as
Finland, Norway, Sweden, and, to lesser extents, the Netherlands,
the United States, and the United Kingdom. It has been practiced de
facto in many Eastern bloc countries and in China. The results are
decidedly mixed. (See Table 6.)

Absolute cigarette consumption has fallen over the last 10 years in
only a dozen countries. Of these, only four had moderate to strong
antismoking policies, while eight had weak ones. Reduction in coun-
tries with weak policies can be attributed to economic decline, specif-
ically to higher costs of imported cigarettes and reduced per capita
income.

A dozen countries have had strong antismoking measures—by to-
day's standards—but have experienced strong growth in tobacco use.
Tobacco advertising is prohibited in Poland and restrictions are
placed on smoking in public, yet that nation ranks among the highest
in per capita cigarette consumption in the world. Advertising bans
and other antismoking policies exist in China, East Germany, and the
Soviet Union, but smoking nevertheless continues at very high levels,
at least among men.

Finland, Norway, and Sweden, in contrast, have imposed advertising
bans and required strong warnings on tobacco labels, and they have
experienced better results. Norway's antismoking policy is exceeded
in strength by only four other countries, and tobacco consumption
has declined by 15 percent since the imposition of that policy. (This
decline takes into account the large use of roll-your-own tobacco in
that country.) Sweden's policy has been somewhat weaker than those
of other Scandinavian countries, but consumption is down some 3
percent since 1974, about the time its policy was initiated.

Bulgaria, Hungary, and the Soviet Union have the strongest policies
in the world. Bulgarians now smoke 2 percent fewer cigarettes than
10 years ago, while the Soviets and the Hungarians use 8 and 4
percent more, respectively.
<table>
<thead>
<tr>
<th>Country</th>
<th>Annual Change in Use of Cigarettes (percent)</th>
<th>Package Warning Label</th>
<th>Advertising Ban Total</th>
<th>Advertising Ban Partial</th>
<th>Bans in Public Places Strong</th>
<th>Bans in Public Places Weak</th>
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</thead>
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<td>Argentina</td>
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<td>X</td>
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<td>Spain</td>
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<tr>
<td>United States</td>
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<td>X</td>
<td></td>
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</tr>
</tbody>
</table>

1Includes restrictions on smoking in the workplace.


Countries with weaker policies but better results include Belgium, the Netherlands, and the United Kingdom. These governments permit advertising in print but forbid it on electronic media. They have
negotiated voluntary warnings on tobacco products with the tobacco industry. Perhaps most importantly, they have conducted vigorous antismoking educational campaigns. Cigarette consumption has declined 20 percent or more over the last 10 years in these nations. The per capita consumption level in each is below the average for industrial countries, though well above the mean for the world. Only in the United Kingdom, however, is consumption lower than 20 years ago.

Some countries have had dramatic declines in cigarette consumption without even trying. Drops in consumption of 7 to 32 percent in Bolivia, Chile, and Zaire can be attributed to their economic difficulties. Their antismoking policies are among the weakest in the world.

Changes in income affect tobacco consumption, though the strength of the income effect depends on a country's stage of development. A statistical analysis of 29 industrial and developing countries suggested that, overall, cigarette consumption increases about 3 percent for every 10 percent rise in income. This relation does not apparently hold for industrial countries, however. Consumption seems more related to price and social attractiveness in countries such as the United States, where price increases of 10 percent appear to reduce consumption by 3 to 4 percent. The largest decline ever in U.S. cigarette use occurred, in fact, in 1983, when the government imposed a tax of about 8 percent of the retail price.

This analysis also reveals that the strength of a nation's tobacco information policy does not appear to reduce consumption, if income and price are taken into account. The result suggests that the stronger the antitobacco policy, the greater the consumption and the higher the rate of increase in consumption. This "nonsense" result, of course, can be explained simply. Countries that have had a problem with cigarette consumption are more likely to have taken steps that they believe will reduce that problem. Unfortunately, the steps taken to date have been too weak to achieve the desired results. Lack of time to take effect could also be a factor, although most policies have been in place for almost a decade.
Health advocates have generally dismissed stronger medicine for dealing with smoking and tobacco. The U.K. Royal College of Physicians, for example, the first governmental body in the world to launch a campaign to save the health of smokers, has conceded that banning tobacco is impractical. The physicians compared such a move to prohibition, and expressed fear that it not only would be unenforceable, but would lead to criminality. Yet, there are a few effective ways to strengthen tobacco control policies without an outright ban.

The policy questions are how to prevent the young and the naive from beginning to smoke, how to persuade smokers to quit, and how to protect the health of passive or involuntary smokers in the interim. When naive smokers first light up without understanding the life-threatening implications of their careless experimentation, they can become addicted and, in effect, “involuntary” smokers themselves. Psychology and medicine currently do not know much about how to help these addicts, other than to recommend that they quit cold turkey.

This dilemma may be unique in medicine. A dangerous drug clearly should—but cannot—be banned. The economic strength of the tobacco industry is so great that it can exploit for its own purposes the safeguards built into democracies to protect legitimate minorities. In nondemocracies, governments may lack the credibility—and the motivation—to tackle so insidious and pernicious a habit. And under both systems the social conditioning and chemical habituation characteristic of tobacco make banning the product a formidable task, one that would take a long time. Yet the current “informational” campaign to control tobacco is falling behind as worldwide use increases faster than population.

An alternative approach is inherent in a new movement to protect passive smokers, banishing tobacco. This campaign, which stops short of an outright ban of tobacco sales, includes either the prohibition of smoking in the workplace and in public buildings or the strict limitation of smoking to specified areas. The movement may be the
By banishing tobacco use from places where innocent people will be exposed and placed at risk, thousands of lives may be saved.

The single greatest success of the informational campaign against tobacco. Its leaders insist that despite the continued sale, advertising, and use of tobacco, nonsmokers—the majority in most societies—have every right not to be exposed to the carcinogens, carbon monoxide, and irritants in tobacco smoke. Such a campaign can make three important contributions.

First, by banishing tobacco use from places where innocent people will be exposed and placed at risk, thousands of lives may be saved. Second, forcing smokers to give up their habit while in the presence of nonsmokers will provide them with an added impetus to quit. If smokers must get through working days without smoking, then they are more likely to be able to quit completely. This has been the result of bans in Minnesota and California. In any case, their total dosage of carcinogens and carbon monoxide should decline. And third, by stigmatizing tobacco use as dangerous and antisocial, the passive smokers' rights movement can accomplish a goal of all antismoking informational campaigns: to make smoking socially unattractive.

The passive smokers' rights campaign focuses on the workplace, public gathering places, and public transportation. Many countries now prohibit smoking on public transportation and in theaters and auditoriums, though the impetus for these restrictions has usually been conventional safety concerns. In a few areas, such as the state of Minnesota and the cities of San Francisco and Los Angeles, smoking is now prohibited in public buildings (except in restricted areas) and nonsmokers must be protected in restaurants and on the job.

Interestingly, nonsmokers have an important ally in the workplace. Employers. Companies, at least in the United States, are rapidly realizing two things. First, most of their employees do not smoke and do not like to breathe the smoke of others. Second, smokers cost employers money. Surveys indicate that the combination of inefficiency and ill health as a result of smoking wastes about 7 percent of a smoker's working time. They also suggest that smokers cost employers at least $650 each per year. Smokers add to insurance and cleanup costs, and they reduce nonsmoker employee morale.
American industry is responding rapidly to the nonsmoker movement. A number of well-known industries have prohibited smoking on the job for most employees. (See Table 7.) A few even refuse to hire smokers. The predominant trend, however, is toward banishing the practice from the workplace. In 1984, the rate of increase in adoption of policies against smoking for the publishing, insurance, finance, pharmaceuticals, and scientific equipment industries in the United States was between 10 and 25 percent. That is, one tenth to one quarter of the top 1,000 businesses in this group of five industries implemented new policies that year to banish smoking.61

A particular difficulty in banishing tobacco is the role of government in promoting tobacco use. This schizophrenic state of affairs persists not just in the market-oriented West, but also in centralized economies. Governments most often own the tobacco industries in these areas. China, the Soviet Union, and India, for example, grow their own tobacco—they are not victims of some cabal of multinational companies. The state-owned tobacco industry in China is being carefully nurtured and expanded rapidly even as another part of the government is telling the Chinese that smoking is bad for them.62

These incompatible policies are also in place in the West. In the United States, the U.S. Department of Agriculture administers a price-support system to protect tobacco producers. West European nations subsidize tobacco farmers with about $660 million in price supports each year. Ironically, the systems protect small, inefficient farmers who earn higher prices than they would obtain without the subsidy. More efficient producers, who could underprice the small farmers, are not allowed to compete fully. The result is that tobacco costs the user more than it would without the system. As tobacco use varies negatively in response to price increases, smoking is being directly reduced by price supports.61

There is an even more subtle effect, however. The tobacco industry, though it loses the right to compete with small-scale farmers for more of the profit of growing tobacco, gains the powerful political support of the small farmer. The added political clout helps counter anti-smoking forces. Moreover, it retains the appealing appearance of official tolerance and even endorsement of the use of tobacco, which
Table 7: Selected U.S. Corporations with Policies Concerning Smoking in the Workplace, 1985

<table>
<thead>
<tr>
<th>Policy/Companies</th>
<th>Employees (number)</th>
<th>Date Implemented, If Known</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoke-Free Areas, Including Work Stations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIGNA Insurance (Philadelphia, Pa.)</td>
<td>12,000</td>
<td>January 1984</td>
</tr>
<tr>
<td>Control Data Corp. (Minneapolis, Minn., and elsewhere)</td>
<td>28,000</td>
<td></td>
</tr>
<tr>
<td>Grumman Corp.</td>
<td>27,000</td>
<td>November 1984</td>
</tr>
<tr>
<td>IBM</td>
<td>200,000</td>
<td></td>
</tr>
<tr>
<td>Pacific Mutual Life Insurance Co. (Newport Beach, Calif.)</td>
<td>1,200</td>
<td>January 1984</td>
</tr>
<tr>
<td>Pratt &amp; Whitney Aircraft, Govt. Products Div. (Palm Beach, Calif.)</td>
<td>7,000</td>
<td></td>
</tr>
<tr>
<td>Smoke-Free Except for Cafeteria, Lounges, and Conference Rooms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adolph Coors Co. (Golden, Colo.)</td>
<td>10,000</td>
<td>December 1982</td>
</tr>
<tr>
<td>Blue Cross-Blue Shield (Minnesota)</td>
<td>1,600</td>
<td>May 1985</td>
</tr>
<tr>
<td>The Boeing Co. (Washington state)</td>
<td>83,000</td>
<td>April 1984</td>
</tr>
<tr>
<td>Campbells Soup Co. (Camden, N.J.)</td>
<td>3,300</td>
<td>1869</td>
</tr>
<tr>
<td>Merle Norman Cosmetic Co. (Los Angeles, Calif.)</td>
<td>1,300</td>
<td></td>
</tr>
<tr>
<td>Raven Industries (Sioux Falls, S. Dak.)</td>
<td>900</td>
<td>May 1983</td>
</tr>
<tr>
<td>Unigard Insurance Group (Seattle, Wash.)</td>
<td>1,600</td>
<td>March 1982</td>
</tr>
<tr>
<td>Entirely Smoke-Free</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Johns-Manville (Denver, Colo.)</td>
<td>8,000</td>
<td>July 1978</td>
</tr>
<tr>
<td>Pacific Northwest Bell (Seattle, Wash.)</td>
<td>15,000</td>
<td>October 1985</td>
</tr>
<tr>
<td>Rodale Press (Emmaus, Pa.)</td>
<td>850</td>
<td>January 1982</td>
</tr>
</tbody>
</table>

Source: Personal communications with company representatives, based on list developed by New Jersey Group Against Smoking Pollution, Summit, N.J.
in turn diminishes the effectiveness of the informational campaign in reducing the social acceptability of tobacco. Any child about to start smoking could be inclined to think that the U.S. government sees tobacco use as desirable. This is, of course, the implicit position of any government that promotes tobacco production. Failing to excise this "subsidy," however perverse for the industry, sends a signal both to the young and to other governments that tobacco is not so bad after all.

The overall situation of antismoking efforts, then, is at best a standoff in industrial countries and a rout in developing ones. At the current rate, Western countries will not see a major improvement in the health effects of smoking for many decades, but Eastern and developing countries will see a rapid worsening. It falls to world health leaders to bolster their antismoking efforts. Unfortunately, one lead agency, the World Health Organization, allots less than 1 percent of its budget to this problem, though it calls smoking "the most important preventable health problem in the world." Its current budget for the mid-eighties has no funds for actively reducing tobacco's toll. 62

Effective policies fall in four categories. The first, continuation of the informational campaign, is worthwhile as a foundation for the others. Now that this exists, at least in some countries, it is time to build on it with more stringent measures.

The second step is for those countries that have low smoking rates, no indigenous tobacco industry, and a reliance on imported tobacco products to ban tobacco altogether. 63 To do so would completely eliminate the epidemic's threat to them, placing these nations in the forefront of the campaign, much as the industrial world spearheaded the campaign to eradicate smallpox.

These governments have an economic incentive to act—the reduction of foreign-exchange losses for the purchase of a nonproductive product. Only a few people in these societies are now severely addicted, making national withdrawal politically easier. Many African nations fall into this category. Unfortunately, other impoverished nations, such as India, do not, because cigarette consumption is already high.
The third approach is for those nations that must be politically pragmatic at least to act to protect the health of the innocent. Experience in the United States and in Poland shows that tobacco can be banished from public buildings, from the workplace, and from public eating establishments and meeting places. Banishing cigarette use in the presence of nonsmokers should be considered a minimum level of protection.

All governments can provide national indoor clean air acts for public buildings, workplaces, and entertainment establishments. United Nations organizations would do well to establish no-smoking policies for their employees, especially those who work with children and the poor, for they are unavoidably going to be viewed as symbols of modernity and success, and therefore should not introduce such a clearly harmful product.

The fourth level is to use the power of economic tools to eliminate smoking as much as possible. Estimates of the cost of smoking amount to $1.25-3.15 per pack. A tax of this magnitude in the Western nations would reduce smoking by as much as 40 percent over time. Any tax increase, even of 5-10¢ per pack, would rapidly encourage light smokers to quit in order to avoid the higher cost, would provide additional pressure on the heavily addicted to bring themselves to the point of enduring withdrawal, and, most importantly, would discourage the young (with low incomes) and poor from ever starting. Additionally, tobacco support systems can be dismantled in order to signal that governments now wish to discourage the use of tobacco. This move would be productive even where such a step would lower the price of cigarettes.

These measures will not be easy, nor will they solve the tobacco problem. They will not, for example, assure that children will be protected in the home against the smoke of their parents. They will not protect the newborn from harm as a result of their mothers' smoking. Parents alone can take this responsibility, though in some cases their addiction makes them risk the health and the intellectual development of their children.
New measures will not assure that smokers themselves will be persuaded to quit. Nor will they guarantee that innocent young people do not become addicted before they realize their new habit eventually kills one out of four users. But without more responsible efforts on the part of the health professions and public interest organizations, even these efforts will be held in abeyance.
Notes


4. See, for example, special editions of New York State Journal of Medicine, July 1985, and Journal of the American Medical Association, May 24-31, 1985, both dedicated to the smoking problem.

5. Estimates based on USDA computer printout. For prevalence in the United States, see DHHS, National Center for Health Statistics, Health, United States, 1984. Note also that the percent of U.S. male smokers who consumed more than 25 cigarettes per day in 1965 and 1983 was 24.1 and 33.6, respectively. The respective rates for U.S. female smokers in those years were 13.0 and 20.6 percent.

6. USDA computer printout. The Third World, excluding China, has 54 percent of the world’s population and uses 25 percent of the world’s tobacco, industrial Western nations, 16 percent of the population and 37 percent of the tobacco, Eastern bloc nations, including the Soviet Union, 8.5 percent of the


14. Patrick L. Remington et al., "Current Smoking Trends in the United States," Journal of the American Medical Association, May 24/31, 1985. The low rate for women with only a grade-school education probably relates to their age. Few women born in the first quarter of this century smoked. These women also were less likely to have had advanced educational opportunities.

15. The estimate of 2 million to 2.5 million annual deaths worldwide includes an extrapolation of lung cancer deaths using an equation derived from death and smoking rates in 20 developed and developing countries. It also includes the sum of the deaths due to heart disease and emphysema in industrial countries, derived from various published estimates (see notes 20 and 25). For the United States, Ravenholt estimates mortality due to tobacco use at almost 500,000, or 25 percent of all deaths. Ravenholt, "Addiction Mortality in the United States, 1980."


18. See various chapters in Krasnegur, *Cigarette Smoking as a Dependence Process*.


27. DHEW, Public Health Service, Smoking and Health.


33. Estimates based on data in USDA, FAS, “Tobacco—World Tobacco Situa-

34. The 50 percent increase in lung cancer deaths is based on the equation of deaths as a function of cigarettes consumed, assuming that lung cancer in the year 2000 would be a function of cigarette consumption in 1980, reduced risk for ex-smokers from Doll and Peto, "Avoidable Risks of Cancer."


40. Ibid.


46. Trager et al., "Longitudinal Study of Maternal Smoking."

47. Ibid.


51. Roemer, Legislative Action, USDA, FAS, "Tariff and Nontariff Restrictions on Tobacco."

52. A number of multiple linear regressions were performed with data on smoking per capita, cigarette price, per capita income, and policy strength. The strength of policy consistently showed a small but positive association with consumption even when price and income were controlled for. The association between price and consumption was not meaningful, perhaps because prices are controlled in many countries. In one regression on per capita income and policy strength, the result was $\ln(\text{Consumption}) = 4.2 + 0.31 \times \ln(\text{Income}) + 0.21 \times \ln(\text{Policy Score}); (t = 4.15$ and 1.77, respectively, $R^2 = 0.63$). Policy scores were based on Roemer, Legislative Action, and on USDA, FAS, "Tariff and Nontariff Measures on Tobacco." Price elasticity for the United States was estimated to be -0.3, using data from Tobacco Institute, The Tax Burden on Tobacco. Historical Compilation 1983 (Washington, D.C.: 1984). Consumption data in this section are from USDA, computer printout. See also, Harvard University Institute for the Study of Smoking Behavior and Policy, "The Cigarette Excise Tax," Cambridge, Massachusetts, April 17, 1985.

53. Royal College of Physicians, Health or Smoking.

54. Shiffman, "The Tobacco Withdrawal Syndrome."


57. Ibid.


63. The nations in this category are mainly in Africa and in the Andes. Examples include Chad, Ethiopia, Niger, Nigeria, Peru, Sudan, Uganda, and Zaire, all of which record annual consumption of fewer than 300 cigarettes per capita (age 15 and older), and in many of which the figure is less than 200.

64. Royal College of Physicians, *Health or Smoking*. 
WILLIAM U. CHANDLER is a Senior Researcher with Worldwatch Institute. He is the author of Worldwatch Papers on improving world health, energy productivity, and investing in children, and of The Myth of TVA.
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