Working for a tobacco-free Scotland

November 2010

Up in smoke

The economic cost of tobacco in Scotland

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ASH Scotland sincerely thanks the following individuals who offered feedback on drafts of this report and commented on its contents. The views expressed in this report are the views of ASH Scotland and do not necessarily represent the views of other individuals or organisations.

Steve Parrott, Senior Research Fellow, Department of Health Sciences, University of York
Howard Reed, Director, Landman Economics

ASH Scotland
8 Frederick Street
Edinburgh EH2 2HB
Tel. 0131 225 4725
Fax. 0131 225 4759
Web. www.ashscotland.org.uk
Mail. enquiries@ashscotland.org.uk

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Contents

Executive summary..3-4

Introduction..5-6

Section 1: The economic costs and benefits of tobacco in Scotland...7-15

Section 2: The cost-effectiveness of reducing tobacco harm..16-20

Conclusion...21

References..22-26

EXECUTIVE SUMMARY

Tobacco use, in particular smoking mass-manufactured cigarettes, remains the most significant preventable cause of disease and mortality in Scotland. In 2008 there were 13,321 deaths attributable to smoking, compared to 1,411 alcohol-related deaths and 574 drug-related deaths during the same year. An individual who smokes 20 cigarettes a day at an average of £6.29 per packet will spend nearly £2,300 a year. While the Scottish Government receives significant revenue from tobacco duties - the proportion of tobacco duty attributable to spending in Scotland was £940 million during the financial year 08/09 - the use of tobacco products results in a range of adverse societal impacts.

This report reviews the literature on the economic costs and benefits of tobacco. It adopts a broad societal perspective, assuming implicitly the benefits of people in Scotland living longer lives, free from readily preventable disease. While there are numerous studies in this area, they are often UK-wide, or based on international examples. This report takes a particularly Scottish perspective by estimating values for the costs of tobacco use in this country.

In Scotland during 2008/9:

- *the proportion of tobacco duty attributable to spending in Scotland was* **£940 million.**

The costs of tobacco in Scotland each year:

- *treating smoking attributable disease in the NHS costs* **£271 million**
- *productivity losses due to excess absenteeism, smoking breaks and lost output due to premature death cost* **£692 million**
- *premature deaths due to second-hand smoke exposure in the home cost* **£60 million** in lost productivity
- *clearing smoking-related litter from the streets costs* **£34 million**
- *fires caused by smoking in commercial properties cost* **£12 million.**

Smoking costs, conservatively, around £1.1 billion to Scotland each year.

This report takes a cautious approach, using mid-point (or lower) estimates in the literature for the costs smoking incurs. It assumes similar costs for Scotland to other parts of the UK when they are likely to be higher in reality due to higher smoking prevalence. It also excludes some factors that are highly likely to incur costs. Although this analysis may underestimate the true cost of tobacco in Scotland, it indicates that tobacco costs around **£129 million more to Scotland each year than estimates of tobacco duty received.**

To put this in context, funding for Scotland's national network of smoking cessation services which helped clients across the country set nearly 70,000 quit attempts in 2009 costs around £15 million. While tobacco taxation in the UK is relatively high compared with many other European countries, tobacco products are effectively more affordable today than during the 1990s as incomes have risen and tobacco taxation has not kept pace. More importantly, the societal costs of tobacco use appear to outweigh any financial benefits it brings to anyone other than the tobacco industry, which continues to post 'healthy' profits; Imperial Tobacco (manufacturers of Scotland's best-selling brand of cigarettes) reported £974 million pre-tax profits in just six months of 2009/10.

Alongside the net cost to the economy, is the now-incontrovertible evidence that tobacco kills. Tobacco sales are poor value to Scotland. However, a range of well-evidenced, effective and cost-effective public health measures are available, with the potential to make a positive impact on the wealth, as well as the health, of the nation.

INTRODUCTION

TOBACCO USE IN SCOTLAND

Smoking has, over the past decade, fallen to record lows in Scotland with adult prevalence falling to just over 24% of the population in 2009[1]. Despite this, smoking rates in Scotland remain higher than equivalent figures for England and Wales (21% of all adults[2]). The adverse health effects both of active smoking and exposure to second-hand smoke are well-established, and together they inflict a significant burden of death and disease on Scotland's population.

Table 1: Smoking attributable deaths, Scotland, 2008[3]

Cause	*Male (deaths)*	*Female (deaths)*
All cancers	2957	2382
[Lung cancer only]	[1910]	[1747]
Vascular diseases	1236	1765
Respiratory diseases	1263	1816
All other causes	641	1261
Total deaths	**6,097**	**7,224**

Smoking was responsible for **13,321** deaths in Scotland in 2008. This is around a quarter of all deaths, with men and women who die in middle age losing on average 22 years of healthy life[4]. To put this in context with deaths from other causes, during the same period alcohol was responsible for 1,411 deaths[5] and drugs (such as opioids, sedatives, or stimulants) for 574[6]. These figures only tell part of the story however, smoking also causes and contributes to non-fatal conditions that significantly reduce the quality of life for those who experience them. Scotland-specific estimates for this burden of disease are not readily available, however figures from the United States estimate that for every smoker who dies from a smoking-attributable condition, another 20 experience smoking-attributable illnesses such as chronic bronchitis and emphysema[7].
Smoking is also strongly patterned by deprivation; 43% of adults in the most deprived 10% of areas smoke compared with only 9% in the least deprived 10% of areas[8], resulting in marked inequalities in smoking-related disease and mortality. The link between smoking and inequality is stronger than just an association; it plays a causative role in the formation and continuation of health inequality. A study of fifteen thousand people living in Renfrew and Paisley published last year in the *British Medical Journal* found that smoking had a greater influence on mortality than social position[9] - non-smokers from lower social classes had better outcomes than smokers from higher social classes.

THE ECONOMICS OF TOBACCO

However, as well as being a health issue - described by the World Health Organisation as a ‘global epidemic’[10] - tobacco is an economic one. Tobacco is a highly taxed consumer product, bringing in around £10 billion in total tax revenue (tobacco-specific duty plus VAT) to the treasury in 2009[11]. The tobacco industry itself directly employs around 5,000 people in the United Kingdom[12], though no companies have their base in Scotland. A range of other jobs in supply, wholesale and distribution are supported by trade generated by the tobacco industry. Many retailers also see the tobacco category, despite its relatively small per-unit profit (due to high proportion of the pack cost being duty) as an important driver of customer visits to the store.

Tobacco has historically been a key economic and trading commodity. The invention and proliferation of the mass-manufactured cigarette in the late 19th and early 20th century caused tobacco consumption to accelerate dramatically. Only when robust evidence of the harm tobacco use can cause had become firmly established in the scientific literature and public awareness, (despite the best efforts of the tobacco industry at the time[13]) did prevalence begin to decline from its peak after the Second World War, when 65% of British men and 41% of women were smokers[14].

Relatively few Scotland-specific analyses of the economic impact of tobacco exist - this report will review the literature to generate estimates for the true cost of smoking in Scotland. The report is split into two sections, **Section 1: the economic costs and benefits of tobacco in Scotland** which considers estimates on costs and benefits of tobacco Scotland, and **Section 2: the cost-effectiveness of reducing tobacco harm** which briefly reviews the wider literature around the cost-effectiveness of tobacco control interventions.

CONSIDERATIONS AND FACTORS EXCLUDED FROM THE ANALYSIS

This report will adopt a broad societal perspective with which to review the relevant economic costs and benefits of tobacco in Scotland. However, as with any analysis of this nature, assumptions must be made, and estimates must be used where true values are not known. Care has been taken to ensure that, when estimating, conservative values are used so as not to over-estimate the true costs of tobacco use, however some degree of uncertainty necessarily remains.

There are also several factors that, while their existence and potential impact is acknowledged, will be excluded from consideration in the analyses.

End-of-life care costs: As a population lives longer from a combined result of lifestyle change and improved care, the costs incurred by the individual to the public purse at the end of life may be greater (individuals have a higher requirement for publicly-funded medical and social care during a time when the individuals are themselves increasingly economically inactive). This observation has been used to argue that premature deaths attributable to smoking are economically beneficial. Studies examining the impact of smoking on lifetime medical expenditure such as Hodgson[15] and Barendregt[16] have come to opposite conclusions in this area, possibly due to methodological differences and populations studied. In any case, and in the absence of Scottish lifetime care cost studies, the perspective adopted for this report will not examine differences in end-of-life care costs, for the reasons that follow.

- *taking such an argument to its logical conclusion would result in the favouring of interventions that shorten, not prolong life (particularly so for interventions that save the lives of younger people or infants, which would be very expensive). Hence there is an implicit assumption in the perspective adopted here that increased length and quality of life is a goal in itself*

- *the medical and healthcare evaluation literature (for example, the testing of new interventions or drugs) does not routinely include increased costs of end-of-life care for self-evident reasons: the aim of such interventions is to prolong life*

Manufacture and sale of tobacco products: As mentioned above, the tobacco industry contributes significantly to the UK economy as a whole. While domestic cigarette consumption is in decline (nearly halving between 1990 and 2009 from 102.5 billion to 58.5 billion cigarettes[17]), tobacco companies in the UK are multi-national and operate in expanding markets in the developing world. This combined with the resilience of the tobacco market to downturns means tobacco companies in the UK continue to show relatively strong economic performance.

This report will exclude the role of manufacture and sale of tobacco products in its assessment of the cost of tobacco in Scotland. Although the tobacco industry is a significant employer in the UK as a whole (though no companies have their base in Scotland), previous research has demonstrated that tobacco control policies (which by their nature seek to reduce tobacco consumption) have little to no net impact on overall employment[18,19]. The principal mechanism behind this is that resource not spent on tobacco products within diversified economies is instead spent on other goods and services[20]. In essence, the money is not 'lost' to the economy. Other industries employ more than the tobacco industry, hence some projections suggest[18] that reducing tobacco consumption may be a net benefit to employment in the UK.

Retailers, particularly smaller independent establishments, frequently report that the sales of tobacco products are important to their continued success. However, as above, money not spent on tobacco products tends to be spent on other products and services (many of them with more profit for the retailer than tobacco). Of course there is no guarantee that expenditure previously directed towards tobacco will be spent in the same sector. Given this, and the fact that tobacco sales are in continual decline as smoking prevalence dwindles, the need to diversify away from tobacco (and to encourage consumer spending on alternatives) for all those who currently sell it will become more pressing as time goes on. While evidence suggests the net impact on business and employment from reduced reliance on tobacco sales appears to be relatively small, and so will be excluded from this analysis, retailers who prepare for reduced reliance on tobacco in the future will be at an advantage compared to those who do not.

Private costs and benefits: Private costs and benefits - those that relate to the gain or loss of utility to the individual - are relevant when considering tobacco. Measures such as increasing taxation on tobacco products, or limiting tobacco advertising will, in a consumer welfare model, result in increased or decreased consumer surplus (the benefit consumers achieve due to the difference between the price they actually pay for an item and the price they would be willing to pay).

Much of the literature reviewed for this report focuses on the externalities (the non-private) costs and benefits of tobacco to society; hence this will be the focus of the analysis which follows. A detailed analysis of private costs and benefits is beyond the scope of this paper - quantifying private benefits is complicated in the case of tobacco use. The assumption that smokers are fully informed, rational, and under no duress when making a decision to smoke or not to smoke is in conflict with the observations that tobacco products are highly addictive[21] and most smokers start when they are young[22] and may be relatively poorly informed of the outcomes of long-term tobacco use.

TAXATION

Total taxation on tobacco (including VAT) brought in approximately £10 billion in revenue to the UK Government in 2008/9[11], approximately £162 for each of the 62 million persons[23] living in the UK in 2009. In the current UK public finance framework, Scotland (as is the case with the other devolved administrations) receives a direct funding allocation for public expenditure from the UK Government (the block grant). The Scottish block grant is set through the Barnett formula[24], whereby the funding is allocated in comparison with equivalent public spending in England (proportionate to relative population sizes).

Through this process, the proportion of tobacco duty attributable to spending in Scotland has been estimated at £940 million exclusive of VAT in 2008/9[25]. This was 2.2% of that year's total revenue, excluding that which comes from North Sea oil and gas. As the UK in total received £8,358 million from tobacco duty (excluding VAT) during this period, Scotland received 11% of total UK tobacco duty[25]. Hence revenue from duties on tobacco received by Scotland is estimated to be higher than Scotland's share of the total UK population or Gross Value Added (a measure of the contribution to the economy of individuals, industries or sectors). As research[18] and intuitive common sense suggests that money not spent on tobacco products will be spent on other products and services that will also predominately be subject to VAT, this report will use the above tobacco-specific duty estimation (exclusive of VAT) as an approximation for the level of direct taxation revenue Scotland receives from tobacco.

The proportion of tobacco duty attributable to spending in Scotland is £940 million

DIRECT COSTS TO THE HEALTH SERVICE

Tobacco use, particularly the use of manufactured cigarettes where tobacco is combusted and the resulting smoke drawn into the lungs, is associated with the development of a wide range of diseases. In many of these diseases evidence is strong enough to conclude that a causal relationship exists. Smoking causes, or increases the risk of contracting, the following diseases and conditions[26] (among others):

- lung cancer
- chronic obstructive pulmonary disease
- coronary heart disease
- stroke
- emphysema
- bronchitis
- acute myeloid leukaemia

- cancer of the kidney
- cancer of the pancreas
- cancer of the bladder
- cancer of the larynx
- cancer of the pharynx
- cancer of the cervix
- cancer of the stomach
- cancer of the oesophagus
- cancer of the oral cavity
- cancer of the uterus
- a range of adverse reproductive and early childhood disorders including: infertility; preterm delivery; stillbirth; low birth weight; and sudden infant death syndrome (SIDS).

These diseases all incur treatment costs. Routinely gathered statistics on the incidence of diseases treated in the UK's public health system can be combined with data on smoking-attributable disease to estimate a smoking-attributable cost to the healthcare system (an alternative methodology being to compare the healthcare costs of smokers and non-smoker[27]).

There are several estimates for this available in Scotland, which vary in size based on assumptions used for the proportion of smoking attributable disease and the costs of treatment. Table 2 below gives an indication of three sources for smoking-attributable costs to the NHS in Scotland.

Table 2: Cost of treating smoking-related diseases in Scotland

Source	*Cost per annum*	*Year of data*
Allender et al. 2009[28]	£409 million	2005/6
Scottish Government[29]	£200 million	2004
Callum et al. 2008[30]	£271 million*	2006/7

* Callum et al estimate the cost to the NHS in England to be £2.7 billion. Assuming similar treatment costs between the NHS in Scotland and England, and a similar per-capita incidence of smoking-attributable disease (likely to underestimate actual cost due to differences in tobacco consumption between nations), a population-based projection for Scotland is £271 million.

While costs clearly differ, they are consistent in order of magnitude. As some have argued that the Allender et al value[28] overestimates the cost of smoking due to the use of disease data derived from a broad geographical area (rather than the UK specifically) and older data on NHS costs for treatment[31], and the Scottish Government figure is itself based on a projection from older data[32], this report prefers the intermediate value extrapolated from the recent Callum et al figures from England.

Treating diseases caused by smoking costs around £271 million in Scotland per annum

PRODUCTIVITY LOSSES

Costs incurred due to lost economic productivity attributable to tobacco use can be broken down into three general categories:

(i) Productivity lost due to smoking breaks: This relates to any excess time taken on breaks by smokers compared to non-smokers

(ii) Productivity lost due to absenteeism: Current smokers are typically absent from work due to illness more often than non-smokers or former smokers[33,34], the productivity lost from this excess absence can be estimated

(iii) Productivity and spending lost due to premature death: As already described, smoking increases the chances of an individual dying prematurely when still of a working age, resulting in loss of economic output and consumer spending.

It should be recognised that, during the calculation of productivity losses, it can be argued that lost output by an individual attributable to smoking may not be 'lost' in reality should colleagues cover for smoking breaks or illness, other workers be recruited to fill vacancies caused by illness or death or other mechanisms are used to compensate for apparent losses. However, it can also be argued that healthy time has an economic value even if not spent in employment. This is the perspective than underlies the approach taken in this section. A total estimate for productivity loss attributable to tobacco use can be gained by combining the estimated totals for the three categories above, dealt with in turn below.

Productivity lost due to smoking breaks

There will be a loss of potential economic output whenever an individual is engaging in an activity which does not contribute to the organisation's productivity. Clearly, this will only apply to organisation which allow smoking breaks in excess of that which is allowed routinely (e.g. coffee and lunch breaks), and employees do not have to 'clock out' to go on a smoking break.

Parrott et al[35], through a survey of 200 Scottish employers provide a figure of approximately £450 million for productivity lost due to smoking breaks in the workplace. However, this figure is based on a methodology devised prior to the introduction of the smoking ban in public places and workplaces (which came into force in March 2006 in Scotland) and some of the assumptions used in the calculations may no longer hold true, as the smoking ban will have changed some aspects of employee smoking behaviour (e.g. smoking 'at your desk' is no longer permitted by law).

McGuire et al[36] attempted to answer the same question using a different methodology and data gathered following the introduction of smoke-free laws across the UK by 2008, estimating a total cost of £914 million for smoking-related breaks. This equates to £88 million for Scotland, inclusive of smoke breaks taken by heavy and light smokers who are full or part-time workers.

Nash and Featherstone[37] use a combination of McGuire et al's estimates with productivity savings estimates taken from the Royal College of Physician's 2005 report *Going smoke-free*[38] , to produce an intermediate figure of £2.9 billion for the UK assuming 10 minutes per day smoking. Extrapolating this figure to Scotland leads to an estimated total of £244 million.

Table 3: Productivity lost due to smoking breaks

Source	*Cost per annum*	*Year published*
Parrott et al[35]	£450 million	2000
McGuire et al[36]	£88 million	2008
Nash and Featherstone[37]	£244 million*	2010

* Population-based projection for Scotland from UK-wide data.

This report uses the Nash and Featherstone value of **£244 million** for lost productivity due to smoking breaks, as the midpoint of currently published figures. It should be noted that, amongst smokers, there may be positive effects on performance associated with smoking breaks and negative performance associated with unsupported enforced abstinence (e.g. improved concentration or reduction in perceived stress versus withdrawal symptoms caused by nicotine abstinence). However as studies to date have not included such variables it has not been possible to estimate any impact this may have.

Productivity lost due to absenteeism

Parrott et al[35] use an estimate of excess absence of 0.9 days (7.2 extra hours) per year among smokers compared to non-smokers from a large American study, and apply it to Scottish data from 1997. Using this method they calculate the excess absenteeism to be around £40 million (approximately £50 million inflated to 2009 prices).

McGuire et al[36] have applied an average estimated excess absenteeism per full-time smoking employee across ten different studies to conclude that smokers take 1.77 excess days of sickness. Using weighted averages for full-time and part-time workers, and aggregating across age groups, this leads to an estimated UK-wide cost of £1.1 billion – equating to around £105 million in Scotland.

The key factor in estimating these figures is the source used to calculate the

number of days of excess absenteeism. While Parrott et al use a large American study and McGuire et al obtained a pooled average from a range of international studies, Nash and Featherstone[37] use an excess value of 33 hours based on data published by the UK's National Institute for Health and Clinical Excellence[39]. Using this value increases the estimate for the UK wide cost significantly, to £2.5 billion (approximately £210 million for Scotland).

Table 4: Productivity lost due to absenteeism

Source	*Cost per annum*	*Year published*
Parrott et al[35]	£40 million	2000
McGuire et al[36]	£105 million	2008
Nash and Featherstone[37]	£210million*	2010

* Population-based projection for Scotland from UK-wide data.

To be conservative, the McGuire et al figure using mid-point estimate of excess absenteeism will be used by this report, leading to an estimated productivity loss due to smoking-attributable absenteeism in Scotland of **£105 million**. It should be noted that this figure may be considerably higher in reality as the number of extra days of absenteeism in smokers has been estimated to be as high as 7.3 in Northern Ireland[43], which may be more similar to Scotland than many of the nations used to create the average excess by McGuire et al (using the Northern Irish excess value would result in a cost to the UK of £4.5 billion, approximately £378 million in Scotland).

Productivity and spending loss due to premature death

Smokers are more likely to die during their working life than non-smokers and skilled workers dropping out of the workforce has an impact on the economy. Nash and Featherstone[37], using data from the NHS information centre on smoking-attributable deaths by age group in 2008 and employment statistics from the ONS, estimate the level of productivity loss in the UK attributable to premature deaths due to smoking to be £4.1 billion. Assuming similar patterns of employment and mortality in Scotland as in the UK (likely to underestimate the true value) this results in a productivity loss of around £343 million due to early deaths.

Taulbut et al[14] use a method developed by the West Midlands Public Health Observatory[44] to estimate smoking's economic impact on local economies, calculating reduced expenditure for each premature smoking-attributable death in the North East of England (demographically comparable to Scotland) to be £11,000. When this figure is applied to the approximately 13,500 smoking attributable deaths in Scotland, this leads to a figure of £143 million reduced expenditure per annum.
These two models clearly differ in methodology and scope, but overlap

somewhat as lost productivity and local expenditure are related. However, as the Nash and Featherstone approach uses a more comprehensive and sophisticated methodology and is more appropriate for a societal costs calculation than reduced expenditure alone, it will be the value favoured here. Hence the productivity loss due to loss in healthy working time caused by premature death attributable to smoking in Scotland is estimated to be **£343m**.

The total productivity loss due to smoking breaks, increased absenteeism, and productivity loss due to premature death attributable to smoking is £692 million in Scotland per annum

COSTS OF SECOND-HAND SMOKE (SHS)

The Royal College of Physicians has estimated that there were 12,200 deaths in the UK due to SHS in 2003, with the great majority (95%) of these deaths occurring as a result of exposure to SHS in the home[45]. In Scotland similar estimations indicate that up to 1,000 deaths per year might be attributed to SHS exposure among lifelong non-smokers[46].

As premature deaths due to second-hand smoke exposure will have similar economic ramifications to premature deaths caused by active smoking, Nash and Featherstone[37] estimate the UK-wide impact of SHS (excluding deaths caused by SHS exposure in the workplace, and taking a conservative estimate to account for reduced prevalence) on the economy to be £713 million. This is approximately £60 million in Scotland.

The productivity loss due to premature deaths attributable to second-hand smoke exposure in the home in Scotland is approximately £60 million

COSTS TO THE ENVIRONMENT

Smoking-related litter (cigarette butts, empty packets) is the most common type of litter found in Scotland, being found in over half of all streets, and closer to 75% in towns and cities[47]. Many local authorities believe that, following smoke-free public places legislation in the UK, there has been an increase in smoking-related litter, with the majority of the public also feeling that discarded cigarette ends are a problem[48].

There are costs incurred by local authorities for cleaning up cigarette butts and other smoking-related litter. The cost per year of cleaning all litter across

Scottish local authorities is around £65 million[49], compared with around £500 million in England[50]. Nash and Featherstone[37] estimate the cost to clean smoking-related litter to be £342 million per year in England. Assuming similar costs incurred for cleaning between local authorities in England and their counterparts in Scotland, a population-based estimation for cleaning smoking-related litter in Scotland is £34 million.

The costs of clearing smoking-related litter in Scotland is approximately £34 million per annum

FIRE DAMAGE TO COMMERCIAL PROPERTIES

Cigarettes are a leading cause of fire, fire deaths and non-fatal injuries. Fire damage to businesses as a result of employee smoking will have an adverse impact (although firms are insured, businesses will ultimately pay for costs incurred due to higher premiums).

Parrott et al[35] estimate the annual cost of fire losses caused by smoking materials in the workplace to be approximately £4 million in Scotland at 1998 prices (around £5.2 million inflated to 2009 prices).

McGuire et al[36], using two different methods estimate the cost of smoking-related fire damage to commercial property in England to be between £124.8 million and £133 million. However, this value is calculated based on data from before the prohibition of smoking in workplaces. Acknowledging this McGuire et al apply a reduction in recorded fires of 11% over the year 07-08[51] to this estimate to compensate, resulting in a revised figure of £118.4 million per annum. Applying this estimate proportionally to Scotland leads to costs of approximately £12 million.

The cost of smoking-related fires to domestic dwellings has been calculated by Nash and Featherstone[37] to be £507 million annually to England and Wales. Scaling this figure proportionately to Scotland's population leads us to an estimate of £48 million. The contribution of smoking-related products to domestic fires is clearly of some significant economic and societal cost (smoking is a cause of 8% of accidental dwelling fires in Scotland, but 41% of those where a death occurs[52]). However, this report will only include the costs of fire damage to commercial properties in the interest of being conservative, and including costs that are likely to have the most direct impact on Scotland's GDP. In this case the report prefers the figure calculated from the McGuire et al data as being the most recent (though it should be noted that both it and the Parrott et al estimates are similar in order of magnitude, and significantly less than the costs incurred to enterprises from productivity losses).

The costs of commercial fire damage attributable to smoking in Scotland is approximately £12 million per annum

SECTION 2
The cost-effectiveness of reducing tobacco harm

This section will briefly review the literature on the cost-effectiveness of tobacco control interventions - actions that seek to reduce the burden of disease caused by tobacco through measures that have proven efficacy. The intention is not to provide an exhaustive list of interventions and their cost, but to demonstrate that an appraisal of currently available evidence shows most commonly implemented tobacco control interventions are cost-effective.

Spending on tobacco control compared to the income available to companies responsible for tobacco promotion is highly asymmetrical. A recent research paper has estimated that, compared to the 2008 total revenue retained of $14 billion (approximately £8.8bn, after all forms of taxation) by the five major tobacco companies which control 90% of the global market, tobacco control activity receives only $240 million (£150m) in funding worldwide[53] - less than 2% of industry income. Imperial Tobacco, just one of the four major multi-national tobacco companies operating in the UK and manufacturer of Scotland's top-selling cigarette brand Lambert and Butler[54] reported £974 million pre-tax profits in just six months of 2009/10 through domestic and international sales[55]. By contrast, the 2008-11 Scottish spending review provided smoking cessation services £11 million total annual funding (£9 million[56] from the national tobacco control budget, and an additional £2 million from NHS Board's budgets), smoking prevention activities around £3 million annual funding[57], £0.7 million for the voluntary sector, and £0.5 million for tobacco communications and mass media work. Ongoing work in smoking cessation was supported through the expansion of accessible cessation support provided in Scotland's pharmacies which were supported with approximately £4 million annual funding from 2008 onwards.

The evidence reviewed in this section indicates that, unlike the sale of tobacco itself, tobacco control interventions typically offer good economic value, in addition to improving health and quality of life.

TAXATION

Of all the interventions designed to reduce tobacco use and protect health, increases in tobacco product taxes and prices have been shown to be the single most effective and cost-effective measure[58]. Between 1991 and 2001 in the UK the retail price of cigarettes increased by around 80% in real terms[59] largely as a result of the 3% real-term increase tobacco duty 'escalator' introduced by the Conservative Government in 1993, and subsequently increased to 5% by Labour in 1997. In 2001 the real terms percentage increase provided by the escalator was abandoned due to concerns over the relatively high price in the UK being a driver of smuggling, hence between 2001 and 2007 tax as a proportion of the retail price of cigarettes actually fell slightly.

Affordability of cigarettes (the price of cigarettes divided by average wage) shows that the price of cigarettes has not kept pace with increasing wages in the

UK; cigarettes are as affordable today as they were in the early 1970s[60]. High quality published evidence from a range of countries indicates that tax increases are a cost-effective measure to reduce consumption[61] as tobacco has a price elasticity of around -0.5 (meaning that a tobacco price rise of 10% reduces consumption by 5%). Some studies indicate that the price elasticity in the UK may be higher (approaching -1.0) in some circumstances[62].

Tax increases obviously increase revenue as well as decreasing outgoings from some of the factors detailed in section 1 of this report. A recent report has estimated that a 5% price increase in the UK would result in nearly 200,000 fewer smokers, and increase total government revenue by £520 million per year during the first five years[59]. Although some argue that increased taxation displaces consumption from the legal to illicit market, international experience generally shows this not to be the case[63]; low taxation countries are more likely to experience high levels of illegal tobacco trade, with the greatest predictor of illicit tobacco proliferation generally being lack of enforcement and other controls.

SMOKING CESSATION COST-EFFECTIVENESS

Smoking cessation, or ‘stop smoking’ services are provided free through the NHS in Scotland. The United Kingdom has been a world leader in the provision of evidence-based smoking cessation support free at the point of care. Services in Scotland provide support that has been demonstrated through clinical trials to give smokers a greater chance of staying stopped than quitting alone[64]. Services offer intensive behavioural support from a specially trained advisor, either in groups or individually, over a series of planned sessions set around a target quit date. Services offer a range of pharmaceutical aids to quitting (such as nicotine replacement gum or patches, and also products not based on nicotine such as varenicline) which help alleviate withdrawal symptoms and have been proven to increase the chance of a successful quit attempt[71]. Such services in Scotland helped clients to set nearly 70,000 quit dates in 2009[65].

As smoking causes such significant harm to health, virtually any type of evidence-based smoking cessation intervention (brief advice to stop given by a GP, intensive group or individual interventions, or the use of pharmaceutical aids) are cost-effective in preserving life[66]. Smoking cessation interventions remain cost-effective, even if the individual has been a smoker for many years. In terms of numbers needed to treat (NNT - the total number of patients who need to be treated to ensure that at least one patient has a positive outcome), smoking cessation interventions compare very favourably with other routine medical interventions like the provision of statins or cancer screening[71]. When examining life years gained (a standardised outcome measure used to judge the cost-effectiveness of medical interventions), the provision of behavioural support and pharmacotherapy costs approximately £1,000 or less per life-year gained,

compared with statins which cost nearly £25,000[67].

Smoking cessation services in Scotland

Each health board in Scotland provides a smoking cessation service, and a national database managed by ISD Scotland[68] captures information on quit attempts made and their outcome. Following the same methodology used by the Department of Health in England[69], a cost-per-quit can be calculated, given in table 5 below for 2007 to 2009.

Table 5: Scottish smoking cessation services cost per quitter

	2007	*2008*	*2009*
Level of funding (£000s)[70]	11,000	14,461	14,746
Number of successful quitters[71]	15,309	20,188	26,485
Cost per quitter (£)	*719*	*716*	*557*

1. A quit attempt is counted as successful if the client has quit smoking at 4 week follow-up and if they have not smoked at all in the two weeks preceding the follow up.
2. Cost per quit excludes the provision of pharmaceutical quitting aids on prescription.
3. Figures presented do not take into account inflation, and are presented in cash terms only.
4. Level of funding is for the financial year, quit attempts are recorded over the calendar year.
5. From August 2008 onwards the level of funding includes the set up, training and operation costs of the national pharmacy scheme for smoking cessation where stop smoking advice is offered through Scotland's network of community pharmacies.

Cost-per-quit has decreased over the years of measurement as service throughput and quality of recording has increased.

Telephone quit lines

NHS Health Scotland provide a national free stop smoking helpline (and web chat service) throughout Scotland which provides advice, information and assistance to smokers who want to quit. This type of telephone support service has been shown to be cost-effective[72], particularly when combined with mass media campaigns[73,74] to advertise the service to potential clients.

MASS MEDIA ADVERTISING AND NATIONAL EVENTS

Both appropriately designed stop smoking mass media campaigns[75,76] and national events that work to encourage smokers to stop (like 'no smoking day' in the UK[77]) have been shown to be cost-effective in encouraging smokers to quit, and to seek out appropriate support should they desire it.

A report by the Central Office of Information in 2009 estimated that the tobacco control campaign running between 1999-2004 (of which mass media campaigns were a central component) generated over £7.1 billion of savings in costs to the NHS, reduced domestic fire risk, and lives saved, against an advertising spend of £49.3 million[78].

SMOKING PREVENTION PROGRAMMES

Smoking prevention programmes that seek to turn young people away from tobacco have the potential to result in the most significant savings of all, as the excess burden of mortality and disease (in addition to the other costs described in section 1) is completely avoided. Evidence and expert opinion suggests that there are many components to an effective youth smoking prevention programme[79]. In Scotland these recommendations have been combined into a policy document by the Scottish Government: *Scotland's future is smoke-free*[80], the only action plan amongst the UK nations specifically dealing with smoking prevention.

Evidence-based measures to reduce youth smoking included in the plan that are highly likely to result in economic savings due to reduced numbers of young people becoming smokers are: smoking prevention education in the curriculum (including at the tertiary education level); further tobacco advertising restrictions; restricting the sale of tobacco products through vending machines; and reduction of the trade in illicit tobacco products.

Of particular importance in smoking prevention is breaking the cycle of young people's exposure to tobacco, and ensuring smoking is no longer seen as the norm. One way this can be achieved is to focus efforts on preventing smoking during pregnancy. Mothers-to-be that are younger, or from more deprived areas are more likely to smoke[81]. In addition to the health harm caused by maternal active smoking and exposure to passive smoke during pregnancy[82], children of parental smokers are more likely to be smokers themselves.

ENFORCEMENT OF ILLICIT SALES

Illicit tobacco is a significant source of revenue loss for the Exchequer. In 2007/8 in the UK, between £700m and £2.2bn of tax revenue was lost due to the illicit trade in cigarettes, and between £530m and £790m due to the illicit trade in hand-rolled tobacco[83]. Effective, intelligence-led enforcement can help reduce this tax gap.

MEASURES TO REDUCE SECOND-HAND SMOKE EXPOSURE

As discussed in section 1 of this report, the diseases which involuntary exposure to tobacco smoke causes result in excess disease and mortality among Scotland's population. Even following the health successes of the legislation to prohibit smoking in most enclosed public places[84], exposure to tobacco smoke persists, chiefly in the home and motor vehicle. Exposure to tobacco smoke can have particularly adverse effects on children and infants which put them at greater risk than an adult.

In a recent report[85] the Royal College of Physicians examined the evidence on child exposure to second-hand smoke, concluding that it is responsible for around 40 cases of sudden infant death syndrome; 20,000 cases of lower respiratory tract infection; 120,000 cases of middle ear disease; at least 22,000 new cases of wheeze and asthma; and 200 cases of bacterial meningitis in the UK each year. Treating these cases generates over 300,000 general practice consultations and around 9,500 hospital admissions each year. The authors calculate that the cost of these excess visits to the NHS is around £23.3 million. (Assuming similar patterns of disease, service access and treatment costs across the UK, this would be around £2 million in Scotland). The authors of the report conclude that interventions to reduce second-hand smoke exposure in children have the potential to make cost savings to the NHS as well as improving the health of children.

CONCLUSION

This analysis has demonstrated that, based on a conservative analysis, the societal costs of tobacco use amount to around **£1.1 billion** in Scotland. It adds to the existing literature examining the costs and benefits of tobacco production, sale and consumption. In this analysis we calculate that tobacco-attributable costs outstrip tobacco-specific duty attributed to in Scotland by some £129 million. However, it should be noted that some of the existing international literature, including an analysis by a senior economist at the World Bank[86] has demonstrated that the economic costs of tobacco consumption may outstrip the economic benefits by a much greater degree, perhaps several times over.

Other more UK-centred research, recently summarised in a report to the Westminster All Party Parliamentary Group on Smoking and Health[87] is consistent with the conclusions presented in this report. The report concludes that the continued use of tobacco products is of significant negative economic consequence, and tobacco control interventions generally offer excellent value for money, providing a net annual revenue benefit of £1.7 billion in the UK[87].

One implication of the evidence on the economics of tobacco presented in this report, and elsewhere, is that the attractive but simplistic theory that tobacco is an easy revenue generator for the Exchequer is likely to be false. Tobacco is such a damaging product that its consequences - in this analysis and others - appear to outstrip the considerable revenue its sale generates. While it is inevitable that differing approaches will over- or under-estimate particular costs in individual analyses, the emergent picture from all the evidence assembled is of a society where tobacco does not pay its way.

While this money may be effectively going up in smoke, the motivating concern behind interventions to reduce tobacco harm remains one of health. Tobacco is a product which kills half its users[87], and is estimated to kill 7 million worldwide annually by 2020[88] should current trends continue . Even in the event of tobacco use having zero economic consequences, such an immense scale of harm demands attention and action. As it is, the financial benefit tobacco brings seem unlikely to benefit those other than the tobacco industry. Any individual or organisation with an interest in reducing tobacco-related harm should be encouraged by the emerging picture that what is good for the nation's health seems also to be good for the nation's purse.

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ASH Scotland
8 Frederick Street
Edinburgh EH2 2HB
Tel. 0131 225 4725
Fax. 0131 225 4759
Web. www.ashscotland.org.uk
Mail. enquiries@ashscotland.org.uk