Policies for Reducing the Costs of Cigarette Smoking

Harry Clarke and Louise Collis
Department of Economics and Finance
July 2007

Draft

Abstract: Policies for regulating tobacco smoking in Australia are examined. Cigarette management policies need to account for the addictive nature of nicotine, information failures and the existence of externalities and internalities. The external costs of smoking are low relative to internalised private costs. In so far as externalities do arise they can be addressed by taxes and by direct controls on smoking. If internalised health costs are targeted then taxes and restrictions can be usefully assessed in terms of implied health outcomes. Substitutions toward 'chop chop' and compensatory behaviour by smokers restrict the usefulness of taxes while the existence of NRTs and smokeless tobacco products enhance the case for hefty taxes on smoked tobacco. Adverse effects on low income consumers from high taxes can be offset by income transfers from high income consumers. Smoking behaviour among high income consumers can be addressed using non-price deterrence, such as bans. Policy development is complicated by the existence of distinct groups of users who react differently to incentives.

1. Introduction

Most governments intervene to reduce the consumption of tobacco. Australia, along with nearly 150 other countries, has ratified the World Health Organization *Framework Convention on Tobacco Control* (WHO, 2003), binding it to provide warning labels on cigarette packages, restrictions on where tobacco can be consumed, advertising bans and disincentive taxes. With an estimated 19,019 deaths in 1998 attributable to smoking in Australia (Ridolfo and Stevensen, 2001), there is little argument against the need for some intervention, but some disagreement as to the level and form.

In Australia, the national policy setting framework is set out as the National Tobacco Strategy (NTS) (Ministerial Council, 2004). Its central goals are to improve tobacco-related health outcomes and to reduce the social costs of tobacco use. The aim is not only to reduce the externalities associated with smoking, such as public health costs and passive smoking exposure, but also the internalities – the costs that smokers may not take into account when deciding to consume tobacco. The latter include increased private health costs, reduced paid and unpaid work potential, disability, and early death. In fact the NTS seeks a reduction in gross health costs, *regardless of* who bears the burden of these costs. The rationale given for the focus on gross health costs rather than external costs alone is that smokers can be irrational and suffer from internalities.

This paper also pursues this objective as well as focusing on external cost. This recognises the fact that reducing smoking *is* a key social objective, so that an economic question arises as to how to meet this objective effectively and at low cost.

One issue when developing policy is that different groups may react differently. In 2004, there were about 2.8 million Australians who smoke at least once a day and half a million who smoke less than daily (AIHW, 2005). Those who smoke less than five cigarettes a day, known as 'chippers', are unlikely to be addicted to nicotine (Shiffman et al, 1995). Studies suggest that, of all smokers, about 7 per cent are chippers, and a further 16 per cent are casual smokers (Zhu et al, 2003), equating to about 650,000 smokers who may be more responsive to smoking disincentives. Over half of the Australian population aged 14 and over have never smoked, while just over a quarter have successfully quit. This group may be considered to be potential users.

In most developed countries the incidence of smoking has fallen dramatically since the 1950s when the connections between smoking tobacco and lung cancer were publicly articulated. In Australia smoking of tobacco products peaked in the 1950s when about 70 per cent of males and 30 per cent of females smoked. Among adult males smoking prevalence dropped from 45 per cent in 1974 to around 18.6 per cent in 2004. Among females it fell from 30 per cent to 16.3 per cent (AIHW, 2006). Before these gains can be celebrated, it should be remembered that globally tobacco use is estimated to kill about 5 million people annually, increasing to 10 million by 2030 (Jha et al, 2006).

Smoking has significant effects on length of life. Doll et al (2004), for example, examine the smoking behaviour of 34,439 male British doctors over a 50-year period and find that long-term smokers died 10 years younger than non-smokers. For men born around 1920, Doll et al found that prolonged smoking from early adult life tripled mortality to 43 per cent among smokers compared to 15 per cent among non-smokers between ages 35-69. Moreover, cessation at age 50 halved the mortality hazard and cessation at age 30 avoided most of it, confirming the huge potential public health gains from quitting.

Smoking is a major risk factor contributing to disease. Mathers et al (2000) evaluate such factors as obesity, unsafe sex, alcohol consumption and smoking for the effect they have on disease and injury as measured in disability-adjusted life years. Tobacco is responsible for nearly 10 per cent of the burden and more than any other identified, avoidable factor.

Part of these health costs is born privately: in Australia in 1998-99 treatment costs borne by individuals were $145 million. Net health care costs borne by government (costs that net out the saving that arise because smokers die early) were $880 million in 1998-99 or about $1054 million in 2004-05 dollars (Collins and Lapsley, 2002). Public health sector costs are therefore much smaller than the tax benefits accruing to the community from cigarette taxes which in 2005-06 amounted to $5.3 billion (Commonwealth of Australia, 2007). This does not, however, imply that taxes are inefficiently high for two reasons. First, efficient externality taxes equate the cost of a good with the social marginal costs. If these social marginal costs are strongly increasing – so damages associated with smoking increase more than proportionately with consumption – then tax revenues collected will exceed external costs. Second, for public financial reasons, taxes on goods such as cigarettes, with relatively inelastic demands, will be large because this helps to limit the ‘excess burden’ of the total tax take.

The NTS claim that one of the major market failures associated with smoking is that smoking is not a free and informed lifestyle choice. First, the health risks of smoking are under-appreciated by smokers as is the reality of nicotine addiction. Moreover, smokers under appreciate the connections between smoking and the incidence of specific diseases. Second, most people start smoking and become dependent on nicotine while young and presumably immature. Further, decisions relating to addictive goods are not easily reversible.

The remainder of this paper is structured as follows. Section 2 considers the addictive nature of nicotine. The question of whether smokers make fully informed choices is further explored in section 3. Sections 4, 5, 6 and 7 look at specific policies, some of which are adopted in Australia. Section 8 concludes.

2. Issues affecting policy development

The addictive nature of cigarettes calls for a distinctive public policy approach compared to non-addictive goods which may nevertheless have the potential for poor information, or yield negative externalities, such as polluting fuels. The nicotine delivered by cigarettes is addictive. This distorts thinking processes and leads to uninformed decisions that may persist. Most people start smoking and become dependent on nicotine while they are young. The addictive agent is much less harmful to health than other components of smoking, such as carcinogenic, tobacco-specific nitrosamines. However when cigarettes are smoked these are inevitably consumed jointly with the nicotine and so cause health damages.

Addicted smokers smoke to satisfy a craving for nicotine. Typically, that craving is met by raising the level of nicotine in the blood to a certain level. This is achieved by consuming enough tobacco products to yield this desired level. This means that 'cutting back' on cigarette consumption will typically not be an option for a smoker who wishes to continue to smoke. Thus, the response of most smokers to low-tar cigarettes is to smoke more cigarettes, smoke more of each cigarette, to inhale more deeply or generally to change smoking behaviour to maintain the nicotine levels in the blood. For example, breathing holes in 'light' cigarette filters, which mix air with smoke before inhalation, are countered by covering holes with fingers or lips to increase nicotine intake. Any measure to reduce the intake of tar, which simultaneously reduces nicotine intake, is therefore likely to fail. An addicted cigarette consumer *compensates* for any move to reduce nicotine consumption by changing their smoking behaviour.

For those smokers who find the addiction insurmountable, alternate methods of delivering nicotine to the brain exist. Pharmaceutical nicotine in the form of patches, gum or inhalers, delivers nicotine without the carcinogens and toxins present in tobacco. These can be used to replace cigarettes completely in the case of those who quit, but they can also be used by

smokers to reduce the amount smoked. Four studies reported in ASH (2007) of smokers who were interested in cutting down the amount smoked but were not yet ready to quit, found that one in twelve had quit within a year. These studies also showed that in double-blind placebo trials, smokers given NRT were more than twice as likely to sustain a reduced tobacco intake.

The nicotine delivered may nevertheless have some adverse consequences. While having far fewer negative health consequences than smoking, nicotine may be a trigger for cardiac events, may affect a foetus, may be passed through breast-milk, and may reinforce a nicotine addiction in adolescents. Nicotine increases pulse-rate and blood pressure, and slows the release of insulin. The health effects could perhaps be compared to caffeine. Nicotine is not, however, associated with carcinogens, and may be beneficial in some cases, for example in the treatment of Parkinson's disease and Alzheimer's disease (Birtwistle and Hall, 1996).

Smokeless tobacco products such as chewing tobacco and oral snuff have been banned in Australia since June 1991, on the basis that they are ‘known to cause cancer of the mouth’. Nasal snuff, that is now consumed in negligible quantities, is not covered by this same legislation, but is controlled federally in a similar fashion to smoked products, and is banned in five states and the ACT.

A 1988 review by the Trade Practices Commission (TPC) found an association between oral snuff and cancer, but did not support a ban on chewing tobacco or nasal snuff. Despite this, the ban introduced covered chewing tobacco and oral snuff on the basis that they may be unsafe (Quit Victoria, 1995). It was acknowledged that this treatment was different from smoking tobacco and alcohol which were known to be unsafe, but this was not seen to be relevant to the decision. In addition to the health consequences of nicotine, chewing tobacco is associated with mouth cancer, due to the presence of nitrosamines in the prepared tobacco. While smokeless tobacco is not harmless, there is much evidence that it is less harmful than smoked tobacco of the order of 1/1000 to 1/10 of the risk (RCPL, 2002). Phillips et al (2005) show that despite evidence that smokeless tobacco is safer than smoked tobacco, information easily available continues to promote the message that smokeless tobacco is no safer.

A distinction that may be important is between harm minimisation and harm reduction. Undoubtedly, quitting tobacco products altogether minimises harm, but where this is not an option, at least in the short term, chewing tobacco may be a reduced harm option.

It could be theorised that promotion of a good that reduces the cost of smoking may increase the demand for cigarettes. By reducing the cost of quitting, NRTs could induce a moral hazard whereby the probability of potential smokers to consume smoked tobacco is increased. Saffer et al (2007) test this thesis on youth smoking, and find that NRT advertising has no affect on whether a person smokes, but may increase the amount smoked for those who do. They find that a 10 percent increase in NRT advertising is associated with an increase in average cigarettes smoked per day from 5.77 to 5.82. Further, a ban on NRT advertising would have the same effect on amount smoked as a 10 percent increase in prices. This suggests a caution to any aggressive promotion of substitutes.

Most smokers commence smoking when they are young. The NTS (p. 3) suggest that more than 90 per cent of those who currently smoke in Australia begin as teenagers. This is significant because, first, many of those using will become addicted to nicotine and will continue smoking throughout their adult life. Second, there is strong evidence nicotine has particular neurotoxicity costs for young people defined as those aged less than 25 years (Jacobson et al, 2005) even though it is much less toxic for those who are older.

Finally, and more significantly, there is strong evidence of enhanced impulsiveness, and hence of higher rates of time preference at very young ages (Mischel et al, 1992) and initiation of smoking during adolescence is related to impulsiveness (Baumeister et al., 1994, p. 198-199). This suggests use at younger ages is less guided by rational foresight than other factors and strains the case for 'informed choice' arguments. The main policy implication of the idea that rates of time preference rates fall during adolescence is to focus the direction rather than level of anti-smoking effort. Strict bans on selling cigarettes to the young, age limits on the right to smoke and advertising campaigns directed at discouraging initiation of smoking are sensible options.

3. Information and internalities

The claim by the NTS that health risks are underappreciated has been challenged by Viscusi (2002) and others, who argue that the risks of smoking are widely appreciated by most people partly because of publicly-funded, anti-smoking campaigns and press coverage of smoking risks. Indeed, this was the basis for the failure of individual plaintiff lawsuits in the United

States up until 1990 – jurors consistently concluded that the risks of smoking were well known and voluntarily incurred. Thus non-smokers are not privy to 'secret information' regarding the hazards of smoking. Viscusi (2002, Chapter 7) argues that US citizens fully understand the risks of smoking with respect to lung cancer, total smoking mortality and life expectancy loss. With respect to lung cancer risks, which Viscusi estimates to be 0.06-0.13, he found that, in 1998, the overall population forecast this risk at 0.48 while smokers predicted 0.42. Thus smokers overstated the risks of contracting lung cancer by a factor of between 3.2-7 times. Viscusi found this was so both for highly educated and un-educated people. Moreover, people overestimated the effects of smoking in reducing life span confirming that they overstate smoking hazards. Viscusi also provides evidence suggesting that people fully understand the addictive implications of smoking. Most people know that it is difficult to quit smoking once it is initiated.

However people do not identify all of the specific risks of smoking. For example women seem to be unaware that they are particularly susceptible to the health costs generated by smoking. Zang et al (1997) shows that, accounting for differences in body weight, women have higher lung cancer risks. In addition, smoking reduces female fertility. Van Voorhis et al, 1996) shows substantial dose-related ovarian disfunction occurs with smoking. Women are also particularly susceptible to becoming addicted to nicotine. DiFranza et al, (2002) shows that smoking periods prior to initial addiction of 12-13 year olds were 21 days for girls and 183 days for boys. It is also true that passive smoking has severe health costs for children: thus ABS (2006) argue that breathing in of tobacco smoke by non-smokers can lead to harmful health effects in unborn children, and middle ear infections, bronchitis, pneumonia, asthma and other chest conditions in children. It is also linked to sudden infant death syndrome (SIDS). In adults, passive smoking increases the risks of heart disease, lung cancer and other chronic lung diseases.

To some extent these hazards will be emphasised by fostering perceptions that smoking is a generally hazardous activity even if specific health problems are not spelt out. But to the extent that these specific problems are individually significant and under-appreciated the implication is that smoking warnings should target not only general risks of smoking, which are already internalised, but instead be specifically targeted to those particular smoking-related health issues that *are* underappreciated.

In addition there are specific groups in the community who do not appreciate the risks of smoking partly because they are isolated from the impact of sustained health warning messages. A particular group of concern are Australian aboriginals who have high rates of smoking and widespread under-appreciation of attendant health risks. About 51 per cent of adult indigenous Australians smoke compared to 17 per cent in the non-indigenous population (ABS, 2006). Higher rates of smoking are associated with lower socio-economic status, unemployment and early school leaving which are characteristics of many indigenous populations. Dispossession and dislocation contribute to the low self-esteem which is also associated with smoking. Members of the 'stolen generations' are also more likely to smoke than other indigenous Australians. A 1994 survey showed that one third of indigenous Australians erroneously thought it was safe to smoke up to one pack of cigarettes a day (ABS, 1996). Smoking warnings should be adapted to target aboriginals.

Even if individuals *on average* internalise health risks, there can be a case for specific policies that target specific health problems linked to smoking and to target particular groups who are not receiving the required message.

In addition, there *are* important aspects of smoking about which individuals seem poorly informed. Cummings et al (2004) argue that smokers may be well-informed about the size of health risks but still not have good information on *reducing* these risks. Knowledgeable smokers might be prepared to experience a certain level of health risk but still seek ways of reducing that risk. For example, 58 per cent of smokers believe that smoking is made less hazardous by switching to low tar or filtered cigarettes despite decades of research showing the converse (Hastrup et al, 2001).

More generally Cummings et al surveyed 49,593 households of occupants aged 18+ to determine generally what is known about reducing smoking risks. They found:

- 94 per cent of respondents believed they were well-informed of the health consequences of smoking even though their understanding was poor.
- 39 per cent misunderstood or didn't know the health consequences of smoking, more than half had misleading information on the content of cigarette smoke, the safety of nicotine and the role of additives.

- 65 per cent had incorrect information on the safety of low tar and filtered cigarettes believing they lowered health risks when they do not.
- 56 per cent had incorrect information on the safety implications of nicotine medications believing they were more harmful than they are.
- Most smokers misunderstood the addiction properties of nicotine medication which is less likely to cause addiction and heart attacks than smoking cigarettes. This misunderstanding limits the potential for consumers to reduce their health risks by switching from harmful cigarettes to safer NRT and smokeless tobacco products.

Cummings et al also provide evidence for *optimism biases.* While smokers estimate community risks adequately they underestimate the risks posed to their own health from smoking. This misperception is partly due to their mistaken belief that they will be able to stop smoking before health problems eventuate.

It is therefore incorrect to claim that smokers have accurate information about reducing the risks of smoking creating a case for public intervention to refine perceptions. A major misperception is the widespread belief that low tar and filtered cigarettes reduce the risks from cigarette smoking but that medically supplied nicotine and smokeless tobacco such as snuff do not. Each of these views is fallacious. Nor is it true that heavy smokers who cut back their smoking, even by 50 per cent, reduce their health costs. Godtfredsen et al (2002) show that over a 16 year period, heavy smokers who reduce their smoking by 50 per cent do not reduce their mortality risk while those who quit to reduce their risk.

Compensatory smoking behaviour explains why there is no reduction in risk associated with reduced smoking. The policy implication is that quitting cigarette smoking completely should be the major policy objective.

4. Policies to counter externalities

The World Bank regards tobacco taxes as the single most important step governments can take to reduce smoking among both young people and adults. The adult demand elasticity is -0.4 and for children -1.6. Australian evidence supporting this general conclusion is in Bardsley and Olekalns (1999). They estimate short-run price elasticities of -0.2 to -1.5, and

suggest that the impact of price is greater than that of anti-smoking messages. Policies that discourage use by increasing the price of tobacco products are therefore fundamental to reducing smoking and thereby to reducing the costs of smoking. These policies are most effective as a tool in discouraging young smokers, chippers and those on low incomes since it is such people who will have most elastic demands.

Surveys which measure preferences for anti-smoking policies show that even smokers themselves support increases in taxes (Gruber and Mullainathan, 2002). This suggests that price increases driven by tax increases have low welfare costs. In 2004, over 65 per cent of Australian ex-smokers supported policies to increase taxes on cigarettes as a measure to discourage use (AIHW, 2005). Moreover, Nakajima (2007) found that peer effects, whereby the smoking choices of friends influences a potential smoker's choices, strengthens the effect of taxes. If these externalities are taken into account, the effect of taxes may be 50 per cent greater than that measured directly.

However, tax based policies have some adverse equity implications which the NTS recognise. Not only are the poorest quintile most likely to smoke, they also smoke more cigarettes per smoker (AIHW, 2005) and cigarette consumption is a large part of their disposable income. The 2003-04 Household Expenditure Survey found that the while the highest income quintile spend 0.8 per cent of total income on tobacco, the lowest income quintile spends 1.8 per cent. To some extent however these regressive effects are offset by the fact that price elasticities will be higher among those with low incomes. In particular, one response to higher prices among the poor will be increased quit rates and lower levels of consumption. Thus the financial burden of the tax will tend to be borne mainly by those on higher incomes.

Currently taxes are applied on a per stick basis. An efficient tax would be set at the amount of externality imposed, implying that cigarettes with higher levels of harm should be taxed at a higher level. This would also provide incentives for producers to reduce known harmful agents.

Complications of further tax increases include greater use of illegally supplied tobacco ('chop chop'). The existence of illicit supplies is a serious constraint: the 2004 National Drug Strategy Household Survey reports that 38 per cent of Australians smokers aged 14 and older are aware of unbranded loose tobacco, and of those, nearly 23 per cent have smoked it. The

recent acceptance of offers to domestic growers to exit the market will make policing of illicit supplies easier and hence should reduce the supply of unbranded illegal tobacco. In the future tobacco may only be grown in Australia if binding contracts to export it exist.

Smoking bans are a further way of countering externalities by reducing the opportunity for passive smoking externalities to be incurred. Many countries impose restrictions on who can sell and buy tobacco, and where it can be consumed. Smoke-free legislation was introduced in the Republic of Ireland from 24 March 2004, and by 2007 the remainder of the United Kingdom, along with most states and territories of Australia and the United States of America, and provinces of Canada have laws against smoking in workplaces and other public places. In Australia, smoking restrictions in public places such as pubs are regulated by states and territories, with Queensland having the strictest laws, and Northern Territory as the only state/territory with no restrictions in force or due to come in force.

It has been argued that bans on smoking in public places may increase exposure to environmental smoke by forcing smokers to consume at home (Adda and Cornaglia, 2006). However, in Ireland, where smoking has been banned in all workplaces including pubs, surveys show that the introduction of the ban was accompanied by an increase in the number of smoke-free households. Borland et al (2006) similarly found a strong correlation between jurisdictions with smoking bans and lower tolerance for smoking in the home.

The NTS, in its discussion of bans, states that the policy intent is to reduce exposure to passive smoking. While important, this ignores additional positive benefits of bans to smokers. A US survey found that workplace smoking restrictions reduced the amount smoked by a given smoker by ten per cent, and reduced the probability of a worker being a smoker (after controlling for the likelihood that a smoker would choose to join a workplace with a ban) by five percentage points (Evans et al, 1999). More recently, a study of smokers in Greece, where smoking rates rose over the 1990s in contrast to most developed countries, shows that smokers are much more responsive to workplace bans than to price increases (Raptou et al, 2005).

5. Policies to counter information failure

To the extent that there exists an information failure as described in section 3, provision of accurate information about risks and ways of reducing risks is an effective tool. Advertising bans and restrictions on smoking scenes in movies are also useful in reducing positive images of smoking. Labels which misleadingly suggest that cigarettes are safer, such as 'mild' and 'low tar' are banned.

Smokers should be provided not only with information about the dangers of smoking, but also with accurate advice on how to reduce risk. Cutting down the number of cigarettes smoked or switching to low tar cigarettes can do more harm as smoke is taken deeper into the lungs in an effort to satisfy the nicotine requirement of the addiction.

In Australia, cigarette packs must contain text and graphic health warnings. They may not contain any descriptors such as 'light' or 'mild'. An equivalent to the comprehensive list of ingredients or nutritional information which is required on food products is not only not required, but is not allowed. One difficulty with providing such information is that the amount of toxins consumed depends heavily on the smoking method. A smoker may change the way they smoke, meaning that a cigarette that contains less of a toxin may deliver more to the smoker if other aspects of the cigarette cause it to be smoked differently. Low values of toxins may suggest a cigarette is less harmful even though the compensatory smoking method may make it more harmful. The drawback of not providing any information is that tobacco manufacturers have no incentive to remove or avoid use of toxins.

Federal and state governments support anti-smoking and quit information campaigns, both directly, and through support of organisations such as QuitSA and Quit Victoria. Information is provided through mass media advertising, schools, and printed material. Fully subsidised advice and help can be sought online or by phone. The thrust of advertising is general, but campaigns are also directed at pregnant women, women in general and youth.

6. Policies to promote substitutes

NRTs, and smokeless tobacco are, as discussed in Section 2, lower risk substitutes to cigarettes although they are not completely riskless. NRTs are available over-the-counter but they are not subsidised. It has been shown that NRTs are a cost-effective way to reduce smoking (Wasley et al, 1997); if social costs are associated with smoking cigarettes, an

argument can be made for a subsidy. However, in Australia, smokeless tobacco is not only not promoted, but actively discouraged with bans and production and import restrictions. The NTS, in its discussion of smokeless tobacco, concedes that it may be less harmful than smoked tobacco, but is concerned that it may hinder quitting, and form a 'gateway to tobacco smoking.'

McNeill et al (2001) argue for a complete liberalisation of the market for NRT on the grounds that the alternative to NRT use is even more destructive tobacco consumption. Criticising the risks of consuming NRT alone is not sensible and reflects risk-aversion from the viewpoint that NRT should be subject to pharmaceutical regulation. One suggested approach is to provide NRT to overcome nicotine withdrawal symptoms and to overcome the behavioural side of nicotine dependence and then to break the dependence by stopping use of NRT. According to McNeil et al, minors, pregnant smokers and even smokers with cardiovascular disease should all be allowed to use NRT if the alternative is to continue cigarette smoking. Moreover, NRT at moderately high doses should be made available for long-term use and should generally be made as widely available as cigarettes. Reducing regulatory hurdles that limit marketing of NRT products would provide incentives for firms to produce and develop such products.

While smokeless tobacco and NRT are a more healthy way for a nicotine addict to access their nicotine, a difficulty in promoting such products is that they may reduce disincentives to smoke. Thus if the constraints on initiating a smoking habit are the anticipated long-term health costs that stem from an anticipated addiction to nicotine that is costly to reverse, any substance, such as NRT, which reduces the cost of quitting, might increase the incentive to initiate use, as investigated by Saffer et al (2007) for youth.

Finally, the drug bupropion, marketed in Australia as Zyban, is not a substitute for nicotine, but aids in smoking cessation. It is available on prescription and is subsidised under the Pharmaceutical Benefits Scheme, receiving a government subsidy of over 80 per cent.

7. Other policies to reduce harm

Cigarettes contain a number of known carcinogens which occur naturally during the curing process, and which could be removed. Also, regulating the use of chemicals, pesticides and

fertilizers in the production of cigarettes could reduce known toxins. These moves would not make cigarettes safe, but safer. As with the promotion of NRTs, any move to reduce the private costs of smoking may increase use, and this must be taken into account when estimating the benefits of the reform.

Cigarettes are known to cause a number of fires every year. Collins and Lapsley (2002) estimates that cigarette-induced fires cause $52.1 million of tangible costs and a further $28.5 million of costs due loss of life. Reduced-ignition propensity (RIP) cigarettes which do not continue to burn when not drawn have been developed, and there are calls to ban in Australia cigarettes which do not incorporate these features (Chapman and Balmain, 2004).

Sale of cigarettes is restricted to licensed outlets in some states, while in Victoria and New South Wales, for example, so licence is needed. There are limits on the size of advertising, the number of packs that can be displayed and a ban on sale or discounting advertising at place of sale, although these may vary from state to state. Sale to minors (age under 18) is prohibited. Cigarettes cannot be sold singly: the minimum pack size is 20 cigarettes. This discourages non-smokers from experimenting with cigarettes, and in particular makes it more difficult for children to buy cigarettes as they typically have less disposable income.

There have been calls for sale of tobacco to be limited to pharmacies. The NTS points out that cigarettes have a higher retail profile than milk or bread, being available in more outlets. Allowing tobacco to be sold together with everyday items gives the impression that it is a similar product, unlike codeine, for example, which may only be sold by a pharmacist.

Research is being conducted into vaccines which prevent nicotine from reaching the brain. Once the nicotine reward mechanism is broken, the addictiveness of cigarettes is removed. Researchers point out that these vaccines, if effective, may help recent quitters from relapsing, but are not designed as a long-term preventative (Hall, 2005).

For addicted smokers, the aim may be to deliver the necessary nicotine with the least amount of tar, carcinogens and carbon monoxide. In theory this could be achieved with artificially heightened nicotine levels in a low tar cigarette – a mandated minimum level of nicotine. An important drawback is that the cigarettes would be available to potential smokers or non-addicted smokers. Given that an addiction is formed when a stock of nicotine is consumed

within a certain time, high nicotine cigarettes would make it easier and quicker for a non-addict to become addicted. This would suggest a recommendation for a maximum level of nicotine.

Penalties are not discussed in the NTS, possibly because most penalties are set by states, although this is also true of bans. Penalties reinforce regulation, and in the absence of appropriate penalties, regulation is not binding. The penalty for manufacturing, selling or supplying chewing tobacco or snuff is 100 penalty units ($10,743) in Victoria (*Tobacco Act 1987* s.15), and 140 penalty units ($10,500) in Queensland (*Tobacco and Other Smoking Products Act 1998* s.26ZR). This suggests that legislators believe that the harm from chewing tobacco is high. In the state of Victoria, the penalty for selling to a minor is from 2 penalty units (~$200), up to a maximum of 50 (~$5,000). Penalties in Queensland are much higher: $10,500 fine for a 1st offence, and up to $31,500 for a 3rd or subsequent offence, plus revocation of seller licence for up to three years (*Tobacco and Other Smoking Products Act 1998* s.10), but this was increased from a fine of $75 in 2005.

A 2002 survey of under-age smokers in NSW found that 22 per cent bought their last cigarette from a retail outlet (NSW DoH, 2004). Similarly, a 2005 survey of Victorian youth found that 23 per cent purchased their last cigarette, and even in the 12-15 age group, 17 per cent of recent smokers indicated that they had purchased cigarettes from retail outlets (Cancer Council Victoria, 2006). This suggests that expected penalties are not providing adequate incentives for licensed retailers to diligently check the age of purchasers.

8. Conclusions

Developing policy in such a complex environment involves trade-offs. While policies have been very effective in reducing the overall numbers of people smoking, there are still huge potential costs and large numbers of new smokers. And while policies are effective for those who are able to quit, for those who find it difficult, the range of alternatives is limited by bans on many nicotine products.

Policy makers are wary of any apparent quick-fixes, and with reason. The low tar campaign which purported to offer a safer cigarette and which was supported by policy makers was shown in many cases to do more harm than traditional cigarettes. Proponents of high nicotine

cigarettes (which give the nicotine hit with less of the carcinogenic tar) often ignore the fact that potential smokers are more likely to become addicted if nicotine is more accessible.

Taxes are a simple way to discourage use, but they are regressive, as lower socio-economic groups smoke in greater numbers. Taxes collected more than make up for externalities imposed, but information failures and the addictive nature of nicotine mean that the cost of internalities may be very large.

While the greater aim is to reduce total costs due to smoking, to the extent that private costs are reduced through safer cigarettes or easier quitting, use may increase. Whether this results in a reduction in harm is a matter of measurement.

Bibliography

Action on Smoking and Health Australia (2007), *Guidelines for Healthcare Professionals on using Nicotine Replacement Therapy for smokers not yet ready to stop smoking*, At: www.ashaust.org.au/pdfs/NRTguide0702.pdf Last accessed 14.05.07.

Adda, J. and F. Cornaglia (2006), 'The Effect of Bans and Taxes on Passive Smoking', IZA Discussion Paper No. 2191.

Australian Bureau of Statistics (1996), *National Aboriginal and Torres Strait Islander Survey 1994: Health of Indigenous Australians*, ABS Canberra.

Australian Bureau of Statistics (2006), *Tobacco Smoking in Australia – A Snapshot 2004-05*, 4831.0.55.001, ABS Canberra.

Australian Institute of Health and Welfare (2005), *2004 National Drug Strategy Household Survey - detailed findings*, AIHW Canberra.

Australian Institute of Health and Welfare (2006), *Australia's Health 2006*, AIHW Canberra.

Bardsley, P. and N. Olekalns (1999), 'Cigarette and tobacco consumption: Have antismoking policies made a difference?', *Economic Record* 75:225–240.

Baumeister, R.F., T.F. Heatherton and D.M. Tice (1994), *Losing Control: How and Why People Fail at Self Regulation*, Academic Press, San Diego.

Birtwistle J, and K. Hall (1996), 'Does nicotine have beneficial effects in the treatment of certain diseases?', *British Journal of Nursing* Oct 24-Nov 13, 5(19):1195–202.

Borland, R., H. Yong, K.M. Cummings, S. Hyland, A. Anderson, and G.T. Fong (2006), 'Determinants and consequences of smoke-free homes: findings from the International Tobacco Control (ITC) Four Country Survey' *Tobacco Control* 15(suppl_3):iii42–iii50.

Cancer Council Victoria (2006), *Smoking among Australian secondary school students 2005*, Monograph Series No. 59.

Chapman S, and A. Balmain (2004), *Reduced-Ignition Propensity Cigarettes: a Review of Policy Relevant Information*. Commonwealth Department of Health and Ageing, Canberra.

Collins, D.J. and H.M. Lapsley (2002), 'Counting the cost: Estimates of the social costs of drug abuse in Australia in 1998–99', Canberra: Commonwealth Department of Health and Ageing, *National Drug Strategy Monograph* Series No. 49.

Commonwealth of Australia (2007), *Budget Strategy and Outlook 2007-08* Canberra.

Cummings K.M., A. Hyland, G.A. Giovino, J.L. Hastrup, J.E. Bauer JE and M.A. Bansal (2004), 'Are smokers adequately informed about the health risks of smoking and medicinal nicotine?', *Nicotine and Tobacco Research* 6 (Supplement 3):s33-s340.

DiFranza, J.R., J.A. Savageau, N.A. Rigotti, K. Fletcher, J.K. Ockene, A.D. McNeill, M. Coleman and C. Wood (2002), 'Development of symptoms of tobacco dependence in youths: 30 month follow up data from the DANDY study', *Tobacco Control* 11:228–235.

Doll, R., R. Peto, J. Boreham, and I. Sutherland (2004), 'Mortality in relation to smoking: 50 years' observations on male British doctors', *British Medical Journal* 328(7455):1519.

Evans, W.N., M.C. Farrelly, and E. Montgomery (1999), 'Do Workplace Smoking Bans Reduce Smoking?', *American Economic Review* 89(4):728–747.

Godtfredsen N.S., C. Holst, E. Prescott, J. Vestbo and M. Osler (2002), 'Smoking reduction, smoking cessation, and mortality: A 16-year follow-up of 19,732 men and women from The Copenhagen Centre for Prospective Population Studies', *American Journal of Epidemiology* 156(11):994–1001.

Gruber, J. and S. Mullainathan (2002), 'Do Cigarette Taxes Make Smokers Happier?', National Bureau of Economic Research Working Paper No. 8872.

Hall, W.D. (2005), 'Will nicotine genetics and a nicotine vaccine prevent cigarette smoking and smoking-related diseases?', *Public Library of Science: Medicine* 2(9).

Hastrup J.L., K.M. Cummings, T. Swedrock, A. Hyland and J.L. Pauly (2001), 'Consumers' knowledge and beliefs about the safety of cigarette filters', *Tobacco Control* 10(84):416-417.

Jacobson, J., J. Krystal, W. Mencl, M. Westerveld, S. Frost and K. Pugh (2005), 'Smoking Causes Memory and Cognitive Impairment in Adolescents', *Biological Psychiatry* 57(1):56-66.

Jha P., F.J. Chaloupa, M. Corrao and B. Jacob (2006), 'Reducing the Burden of Smoking World-Wide: Effectiveness of Interventions and their Coverage', *Drug and Alcohol Review* 25:597-609.

McNeill A., J. Foulds and C. Bates (2001), 'Regulation of nicotine replacement therapies (NRT): A critique of current practice', *Addiction* 96:1757–1768.

Mathers C.D., E.T. Vos, C.E. Stevenson and S.J. Begg (2000), 'The Australian Burden of Disease Study: measuring the loss of health from diseases, injuries and risk factors', *Medical Journal of Australia* 172:592 –596.

Ministerial Council on Drug Strategy (2004), *National Tobacco Strategy, 2004-2009: The Strategy*, Commonwealth of Australia.

Mischel, W., Y. Shoda, and M.L. Rodriguez (1992), 'Delay of Gratification in Children' in G. Loewenstein and J. Elster (eds), *Choice Over Time*, Russell Sage Foundation, New York, 147-166.

Nakajima, R. (2007), 'Measuring Peer Effects on Youth Smoking Behaviour.' *Review of Economic Studies* 74:897–935.

NSW Department of Health, Centre for Epidemiology and Research (2004), 'The health behaviours of secondary school students in New South Wales in 2002', *NSW Public Health Bulletin* 15, s-2.

Phillips C.V., C. Wang and B. Guenzel (2005), 'You Might as Well Smoke: The Misleading and Harmful Public Message About Smokeless Tobacco', *BMC Public Health* April 2005, 7 pages.

Quit Victoria (1995), 'Tobacco in Australia: Facts and Issues' available at: http://www.quit.org.au/quit/FandI/welcome.htm

Raptou, E., K. Mattas, E. Tsakiridou and C. Katrakilidis (2005), 'Factors Affecting Cigarette Demand', *International Advances in Economic Research* 11(3):275.

Ridolfo B. and C. Stevenson (2001), *The quantification of drug-caused mortality and morbidity in Australia*, 1998. AIHW Cat. no. PHE 29. Canberra: AIHW (Drug Statistics Series no. 7).

Royal College of Physicians of London (2002), *Protecting Smokers, Saving Lives: The Case for a Tobacco and Nicotine Regulatory Agency*, Salisbury, London.

Saffer, H., T. Wakefield and Y. McElrath (2007), 'The Effect of Nicotine Replacement Therapy Advertising on Youth Smoking', National Bureau of Economic Research Working Paper No 12964.

Shiffman S, J.A. Paty, M. Gnys, J.D. Kassel and C. Elash (1995), 'Nicotine withdrawal in chippers and regular smokers: subjective and cognitive effects', *Health Psychology* 14(4):301–9.

Van Voorhis B.J., J.D. Dawson, D.W. Stovall, A.E. Sparks and C.H. Syrop (1996), 'The effects of smoking on ovarian function and fertility during assisted reproduction cycles', *Obstetrics and Gynaecology* 88:785–791.

Viscusi, W. Kip (2002), *Smoke-Filled Rooms: A Postmortem on the Tobacco Deal*. Chicago, University of Chicago Press.

Wasley M.A., S.E. McNagney, V.L. Phillips and J.S. Ahluwalia (1997), 'The cost-effectiveness of the nicotine transdermal patch for smoking cessation', *Preventive Medicine* 26(2):271–3.

World Health Organisation, (2003), *WHO Framework Convention on Tobacco Control*, World Health Organisation, Geneva.

Zang E.A. and E.L. Wynder (1997), 'Differences in lung cancer risk between men and women: examination of the evidence', *Journal of the National Cancer Institute* 88(3-4):183-92.

Zhu, S., J. Sun, S. Hawkins, J. Pierce and S. Cummins (2003), 'A Population Study of Low-Rate Smokers: Quitting History and Instability Over Time', *Health Psychology* 22(3):245–252.