Public Policy Issues in the Promotion of Less Hazardous Cigarettes

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From 1967 to 1977, the domestic market share of cigarettes with FTC tar levels of 15 mg or less increased from 2–23%. The proportion of manufacturers' advertising and promotional expenditures devoted to these cigarettes increased from 5–49% (Federal Trade Commission 1978). By 1978, 23% of adult male cigarette smokers and 35% of adult female cigarette smokers regularly consumed brands with FTC tar levels of 14 mg or less (National Center for Health Statistics 1979).

This discussion briefly addresses two basic questions. Should we continue to promote these trends in cigarette consumption? If so, what public policy interventions are at our disposal?

IS PROMOTION OF THE LESS HAZARDOUS CIGARETTE AN APPROPRIATE PUBLIC POLICY?

The promotion of lower-tar and nicotine cigarettes would be an appropriate public policy if:

1. the population of current cigarette smokers were unchanging, with no new entrants and no quitters;
2. a smoker's shifting to a lower-tar and nicotine cigarette did not adversely affect his or her style of smoking or the number of cigarettes smoked;
3. the dose-response relation between cigarette tar and nicotine delivery and cigarette-induced health damage were uniform across the population.

When one of these suppositions is violated, however, the value of a policy promoting less hazardous cigarettes is not so clear.

Initiation of Smoking

The progressive decline of the tar and nicotine contents of cigarettes over the past 25 years may have made it easier for teenagers and young adults—

particularly young women—to experiment with and later become habituated to cigarettes. This possibility is particularly important in view of the marked increase in smoking among teenage women in recent years.

Data presented in Table 1 indicate that lower-tar cigarettes have infiltrated the teenage smoking population and that high-tar, nonfilter cigarettes are virtually absent. (Most of the teenagers reporting a brand with FTC tar over 20 mg smoked a relatively new, 120 mm filter-tipped brand.) The marked prevalence of low-tar smoking among older teenage females is consistent with independent survey data on young women ages 17–24 reported from the Health Interview Survey (National Center for Health Statistics 1979). Although these data are not conclusive, I know of no evidence contradicting the hypothesis that the availability of lower-tar and nicotine cigarettes enhanced the rate of initiation of smoking among younger females.

Cessation of Smoking

Earlier in this meeting, Lawrence Garfinkel cited data from the American Cancer Society's 25-state study showing that smokers of lower-tar and nicotine cigarettes in 1959 had a higher probability of reporting nonsmoking status in 1972 (Hammond et al. 1976). However, cigarettes regarded as low in tar and nicotine during this period do not represent current products. Whether smokers

Table 1
Distribution of Cigarette Brands of Current Regular Teenage Smokers According to FTC Tar Content, 1978

Sex and age	Fraction of current smokers according to FTC tar [a]			Overall prevalence of current smoking (%)
	15 mg or less (%)	16–20 mg (%)	21 mg or greater (%)	
Males				
12–14 years	23	77	0	3
15–16 years	38	62	0	14
17–19 years	30	69	1	23
12–19 years	32	68	1	13
Females				
12–14 years	26	70	4	4
15–16 years	30	70	0	12
17–19 years	40	57	3	28
12–19 years	37	61	3	15

Data from U.S. National Institute of Education telephone survey in 1978 of over 3000 teenagers. Respondents reported their current brand, and not the brand of the very first few cigarettes smoked.

[a]Excludes current smokers who did not specify brand and type. Percentages may not add up to 100 due to roundoff.

of the new cigarettes with even lower tar and nicotine are more or less likely to quit has not been determined.

Although a significant percentage of adult males have quit smoking since 1964, the rate of quitting among adult women has been less impressive. Since women currently aged 45 years and over have a disproportionately high propensity to smoke lower-tar and nicotine cigarettes (National Center for Health Statistics 1979), it is possible that the availability of lower-tar and nicotine cigarettes has served as an alternative, thus deterring quitting in this group. The more intriguing possibility is that the increased publicity and availability of lower-tar and nicotine cigarettes has actually enhanced the public perception of the health risks of smoking.

Smoking Frequency

The continued decrease in cigarette tar and nicotine has been associated with an increase in the average number of cigarettes smoked per day among current smokers (Harris 1979). The percentage of adult male current smokers who consumed 25 or more cigarettes per day increased from 25% in 1965 to 28% in 1970 to 34% in 1978. The corresponding proportions for adult female smokers were 14% in 1965, 18% in 1970, and 21% in 1978 (Harris 1979; National Center for Health Statistics 1979). Using Gallup Poll data on the percentage of smokers and U.S. Department of Agriculture data on aggregate consumption (Harris 1979), I calculate that the average smoking frequency increased from 22 per day in 1954 to 30 per day in 1978.

Possible explanations for this observed increase in average smoking frequency include a higher rate of quitting among lower frequency smokers; an increase in smoking frequency of those who continued to smoke; and, an increased frequency of smoking among new entrants into the population of smokers. Garfinkel's data for 1959–72, from the American Cancer Society study, tend to support the explanation that there is a higher quitting rate among lower frequency smokers. Yet, it tends to negate the explanation that smoking frequency increased among continued smokers (Garfinkel 1979). However, these inferences are weakened by possible underreporting bias and digit preference artifacts (Warner 1978). Moreover, these data say little about changes in smoking frequency among those who are now switching to previously unavailable cigarettes, with considerably lower tar and nicotine, and different filter aeration, paper porosity, tobacco density, air resistance, and flavor. The reported increase in current smoking frequency among new smokers, particularly females, emphasizes that there is an increased frequency of smoking among new smokers (Harris 1979).

In this respect, there is little epidemiological information concerning the tradeoff between smoking a few higher-tar and nicotine cigarettes and smoking many lower-tar and nicotine cigarettes. The findings of Hammond and colleagues (1976) suggest that smoking a large number of low-tar, low-nicotine cigarettes may be more damaging.

Changes in the Style of Smoking

There is no evidence from long-term studies contradicting the accumulating mass of experimental data that subjects who switch to low-tar, low-nicotine cigarettes manage to maintain their blood carboxyhemoglobin and nicotine levels by inhaling more deeply or smoking a greater fraction of the cigarette. Survey data on changes in smoking styles are not reliable (Harris 1979). The real possibility of substantial compensation in both the depth and volume of inhalation and the fraction of burning cigarette actually smoked cannot be ignored.

High-Risk Groups

Hammond and colleagues (1976) found that the overall mortality rates of low-tar, low-nicotine smokers were on average 84% of high-tar, high-nicotine smokers and 150% of life-long nonsmokers. Although these overall rates were based on a case-matching procedure, they are average risks. They do not tell us what protection, if any, would asbestos or uranium or fluorocarbon workers attain from lower-tar and nicotine cigarettes. This applies equally well to pregnant women and their unborn children, to men and women with increased coronary risk from hypertension and hypercholesterolemia, or to women taking oral contraceptives, or to men and women with peripheral arterial disease, chronic obstructive lung disease, and postmyocardial infarction ventricular irritability.

Associated Changes in Life-Style

People do not change their smoking patterns as if they were part of a hypothetical controlled trial in which all other health habits were held constant. The act of quitting smoking may be the critical gateway event to substantial changes in physical activity, compliance with an antihypertensive medication, or motivated diminution of salt or fat intake. Those individuals who continue to smoke even the lowest-tar and nicotine cigarettes do not appear to make these changes. The validity of these impressions aside, it is inappropriate to evaluate less hazardous cigarettes as purely chemical entities without considering the more complex behavioral environment in which they are smoked.

No-effect Thresholds and Tolerable Dosages

Gori (1976) has attempted to demonstrate that the overall mortality rate in the late 1950s of those smoking two cigarettes per day containing about 43 mg tar was statistically indistinguishable from the overall mortality of those who never smoked. This finding cannot be equated with the absence of a substantive dose effect. Doll and Peto (1978), for example, reported that men who continued to smoke one to nine cigarettes per day (mean 5.3) during the years 1951–1971

had an age-standardized lung cancer incidence rate four times that of men who had never smoked, and the difference was statistically significant at the 10% level. Although the number of subjects who smoked one to four cigarettes per day (mean 2.7) was too small to achieve statistical significance, their lung cancer incidence rate was actually higher. Does this mean that smoking an average of 2.7 cigarettes per day for 20 years has no substantive risk? Drs. Gori and Lynch (1978) are careful to state that "This could still imply an important risk, although it may be difficult to detect." But it is hardly clear in that case what operational value such terms as "critical level" or "tolerable" (rather than "safe") are supposed to have. If smoking 2 cigarettes per day, each containing 43 mg tar, has a "tolerable" risk, then why should we assume, as Gori and Lynch (1978) must, that smoking 43 cigarettes per day, each containing 2 mg tar, also has a "tolerable" risk? How can they exclude all the identifiable (and unidentifiable?) high-risk groups from their analysis without assuming away the problem altogether? If the goal of their work is to get the smoker "to wean himself to progressively less hazardous cigarettes" (Gori and Lynch 1978), I do not see what relevance these critical dosages have. On the contrary, Saul Shiffman presented evidence (Shiffman, this volume) that gradual weaning is more likely to lead to relapse. In any case, I would like to know what are the tobacco craving and withdrawal symptoms of smokers of a cigarette with 9 mg tar, 0.6 mg nicotine, and 12 mg CO, who goes down to a "critical level" of 3 cigarettes per day, and how these symptoms might differ at 5 or 10 cigarettes per day.

PUBLIC POLICY INTERVENTIONS TO PROMOTE LESS HAZARDOUS CIGARETTES

The preceding discussion suggests that the central public health issue is less hazardous smoking and not less hazardous cigarettes. Resource expenditures to get people to either quit smoking or not start are likely to have a benefit-cost ratio at least an order of magnitude greater than comparable expenditures to promote less hazardous cigarettes. Let us assume that less hazardous cigarettes should be promoted. What forms of direct intervention are available and how should we evaluate these alternative actions?

The market share of cigarettes with FTC tar 15 mg or less is expected to exceed 50% in the coming decade. But at this degree of market penetration, the burden of excess mortality and morbidity from smoking is still likely to be enormous (Schneiderman 1978). If the government is to intervene to promote less hazardous cigarettes, a cogent case can be made for the use of tax incentives and regulatory standards.

Taxes and Product Standards

Figure 1 describes the prototypical design for a tax scheme intended to induce smokers to switch to low-tar, low-nicotine cigarettes. This scheme has three

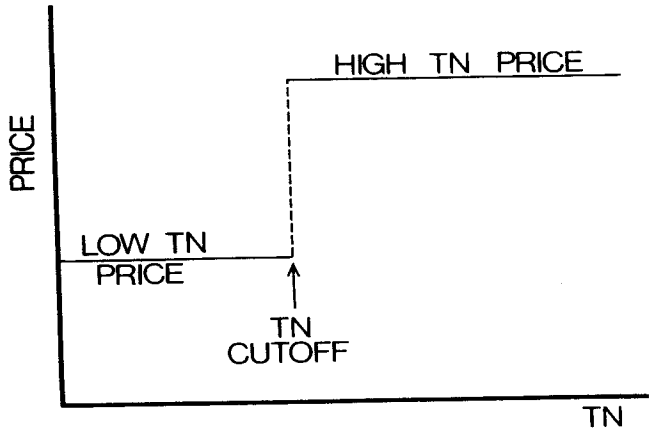

Figure 1
The three regulatory parameters in the design of a tar and nicotine-based tax

regulatory parameters: tax rates for low-tar and nicotine and high-tar and nicotine cigarettes, and a cutoff value of tar and nicotine separating high from low. Note that a government regulation setting a maximum permissible tar and nicotine is equivalent to levying a prohibitively high tax on high-tar and nicotine brands.

The determination of these three regulatory parameters involves the following considerations. If we set the price differential between the two tax rates at a sufficiently high value to induce high-tar and nicotine smokers to switch brands, we will have to worry about their compensating for the resulting drop in cigarette tar and nicotine delivery. In fact, the lower we set the cutoff value, the larger will be the decrease in tar and nicotine experienced by those smokers who switch, and hence the higher the extent of compensation. If we set the cutoff value at too high a level, on the other hand, we may affect the brand choices of only a relatively small number of smokers.

The optimal choices of these three parameters hinge critically on the characteristics of the biological dose-response curve for cigarette-induced health damage, in particular, the relative potency of smoking frequency and cigarette tar and nicotine delivery. If smoking a few high-tar, high-nicotine cigarettes is worse than smoking a large number of low-tar, low-nicotine cigarettes, then the best policy is a prohibitively high tax (or equivalently, a product standard) on cigarettes delivering above 14 mg tar. In that case, the health gains from reducing tar and nicotine per cigarette outweigh the possible losses from smokers' compensation. On the other hand, if smoking a large number of low-tar, low-nicotine cigarettes is more damaging, then the best policy is a uniformly high tax on all brands. In that case, the main objective is to reduce the number of cigarettes smoked, even if it retards the consumption of lower-tar and nicotine cigarettes. Finally, if health damage depends only on total daily tar and nicotine intake (the assumption implicit in the analysis of Gori and Lynch, 1978), then the best policy is to tax all brands, establishing a moderate price differential at about 16 mg tar. (Calculations based on 1975 data yielded an

additional $.30 tax per pack on brands below 16 mg tar and an additional $.45 tax per pack on brands above 16 mg tar.) The main objective in this case is to get conventional filter smokers in the 16–20 mg tar range to make a moderate brand switch while decreasing their smoking frequency. At the same time, high-tar and nicotine nonfilter smokers are compelled to cut down the number of cigarettes smoked without switching brands (Harris 1980).

In each case, these proposed taxes also reduce cigarette CO delivery. For example, in the case where cigarette tar and nicotine is considered more potent than smoking frequency, the tax induces both high-tar and nicotine and medium-tar and nicotine smokers to switch to brands below 14 mg tar, reducing CO delivery proportionately with tar and nicotine (Jenkins et al. 1979). In the case where smoking frequency and tar and nicotine are equally potent, the appropriate tax scheme is designed to get nonfilter smokers to cut down the number of cigarettes smoked, but not to switch to higher CO, conventional filter-tipped brands. Moreover, these results are not sensitive to large changes in the proportion of low-tar and nicotine smokers. These calculations suggest that the steady-state reduction in health damages resulting from such a tax, including medical care costs and lost earnings from early death, disability and absenteeism, are substantial. Even the net benefit of this tax scheme (taking into account changes in tax revenues, economic returns to producers and consumer satisfaction) runs into the billions of dollars annually.

CONCLUSIONS

It is inappropriate to evaluate less hazardous cigarettes as purely chemical entities without considering the more complex behavioral and social environment in which they are smoked. The progressive decline in cigarette tar and nicotine content may have made it easier for young adults, particularly young women, to take up smoking. It is unknown whether smokers of current low-tar, low-nicotine brands are more or less likely to quit smoking. It is unclear whether the increased publicity and availability of lower-tar and nicotine cigarettes have enhanced or dulled the public's perception of the health risks of smoking. There is no evidence contradicting the experimental finding that subjects who switch to low-tar, low-nicotine cigarettes compensate by inhaling more deeply or smoking a greater fraction of the cigarette. Although recent epidemiological studies have found reduced overall risks for low-tar, low-nicotine smokers, as compared to high-tar, high-nicotine smokers, these results do not necessarily apply to workers with occupational exposures, men and women with increased risk for coronary heart disease, patients with smoking-related illnesses, women taking oral contraceptives, or pregnant women and their unborn children. Recent calculations of so-called critical or tolerable levels of smoking do not demonstrate the absence of a substantive toxic effect of smoking at any dosage. As a guide to either the design of cigarettes or individual smoking strategies, the terms "tolerable" or "critical" have no operational significance. Complete cessation of smoking, rather than continued

smoking of low-tar, low-nicotine brands, may be the important gateway event to other favorable changes in health habits and life style.

The fact that the market share of low-tar, low-nicotine cigarettes is expected to exceed 50% does not constitute a solution to the smoking public health problem. If the government is to promote less hazardous cigarettes, then a cogent case can be made for the use of tax incentives or product standards. The steady-state net benefit of such interventions is likely to run in the billions of dollars annually.

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