Report of the Tobacco Policy Research Study Group on Tobacco Pricing and Taxation in the United States

David Sweanor, Scott Ballin, Ruth D Corcoran, Alan Davis, Karen Deasy, Roberta G Ferrence, Rhona Lahey, Sal Lucido, W James Nethery, Jeffrey Wasserman

It is widely recognised that tobacco taxes are a potent device to decrease tobacco consumption. In the United States, however, tobacco taxes have fallen, after adjustment for inflation, since the first Surgeon General's report was issued in 1964 in which the US government acknowledged the link between tobacco and disease. The proportion of pack price accounted for by tax has decreased by nearly half since 1964. Indeed, there have been only two increases in the federal tobacco tax since 1950.

These facts produce a startling enigma. Despite major progress on other issues of tobacco control, the United States has the lowest taxes on tobacco of any major industrial country, although it is the richest such country.

This report provides background on issues of tobacco pricing and taxation, and considers research needs to further understand the potential for increases in excise tax to limit cigarette consumption. It also delineates the research needed to advance the acceptance of increased excise taxes as a key policy for tobacco control. Although this report deals specifically with pricing and taxation in the United States, similar, if not identical, questions arise for most nations.

Background

INCREASED AFFORDABILITY OF TOBACCO

Many elements determine the amount of tobacco consumption in a given population. Perhaps the most important is the affordability of tobacco products, which is influenced by both the price of these products and the income of the potential purchasers. The price of tobacco products is, in turn, determined by the manufacturers' price, wholesale and retail markups, tobacco taxes, and sales taxes. Clearly, although consumer income and pricing policies in the tobacco trade are important factors deserving of consideration, they are beyond the control of tobacco control efforts. Ample opportunity exists however, to decrease the affordability of tobacco products through taxation.

It is important to recognise that tobacco has become significantly more affordable to the United States consumer since the 1964 Surgeon's General Report, because of rising consumer income and inflation. In 1964, disposable personal income was \$6727; by

1990, it had risen to \$11501, after adjustment for inflation, in constant 1982 dollars.¹ Also cigarette taxes have not kept pace with inflation, which has eroded the proportion of a pack of cigarettes accounted for by excise taxes. The Consumer Price Index, which measures a "Market basket" of goods, is a widely used measure of the inflation rate, compiled by the US Department of Labor. Taking 1982-84 as a base, the Consumer Price Index was 31.4 in 1964 and 141.2, in 1991.² Thus since 1964, the price of consumer goods has risen, on average, 4.5 times, because of inflation. In 1964, the average tax on a pack of cigarettes was 14 cents. By 1991, the average tax would need to have risen 4.5 times to 63 cents, simply to keep pace with inflation, but in 1991, the average tax on a pack of cigarettes was only 44.5 cents. If cigarettes were not to become more affordable, tobacco taxes would also have to rise in proportion to Disposable Personal Income; to accomplish this, taxes would now be more than one dollar a pack.

Cigarettes are taxed by the Federal Government, by all 50 states and the District of Columbia, and by several hundred municipalities. In 1991, state and local taxes ranged from 2.5 cents a packet in Virginia, to 48 cents a packet in Minnesota. Also, the tobacco industry has successfully prevented most increases in tax. For these reasons, the percentage of the retail price accounted for by taxes has fallen from 50% in 1964, to 25% today.

The Tax Burden on Tobacco, published by the Tobacco Institute, is a basic resource document for studies of pricing and taxation. It provides a wealth of background data on tax rates in individual states of the United States over time.³ As an industry document, however, it requires a degree of reinterpretation before use. In particular, the document fails to adjust for inflation, which enables it to show a rising burden of taxation. In reality, when adjusted for inflation, the tax burden on tobacco has been falling.

Figures 1 and 2, which are derived from data obtained from *The Tax Burden on Tobacco*, show the extent of the fall in real (inflation adjusted) taxes on cigarettes in the United States between 1955 and 1990. They show that tax policy contributed to making cigarettes more affordable during the 1970s. Further-

Non-Smokers' Rights Association, Ottawa, Canada

D Sweanor

Office of Public Affairs, American Heart Association, Washington, DC

S Ballin

American Cancer Society, Washington, DC

A Davis

Office on Smoking and Health, Centers for Disease Control, Washington, DC

K Deasy
Atlanta, Georgia

S Lucido

Department of Preventive Medicine and Biostatistics, University of Toronto, Toronto, Canada

R G Ferrence

Canadian Cancer Society, Toronto, Canada

R Lahey

Western Medical Center, Santa Ana, California

W J Nethery

Systematics, McGraw Hill, Santa Barbara, California

J Wasserman

Correspondence to: Mr David Sweanor, Non-Smokers' Rights Association, 124 O'Connor, Suite 300, Ottawa, Ontario K1P 5M9, Canada.

Figure 1 Tobacco prices and taxes: United States, 1955-91 (in real dollars)

more, they show that in the 1980s, it is the tobacco companies that have raised the real price of cigarettes, not federal and state governments.

THE PRICE ELASTICITY OF TOBACCO

The link between the price of tobacco and tobacco consumption has been studied by many economists. Existing studies from the United States were summarised in the 1989 Surgeon General's Report. Such studies have examined the potential for using excise taxes as a policy instrument for limiting the quantity of cigarettes consumed, with higher taxes causing lower consumption. The ability of increases in excise tax to reduce cigarette consumption depends on the extent to which such increases are incorporated into the price of cigarettes and the degree to which the demand for cigarettes is sensitive or responsive to price increases. Empirical evidence suggests that increases in excise tax are, in fact, passed on to smokers. The evidence concerning the response of smokers to increased prices, however, in terms of the quantity of cigarettes they demand, is more ambiguous.

One measure of the degree to which smokers are responsive to price changes is the price elasticity of demand, which is defined as the percentage change in quantity demanded divided by the percentage change in price. For example, a price elasticity of -0.2 suggests that a 10% increase in the price of cigarettes will reduce consumption by 2%. Estimates of the price elasticity of demand for cigarettes vary considerably from study to study, ranging from -0.2 to -1.4 . This broad range is attributed to differences in both collection of data and statistical techniques used in constructing smoking demand models.

Many of the studies in this area use aggregate time series data to estimate demand, with the unit of analysis being either the nation or the state. For example, Baltagi and Levin pooled cross sectional and time series data from 46 states between 1963 and 1980 to estimate cigarette demand.⁴ Their result gave a price elasticity of -0.22 . Similarly, Fujii used time series data in his analysis of cigarette demand and found a price elasticity of -0.47 .⁵

Only a handful of studies have used "micro"

Figure 2 Tobacco taxation in the United States: average cigarette tax as percentage of retail price. Source: Tobacco Institute, Tax Burden on Tobacco 1990; 25: 72-108.

data, in which the individual subject serves as the unit of analysis, to estimate cigarette demand. For instance, with data from the 1976 National Health Interview Survey, Lewit and Coate estimated that the adult price elasticity of demand was -0.42 .⁶ In further work, Lewit *et al* analysed data from the Health Examination Survey to show that teenage smoking demand was very different from that of adults.⁷ They studied two measures of smoking behaviour: whether the teenager smoked and, if so, the number of cigarettes smoked each day. The estimated elasticities for both of these measures were large (-1.19 and -1.44 respectively) compared with other studies.

Unfortunately, most studies in the United States are with data from the time when tobacco prices were falling in real terms. The recent tax increases in Canada have allowed studies to be made of the effect of much larger tax increases, which resulted in increases in the real price of cigarettes. In Canada between 1980 and 1989 large tax increases more than doubled cigarette prices in real terms. Ferrence provides preliminary elasticity estimates of roughly -0.6 for adults and -1.4 for 15 to 19 year old teenagers, during this period (Ferrence, personal communication). Her findings, that young people are more responsive to price increases than adults, confirm those of Lewit *et al*.

Several studies have applied a "rational addiction" model to cigarette demand. This modelling approach maintains that, due to the addictive nature of smoking, there are important links in cigarette consumption that should be accounted for in efforts to estimate cigarette demand. For example, Becker *et al* adapted data on cigarette sales from 1955 to the end of 1985 to estimate a cigarette demand model based on a rational addiction framework.⁸ Their results indicated that a 10% permanent increase in the price of cigarettes reduced consumption by 4% in the short term and 7.5% in the long term.

Finally, using monthly time series data between 1980 and 1990 from California, Keeler *et al* found a price elasticity of demand of

around -0.35 at the mean value of their sample.⁹ Also, these researchers found that the price elasticity of demand increased as the price of cigarettes increased. At the time of the highest price in the sample for June, 1990, 18 months after Proposition 99 tax increase, the price elasticity increased from -0.6 to -0.7 . Interestingly, the study by Keeler *et al* found no evidence to support the “rational addiction” model of smoking behaviour.

Work in the United Kingdom has also confirmed similar elasticity estimates to those produced for the United States. In the only study to directly consider regressivity, Townsend found that the lowest income groups in the United Kingdom tended to have the most price elastic response, actually reducing their aggregate expenditures on tobacco products after an appreciable tax rise.¹⁰

In summary, existing research has shown that the price elasticity of demand for cigarettes is greater than zero. Price does effect demand, particularly for the most price sensitive smokers – young persons. Price elasticity is, however, sufficiently low that price increases will generate revenue; for this reason, the tobacco companies have steadily raised the price of cigarettes since the 1980s. Despite this extensive body of work, there is a continued need for up to date estimates of price elasticities, especially as many of the earlier studies are dated. Particularly, it will be critical to analyse the effect of substantial tax increases imposed in California, Canada, and New Zealand.

OVERCOMING RESISTANCE TO INCREASING TAXES
The United States has the lowest taxes on tobacco of any industrialised nation; some have attributed this fact to the general antitax sentiment prevalent in the United States. This is, however, a defeatist and counterproductive argument that inhibits tobacco control advocates from devising novel strategies and approaches to pressing for tax increases. In fact there are numerous examples of antitax jurisdictions that have mandated large increases in tobacco taxes, when the issues have been presented properly.

The Canadian province of Alberta, which is strongly antitax, raised tobacco taxes from six cents to \$1.40 per pack in less than a decade. In one instance, a tax increase of over 50 cents was achieved because health advocates argued that low tobacco taxes had the effect of subsidising companies based in other provinces, which provided no local employment. Large increases in tobacco tax were made in the United Kingdom during Margaret Thatcher's antitax administration. Hong Kong, perhaps the strongest antitax nation in the world, has recently increased tobacco taxes dramatically.

PREVENTING SUBSTITUTE TOBACCO PRODUCTS

Health advocates focus most often on taxation of cigarettes. It is important, however, to ensure that there does not remain a cheap substitute for the products being taxed. In

Canada, The Netherlands, and Norway, many cigarette smokers turned to “roll your own” tobacco when taxes made only manufactured cigarettes more expensive. The tax system should ensure that all tobacco products become less affordable.

RESEARCH PRIORITIES

The potency of tobacco taxes as a means of reducing the use of tobacco, particularly among teenagers, is established in published papers. Why has this tool been used so infrequently? This section of the report outlines six critical research areas. It is designed to ensure that tobacco tax policy becomes an integral part of tobacco control efforts.

Data needs

More and better data are required in various areas to permit enlightened assessment of the impact of tobacco pricing and taxation. Information available from national surveys of smoking has so far not included data on price, which are required to produce more sophisticated analyses of smokers' reactions to price changes. A key input into any analysis of price elasticities is basic data on the price that smokers' pay. At the moment, the best available data are statewide averages. With the growth of discounting, the generic segment of the market, and changing brand preferences within a range of differently priced brands, information on the prices smokers actually pay for their cigarettes would allow better estimates of elasticity to be made.

Little is known about smokers' purchasing behaviour. What proportion of smokers buy one pack at a time? What price differential might induce them to make regular purchases away from their neighbourhood? Is increased cross border shopping a short term reaction to a change in tax differentials or is such a change of behaviour sustained over time? The availability of such data would enable researchers to examine the impact of interstate tax differentials on behaviour of smokers. It would also provide data to refute arguments from the tobacco industry that higher taxes in one state lead to increased tobacco sales in another.

More detailed information on behaviour of smokers would permit studies of the psychology of smokers' reactions to price increases. A key question is whether or not smokers' react differently to a tax induced price increase than to an industry induced increase. Or to price increases through a psychological threshold – for example, a particular number of dollars a pack. Simple economics would suggest that the reaction should be the same, but there could well be a stronger reaction to a tax rise than to the industry's price increases; and a stronger impact if this increase pushed cigarette prices through a given dollar level. Is this so? If so, what does it imply for strategies that would seek to raise cigarette prices, indirectly, for example, by surcharging the industry for the costs they impose on Medicare and Medicaid?

Would these have less effect on tobacco use than an equivalent and publicised increase in excise duty?

The US Tobacco Institute provides more comprehensive data on taxation than is available for any other industrialised country. More and better information is required concerning taxes imposed in other countries. Specifically, comparative data on tax rates and levels, the evolution of these rates with time, and the attitude of governments towards tobacco taxes, is required. This information could then be compared with consumption trends in those countries.

One of the problems with the narrow range of prices for cigarettes in the United States is that it is not possible to examine how the price elasticity of demand would change in response to large increases or increases superimposed on much higher starting prices. At what point does the response become more elastic? Or does demand become more inelastic at a point where all the price sensitive smokers have been driven out of the market? It is tempting to think that it should be possible to construct a demand curve for cigarettes from data from countries with very different price levels. In practice, however, it would be almost impossible to account for all the differences not related to price namely, differences in other measures of tobacco control, social attitudes toward tobacco use, income differences, and other factors. It would be useful, however, to survey the existing publications for studies that consider the issue of the relation between price and consumption around the world.

What are the institutional and political barriers to higher tobacco taxes?

Legislators in the United States, particularly at the federal level, are unwilling to make significant increases in tobacco taxes. It is critical to understand the reason for this reluctance, in order to devise strategies to overcome it. The first question is why are legislators so reluctant to raise or maintain tobacco taxes in real terms?

Also, it is equally clear that many of those involved in tobacco control have been unprepared to advocate for higher taxes and have felt more comfortable with other strategies for tobacco control – education, seeking bans or restrictions on advertising – the impact of which is likely to be significantly less than that of an increased tax. Therefore, a second priority for research in this area is the question of why have health advocates not given higher priority and allocated more resources to seeking higher tobacco taxes?

Any serious attempt to seek higher tobacco taxes will require the building of a coalition around the issue. How can advocates best organise to maximise their impact? The best approach for such a study would seem to be a comparative case study, which would examine the experience of successful campaigns to raise tobacco taxes. The study would try to isolate the salient features that contributed to the campaign's success and compare it with failed

attempts to argue for tax increases. The most obvious example of a successful campaign in the United States is the 1988 campaign by the "Coalition for a Healthy California" that led to the passage of Proposition 99. But it would also be important to look at the factors that have led to tax increases in other states – for example, Texas and Connecticut.

Outside the United States the factors that led Canada to move from levels of taxation similar to the United States, to the highest tax levels in the world should be studied. These successes should be contrasted with the failure to secure significant increases in United States federal taxes throughout the 1980s, and with failures at the state level. This research will provide critical information to health groups and advocates on the ingredients of a successful campaign, the resources required, and the best ways of constructing a coalition and optimising a campaign's timing.

What is the best way to frame an increase in tobacco tax to maximise the chances of acceptance by legislators and voters?

The key to increasing tobacco taxes and making these increases regular and significant, is to frame the issue in the way most likely to be accepted by voters and legislators. Taxes on tobacco and alcohol products are often referred to as "sin taxes". This terminology is unfortunate and should be eliminated. By blaming the victim, it detracts attention from the tobacco industry's role in promoting tobacco use. The evidence from California is that voters can be persuaded of the case for higher tobacco taxes. Similarly, polling in Canada has shown considerable voter acceptance of substantial increases, even if the sole purpose is described to voters as reducing the government deficit.

The United States has no experience with the sort of large tax increases required to bring tax levels up to those seen in Canada, the United Kingdom, Ireland, Scandinavia, New Zealand, and elsewhere. Research on public opinion can help gain acceptance for such increases in several ways. The first is through the study of voter attitudes to determine the best way of making the case for increases taxes. For example, is it better to highlight health costs, or to advocate decreasing the affordability of cigarettes that falling real tax has permitted since the mid-1960s?

Do voters and legislators react more positively if the issue is framed in terms of making a greater contribution to costs of health care or to reducing consumption among children and teenagers? Or do they prefer to see tobacco tax increases as a way of raising revenue that, incidentally, has a positive health impact?

The second arm of this research would be to conduct detailed polling of public opinion in the districts of relevant legislators, to provide information to the legislators on local attitudes to tobacco tax increases.

Lastly, research on public opinion can be used to assess the knowledge base of key decision makers. Do they understand the

relation between the price of cigarettes and the demand for cigarettes? Do they understand the implications for revenue of higher taxes? Do they know what has happened to cigarette prices at the instigation of the tobacco manufacturers over the past decade? Are they aware of the trend in tobacco taxes since the second world war, and how the United States compares with other countries in this regard? Is there a range of questions, misunderstandings, or objections that are commonly expressed by such decision makers?

This information would allow advocates to decide what arguments will be most effective and will allow them to map out the best method of persuading legislators and voters of the case for higher tobacco taxes.

What would be the effect of large increases in tobacco taxes – for example, increases of \$1.00 or \$2.00 a pack?

One of the most often expressed reasons for failing to increase tobacco taxes is concern about the impact of such increases on the poor and on those involved in tobacco production – farmers and those employed in tobacco manufacture. A study of the impact of increases in tobacco tax on these groups is required. This would provide a basis to develop policy options for evaluating the concerns of these groups.

Tobacco taxes are regressive because low income groups smoke more than high income groups. Quarantining tobacco taxes from increases, in the absence of a more comprehensive consideration of overall tax and welfare, however, is a perverse way of helping the poor. The study would enable advocates to determine ways of compensating poor people through changes in income tax or welfare benefits. The study would also be able to determine the magnitude of the impact on the poor, which is likely to be much smaller than often threatened by industry alarmism.

The first priority should be to study the impact of such a rise in tax at the federal level. Because the states can also tax tobacco, however, and because the cost of living differs significantly between states, a disaggregated study would give advocates at the state level powerful information to use in their campaigns.

What is the optimal tax structure to promote health?

There are several options for how taxes can be applied to cigarettes. These include specific taxes (defined cash amounts), proportional taxes (based on a percentage of the selling price), indexed specific duties, and taxing on the basis of weight or toxic constituents. Little is known about which tax structures best serve tobacco control objectives, principally, reducing consumption and prevalence of smoking. Research into this question could cover issues such as:

- Specific compared with proportional structures, the case for index linking the specific duty, and the choice of index

- The possibility of restructuring the tax to take account of other health policy objectives – for example, what would be the effect of graduating the duty according to nicotine or tar content? Which would produce a better health outcome?

- The taxation of other tobacco products. As the duty on cigarettes rises, there could be a financial inducement to move to available cheaper alternatives. The tax structure should prevent this substitution effect. How can the design best achieve this?

Once all alternatives have been explored from the point of view of optimal policy design, it should be possible to factor in the political constraints to see which structure best meets health policy objectives in the light of these constraints.

Another important research area relates to policy design. If the target is to raise tobacco taxes to a certain specified amount over a period of years, is it better to have a few appreciable rises, or is it better to aim for smaller incremental increases. How much does the publicity surrounding big, news making tax rises magnify their impact? Does the effect last? A study from California suggests that without a further increase in taxes, the benefit from the 1989 tax increase will have eroded by the mid-1990s.

What are the advantages and disadvantages of earmarking tobacco tax revenues for specific programmes?

Four Australian States (Victoria, Western Australia, South Australia, and the Australian Capital Territory) and one state in the United States (California), have earmarked or hypothesized significant proportions of state tobacco taxes for tobacco control and other activities of health promotion, including buy outs of tobacco sponsorships. Although evaluations of the impact of these schemes are currently being undertaken, many questions arise that hold importance for other efforts. These include:

- Does earmarking make a tax increase more palatable to voters? Do voters prefer to see part of the tax money collected from smokers “returned” to smokers in some form of service?
- Are legislators more or less willing to raise tobacco taxes when the revenues generated from those taxes is more constrained?
- Funding tobacco control programmes with earmarked monies may create perverse incentives for those employed in such programmes. Are these perverse incentives ever demonstrated?

Conclusion

Tobacco products show a strong relation between affordability and levels of consumption. If tobacco becomes more affordable through lower prices or higher incomes, consumption tends to increase. This is particularly true for young people. Despite this rather obvious relation, the United States, like

many other countries, has paid little attention to the role of pricing in determining amounts of tobacco consumption. In fact, tobacco taxes, as a percentage of retail prices in the United States, have fallen by half since the time of the landmark 1964 Surgeon General's report.

Pricing policy is perhaps the single most effective way to reduce tobacco use. There is, however, a great need to understand why it has been so little used to date, and to analyse on a case study basis the various successful and unsuccessful efforts that have been undertaken in the United States and elsewhere. Much can be learned about the institutional and political barriers to higher tobacco taxes both within governments and within health organisations.

At the same time basic research questions still need answers. In particular, we need to understand the negative impact of increases in tobacco tax on various population groups. We also need to study the various taxation alternatives to determine which ones provide optimal public health benefits.

With this information, we should see tobacco taxation in the United States linked to health goals, much as occurs in Canada, the United Kingdom, New Zealand, and Hong Kong.

With the potential benefits encompassing

millions of human lives and billions of dollars saved, this work could rank as the most cost effective tobacco control intervention possible.

- 1 *Economic report of the President, transmitted to the Congress, p 317.* Washington, DC: US Government Printing Office, 1991. (House document No 102-2.)
- 2 *CPI detailed report January 1992.* Washington, DC: US Department of Labor, Bureau of Labor Statistics, March 1992.
- 3 *The Tax Burden On Tobacco, Vol 26.* Washington, DC: Tobacco Institute, 1991.
- 4 Baltagi BH, Levin D. Estimating dynamic demand for cigarettes using panel data: The effects of bootlegging, taxation and advertising reconsidered. *Review of Economics and Statistics* 1986; **68**: 148-55.
- 5 Fujii ET. The demand for cigarettes. Further empirical evidence and its implications for public policy. *Applied Economics* 1980; **12**: 479-89.
- 6 Lewit EM, Coate D. The potential for using excise taxes to reduce smoking. *Journal of Health Economics* 1982; **1**: 121-45.
- 7 Lewit EM, Coate D, Grossman M. The effects of government regulation on teenage smoking. *Journal of Law and Economics* 1981; **24**: 545-70.
- 8 Becker GS, Grossman M, Murphy KM. *An empirical analysis of cigarette addiction.* Cambridge, MA: (National Bureau of Economic Research Working Paper No 3322.) National Bureau of Economic Research.
- 9 Keeler TE, Hu T, Barnett PG. Taxation, regulation, and addiction: a demand function for cigarettes based on time series evidence. University of California, Berkeley: Department of Economics, July 1991. (Working paper No 91-173.)
- 10 Townsend JL. Cigarette tax, economic welfare and social class patterns of smoking. *Applied Economics* 1987; **19**: 355-65.