

## Cough up

### Balancing tobacco income and costs in society

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#### Executive Summary

Smoking remains a controversial issue in our society. Despite tobacco being the only consumer product that kills half of its regular users,<sup>1</sup> smoking is an addiction that many people continue to enjoy. However, 65% of smokers want to quit their habit, but are unable to do so;<sup>2</sup> therefore smoking remains the single largest cause of preventable mortality - over 83,000 deaths in England in 2008<sup>3</sup> - and a major driver of health inequalities in our society, since poorer people are more likely to smoke.<sup>4</sup>

There has been a significant amount of anti-smoking legislation enacted in recent years: smoking has been banned in enclosed public places;<sup>5</sup> the legal age at which tobacco may be bought has increased from 16 to 18<sup>6</sup> and the display of tobacco products are to be removed from the point of sale.<sup>7</sup> These measures have been well received<sup>8</sup> and public opinion favours further measures.<sup>9</sup> We have reached a tipping point in our attitudes to smoking.

Although tobacco tax in the UK is relatively high compared to other countries, cigarettes are much more affordable today than they were in the 1990s because tobacco duty rates have failed to keep pace with rises in income. Indeed, the duty escalator introduced in 1993 was removed in 2001 following concerns about high rates of tobacco smuggling. However, data now shows that tobacco smuggling has been in steep decline following the introduction of a targeted strategy: since 2000 the market share of smuggled cigarettes has fallen by 50%.<sup>10,11</sup>

Taxation of tobacco contributes £10 billion<sup>12</sup> to HM Treasury annually; however, we calculate that the costs to society from smoking are much greater at £13.74 billion. Every cigarette smoked is costing us money. These societal costs comprise not only the cost of treating smokers on the NHS (£2.7 billion) but also the loss in productivity from smoking breaks (£2.9 billion) and increased absenteeism (£2.5 billion); the cost of cleaning up cigarette butts (£342 million); the cost of smoking related house fires (£507 million), and also the loss in economic output from the deaths of smokers (£4.1 billion) and passive smokers (£713 million).

In order to balance the income and costs of smoking, we believe that tobacco duty should be progressively increased until the full societal costs of smoking are recovered through taxation. Currently a packet of cigarettes costs £6.13,<sup>13</sup> whereas we believe the cost should be at least £7.42. Cigarettes are being under-taxed by £1.29 per packet which amounts to £2.82 billion in lost revenue for HM Treasury. We believe that this increase in tax should be recovered through the re-introduction of the duty escalator; but in the first instance, tobacco tax should be increased by 5% at the next Budget.

Health England, the national reference group for health and wellbeing established by the Department of Health, has concluded that a 5% increase in tobacco taxation is one of the most cost-effective public health interventions.<sup>14</sup> A 5% tax increase would decrease tobacco consumption by approximately 2.5%, and

increase annual tobacco revenue by approximately £400 million. However, so that this tax increase is not unduly regressive, we believe that a proportion of the additional revenue generated should be targeted towards helping people quit, particularly hard to reach groups such as pregnant teenagers. The cost of the programmes we have identified amounts to £180 million per annum.

In order to re-balance tobacco income and expenditure in our society we propose the following measures:

- Tobacco taxation should be increased by 5% in the next Budget. This would see the price of a pack of cigarettes rise by 23 pence from £6.13 to £6.36 per packet and generate over £400 million for HM Treasury.
- The tobacco duty escalator should be re-introduced to increase the cost of tobacco over the course of the next Parliament to ensure tobacco use becomes revenue neutral to our society. Currently, cigarettes are being under-taxed by £1.29 per packet which amounts to £2.82 billion in lost revenue for HM Treasury. Detailed cost and revenue changes over time would need further modelling.
- To prevent people from switching from packets of cigarettes to hand-rolled tobacco (HRT) as a means of avoiding tax increases, the duty on HRT should be increased to a level commensurate with cigarettes, since HRT is under-taxed in comparison with other forms of tobacco.<sup>15</sup>
- Only a tiny fraction of smokers wanting to quit use the NHS Stop Smoking Service. To increase referral rates to this highly cost-effective service, funding of mass media campaigns should be increased by £10 million per annum to both continually educate the public and encourage higher levels of self-referral.
- Encouraging smokers to quit needs to become part of NHS culture. Every patient that expresses an interest in stopping smoking to an NHS professional should automatically be referred to the NHS Stop Smoking Service.
- Varenicline is the most cost-effective treatment option in the NHS Stop Smoking Service. Studies consistently demonstrate it to be superior to any other therapy,<sup>16</sup> but it is only used in 20% of cases. Varenicline should be offered as first line drug treatment for all patients wishing to quit smoking - this would cost £36 million.
- All forms of Nicotine Replacement Therapy (NRT) are comparably expensive and much less prevalent than cigarettes, despite not having the substantial tax burden of tobacco.<sup>17</sup> Perversely, NRT is regulated to a greater degree than tobacco, despite it being a much safer product. We recommend moving to light-touch regulation of NRT in order to encourage a more competitive market with lower prices.
- It should become a legal obligation for NRT to be prominently stocked in all retailers that sell also tobacco products. This would help those people attempting to stop smoking, who may suffer from cravings and be near to a cigarette retailer, but not an NRT retailer.
- Smoking is a socially inherited disease: a smoking mother increases the chances of a child smoking. Drug treatments are not licensed for use in pregnancy, and NRT is only minimally effective. Therefore, a specialist stop smoking service for pregnant mothers should be established throughout the country, as part of either maternity units, or the current NHS Stop Smoking Services. Direct financial incentives to stop smoking of £10 per week have been found to be effective in limited trials and therefore should be offered to all pregnant women of, or below, the age of 20 – this would cost £36 million annually.
- Prevention of addiction is the crucial next step in reducing smoking prevalence. A body of evidence demonstrates the effectiveness of mass media campaigns targeted at young adults to prevent tobacco addiction.<sup>18</sup> Independent research shows these media campaigns would cost £10 million per year to implement.<sup>19</sup>

## The true cost of a packet of cigarettes

According to the Tobacco Manufacturers Association (TMA) the most popular packet of cigarettes can be bought for £6.13.<sup>20</sup> However, this is just the price that is deemed acceptable between the retailer, consumer, and the government which takes some £4.67 in taxation. We believe that the cost of a packet of cigarettes should also take into account wider measures of the actual costs to society. It should include the cost of treating the illnesses caused by the tobacco it contains; it should include the costs of clearing the cigarette butts littering our streets; the loss of productive output caused by premature death and so forth. These costs are referred to by economists as 'externalities'.

When considering the total cost of a packet of cigarettes, studies in the US have calculated results as diverse as \$40<sup>21</sup> and \$222<sup>22</sup>. The main reasons for the disparity between values are the decisions on which externalities to include when making a calculation. In this report we adopt a societal point of view because it takes the broadest outlook and is, from an economic perspective, always considered relevant.<sup>23</sup> We have used official data from the Office for National Statistics (ONS), NHS Information Centre, peer-reviewed scientific journals as well as sources such as the Royal College of Physicians and the Tobacco Manufacturers Association. The assumptions and detailed workings of the calculation are presented in Appendix 1 of this note. Below we summarise the items we have included, and the estimates for their costs.

### Cigarette production, shipping and retail costs

The price the Tobacco Manufacturer's Association quote for the production, shipping and retail of a packet of cigarettes is £1.46.

### Healthcare costs

One of the most direct ways in which smoking drains the economy is through the provision of healthcare to patients' suffering from illnesses caused, or predisposed to by smoking. These costs tend to increase at a rate higher than inflation as expensive new therapies become available, and are estimated to be between £2.7 billion and £5.2 billion. It is worth noting that these costs do not include the treatment of those non-smokers exposed to environmental smoke, which is considered later.

### Loss of productivity

Direct measurement of worker productivity is difficult. However, a number of studies have investigated workers taking breaks in order to smoke, and have tried to quantify this time at between £915 million and £3.2 billion per annum.

### Absenteeism

Smokers have been demonstrated to have an increased rate of absenteeism from illness. The cost of this is between £1.1 billion and £2.5 billion. This gives a good indication of the amount of money the country loses annually due to smokers' excess illness causing them to miss work. These costs are borne by businesses, consumers, and the taxpayer.

### Loss of productive output

A loss of output refers to the loss of economic activity that is caused by smokers of working age dying early. We use the human capital approach<sup>24</sup> to calculate the expected life time output that would have been realised had each death caused by smoking been avoided. Using this methodology we calculate the loss of productivity to cost £4.1 billion.

We should be clear that the human capital approach does not attempt to measure the value of a life; rather, it is purely a means to capture the loss of economic output. Any financial calculation based on early mortality is overshadowed by the impact on the individuals, and their friends and families of this loss of life.

#### Costs of passive smoking

Smokers are not the only people exposed to the harmful effects of tobacco. Passive smoking – the inhalation of environmental smoke – has, for some time, been recognised to have significant effects on health. It was these effects that led to calls for smokefree legislation.

We estimate that the productivity loss of lives lost as a result of passive smoking is £713 million. This value does not, however, include the costs of NHS care and absenteeism due to illness caused by passive smoking. These are likely to be less than the direct costs incurred by active smokers.

#### Environmental costs

Cigarette butts are the most common type of litter found in the UK. According to an Environmental Campaigns (ENCAMS) local environmental quality study, smoking related litter was found in 78% of locations investigated.<sup>25</sup> The cost of clearing these cigarette butts is estimated at £342 million each year.<sup>26</sup>

#### Fire costs

Smoking is a common cause of fire throughout the world. Notable disasters attributed to smoking materials include the 1988 King's Cross station fire, the 1999 Mont Blanc tunnel fire and numerous Californian wildfires. We calculate the costs of smoking related fire at £507 million annually. This cost is likely to be conservative as it is based on the 2004 value for costs of fire and completely excludes costs of fires other than those within the dwelling.

#### Total societal costs of smoking

We calculate the approximate cost of smoking to our society is £13.74 billion, whereas smoking currently contributes £10 billion to the Exchequer. Each cigarette smoked is currently costing the country money.

#### The true cost of a packet of cigarettes

Currently a packet of cigarettes costs £6.13,<sup>27</sup> whereas we believe the true cost underpinned by our analysis is £7.42. This means that cigarettes are being under-taxed by £1.29 per packet which amounts to £2.82 billion in lost revenue for HM Treasury. In order to balance the income and costs of smoking, we believe that tobacco duty should be progressively increased until the full societal costs of smoking are recovered through taxation. This increase in tax should be recovered through the re-introduction of the duty escalator; but in the first instance, tobacco tax should be increased by 5% at the next Budget.

### The role of taxation

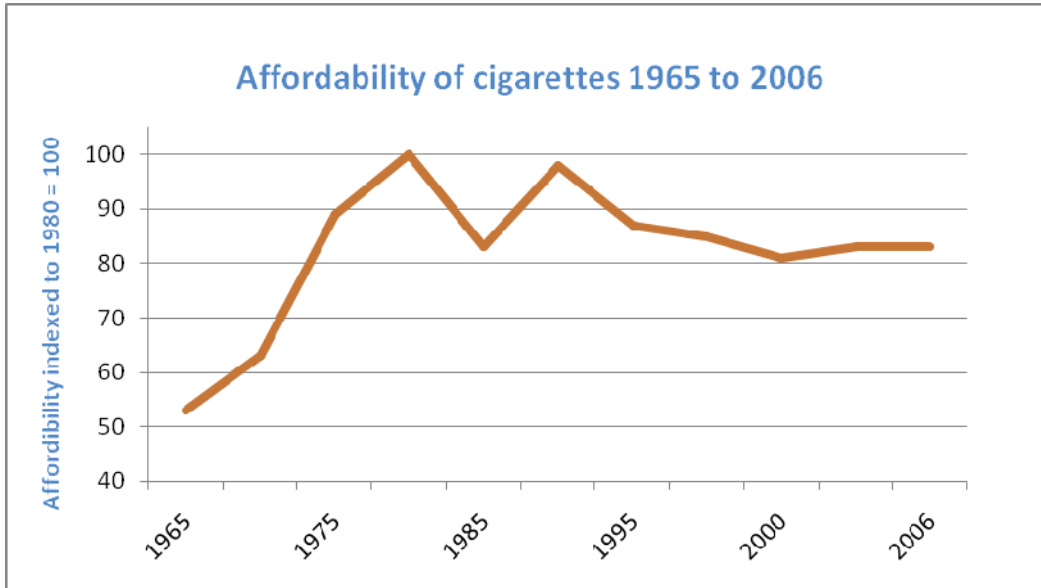
Taxation is highly effective at both reducing smoking and raising money for the Exchequer (much of which is spent on the detrimental effects of smoking). The UK has high levels of tobacco taxation; indeed, the only nation in the EU with a higher levy is Ireland. Of the £6.13 which an average packet of cigarettes currently costs, £4.67 is taken in tax.<sup>28</sup> This compares with taxation of just £1.86 in Spain, or £0.94 in Lithuania.

Nevertheless, there is a powerful argument for increasing this already high level of taxation.

First, as shown above, the current price of a packet of cigarettes underestimates its true costs to society.

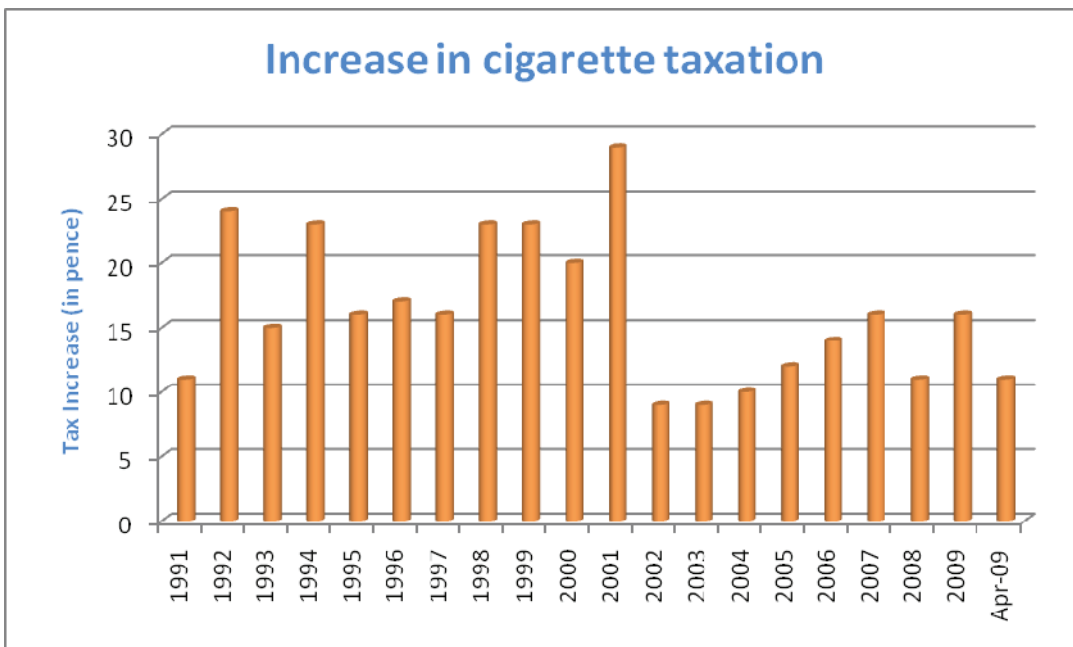
Second, cigarettes are 16% more affordable today than they were in the 1990s because tobacco duty rates

have not kept pace with rising levels of income. Affordability is the measure of the price of cigarettes divided by the average wage. The graph below shows that cigarettes are as affordable today as they were in the early 1970's when 45% of the population were smokers.<sup>29</sup>



Source: Townsend J. Affordability of cigarettes 1965-2007 (1980=100). London School of Hygiene and Tropical Medicine.

Third, the increases in cigarette taxation since 2001 have been, on average, considerably lower than the decade before 2001. This is shown in the figure below:



Source: Tobacco Manufacturers' Association: UK Cigarette Prices.

Fourth, increases in the price of cigarettes have consistently been demonstrated to decrease the use of tobacco. The price elasticity, the measure of the change of consumption compared to price, is calculated to be approximately -0.5.<sup>30</sup> Thus, if the price of cigarettes rises 10%, then 5% less cigarettes are consumed.

The prevalence elasticity is estimated to be about -0.35,<sup>31</sup> meaning the 10% price rise would cause 3.5% of smokers to stop. In this way, cigarette consumption acts as a 'sumptuary tax'. Furthermore, as the price elasticity in low income groups is disproportionately high,<sup>32</sup> tax increases would reduce smoking further in these groups,<sup>33</sup> thereby helping to reduce health inequality.

It is worth noting that between 27%<sup>34</sup> and 31%<sup>35</sup> of smokers who choose to give up smoking quote financial reasons. The consequence to this is that those undergoing financial stress may find it more difficult to stop smoking.<sup>36</sup> Decreasing the total use of cigarettes would help fulfil all of the aims of the smoking policy; however, a price elasticity of less than -1.0 ensures that revenue would still increase. Nevertheless, it should not be overlooked that those unable to stop smoking would be forced to pay a higher level of taxation. Given that these people are often in low socioeconomic groups, this would be regressive taxation.

Fifth, it has been shown that rises in duty on tobacco is a popular form of taxation: 60% of people support increasing the price of cigarettes more than inflation.<sup>37</sup> Our polling also shows that increasing tobacco taxes is the most popular way to increase revenue.<sup>38</sup> Health England, the national reference group for health and wellbeing established by the Department of Health recommends that a 5% increase in tobacco taxation as the second most cost-effective preventative health intervention.<sup>39</sup> A 5% increase would cause a decrease in tobacco consumption of approximately 2.5%, and an annual revenue increase of 4.1% in tobacco derived revenue – approximately £400 million. This figure would increase with tax increases on cigars and hand-rolled tobacco, and improved control of tobacco smuggling (discussed below).

**Recommendation:** We believe that tobacco taxation should be increased by 5% in the next Budget. This would see the price of a typical pack of cigarettes rise by 23 pence from £6.13 to £6.36 per packet.

**Recommendation:** In addition to increasing the taxation on cigarettes, it is also important to increase the levy on hand-rolled tobacco (HRT). This would prevent people from switching from packets of cigarettes to hand rolling as a means of avoiding any tax increases. It is worth noting that HRT is already under-taxed in comparison with other forms of tobacco,<sup>40</sup> and should therefore be disproportionately increased.

**Recommendation:** The tobacco duty escalator should be re-introduced to increase the cost of cigarettes and HRT over the next Parliament to reflect the cost of smoking to society. A proportion of the additional revenue generated by the duty escalator should be diverted towards comprehensive education and effective cessation programs.

## Tackling tobacco smuggling

Smuggling of tobacco refers to the illegal trade of tobacco products across borders without the applicable duty being paid. It is a major problem both in the UK and around the world and accounts for some \$40 billion in lost revenue annually.<sup>41</sup> A significant market in less expensive smuggled tobacco undermines the use of taxation to regulate demand for cigarettes. Indeed, concerns about the rise in smuggling into the UK in the late 1990's following the elimination of routine border controls between EU states led to the removal of the tobacco duty escalator in 2001. Furthermore, tobacco smuggling is linked to organised crime.

The UK launched a Tackling Tobacco Smuggling strategy in 2000. Since then 14 billion smuggled cigarettes, both genuine products and counterfeits have been seized by UK authorities.<sup>42</sup> Due to increased cooperation with tobacco companies,<sup>43,44</sup> the number of smuggled domestic cigarettes has fallen significantly, as shown in the table below.

	Tobacco market share (%)							
	2000-1	2001-2	2002-3	2003-4	2004-5	2005-6	2006-7	2007-8
<b>Illicit cigarettes</b>	21	20	16	18	15	15	13	10
<b>Illicit HRT</b>	63	52	53	57	59	57	53	47

Sources: HM Customs & Excise, Measuring and Tackling Indirect Tax Losses - 2004. HM Revenue & Customs, Measuring Indirect Tax Gaps – 2008; Measuring Tax Gaps – 2009.

As a response to the international problem of cigarette smuggling, a global plan has been developed. A protocol on the illicit trade in tobacco to the World Health Organisation (WHO) Framework Convention for Tobacco Control (FCTC) is currently under negotiation.<sup>45</sup> This is the first treaty negotiated under the auspices of the WHO, and already has signatories from 167 countries, making it one of the most widely embraced of the United Nations’ treaties. The protocol will benefit both the wealthy countries that lose large amounts of revenue from smuggled cigarettes, as they often have high tobacco taxation; and poor countries, whose domestic cigarette market and tax revenue is undermined by more desirable foreign competition available at a tax-free reduced price.

The draft protocol, which is due to be adopted at the next Conference of the Parties in November 2010, proposes a number of measures – including tighter control of the supply chain, improving local enforcement activities and encouraging international cooperation - which are expected to reduce the size of illicit trade globally. Previous economic analysis has demonstrated that the additional costs incurred by implementing the FCTC would be more than repaid in additional tax revenue, and that there would also be ongoing benefits derived from health expenditure, and productivity.<sup>46</sup> We publish here, for the first time, the estimated changes in UK tax revenue, annual and net present value (NPV) over 50 years for three possible scenarios for implementation of the FCTC. The scenarios are dependent on the geographic scope of effective implementation of the FCTC protocol.

Scope of protocol adoption	Reduction in illicit market (%)	UK tax revenue gained annual (£m)	UK tax revenue gained annual NPV (£m)
<b>EU only</b>	5	84	1,994
	15	251	5,983
<b>EU + countries-origin of counterfeit</b>	25	419	9,972
	50	838	19,944
<b>Worldwide</b>	60	1,006	23,933
	80	1,341	31,911

Source: Unpublished calculations by Paul Johnson prepared for Cost Benefit Analysis of the FCTC Protocol on Illicit Trade in Tobacco Products. ASH 2009.

It should be noted that margins for tobacco smuggling are high throughout the world, and historically those countries with lower levels of taxation have often had higher levels of smuggling.<sup>47</sup> This is clearly not a causal effect, but demonstrates that smuggling can be limited by effective border control, and that smuggling is sometimes more often a consequence of corruption than a result of tax. This is echoed by the World Bank, who say “Conditions that contribute to smuggling include high levels of government corruption,

an established informal market for cigarettes (sales of cigarettes by street vendors), and a well-organised criminal establishment".<sup>48</sup> It should also be noted that the type of tobacco that is most frequently smuggled, HRT, is the tobacco which enjoys the lowest level of duty.

**Recommendation:** The UK should continue to invest in its Tobacco Smuggling Strategy and work to ensure the worldwide implementation of the WHO protocol on the illicit trade in tobacco.

### Supporting the NHS Stop Smoking Services.

The NHS Stop Smoking Service (NHS SSS) is the framework within the NHS that provides smoking cessation advice and treatment. It is divided into centrally funded local organisations, with those services within the Spearhead Areas of poor health outcomes receiving additional funding in order to help address health inequalities. These services are free, accessible both by GP and self-referral, and demonstrate effective results. Recent Government figures show that these services have saved 70,000 lives since their introduction in 2000,<sup>49</sup> at a cost of less than £400 million. How can such an effective service be improved?

#### Referrals to the NHS Stop Smoking Service

Last year, the service helped over 670,000 people to set a quit date.<sup>50</sup> However, this is a fraction of the 65% of smokers who want to quit (5.7 million people), and the 53% of smokers who have sought some kind of advice (4.4 million people).<sup>51</sup> That only 9% of smokers are referred to a cessation group, and 5% use the telephone service seems low in comparison to the 16% who see doctors and other health professionals<sup>52</sup>. 41% of smokers wanting to quit use leaflets and booklets, but still do not present to the NHS SSS.<sup>53</sup> The relatively low number of patients who are referred to the service is surprising. These services tend to have superior results to any other medical input,<sup>54</sup> and given their relative cost-efficiency and expertise in the area, it would be logical to increase the number of referrals to the service.

There are two important ways in which we can increase the number of referrals to these services. Mass media campaigns in their own right have been demonstrated to be effective in reducing smoking prevalence.<sup>55</sup> It has been recognised that mass media campaigns are a key driver to the NHS SSS,<sup>56</sup> and the US Center for Disease Control & Prevention recommend spending \$1-3 a year per capita on these services<sup>57</sup> (this compares to the \$45 per capita per annum spent on advertising by tobacco companies in the USA)<sup>58</sup>. This value equates to between £29 million and £88 million a year in the UK. Yet between 2004 and 2006, the UK spent just £17.5 million per annum.<sup>59</sup> Increasing funding of mass media campaigns would both educate and encourage higher levels of self-referral. This would cost between £11.5 million and £70.5 million per annum to bring up to the level suggested in the USA. These media campaigns could be amalgamated with a program designed to discourage young people starting smoking, which will be discussed below.

Secondly, the NHS could increase the rate at which smokers were referred by healthcare professionals. The service carries a reasonably low profile within the NHS, especially in acute hospitals. Raising the profile of the Stop Smoking Service across the NHS could allow more patients to get the effective help that they require. Increased direct referral of patients from all healthcare professionals would also reduce the burden on GP appointments, and save money from the Quality Outcomes Framework (QOF). Smoking cessation services should automatically be offered to all patients expressing interest in stopping smoking. For example, the Royal College of Physicians is currently producing a standard format for doctors to ask patients on admission to hospital which includes a question about smoking.<sup>60</sup> With the advent of electronic medical records the referral process would become automatic.



**Recommendation:** The Department of Health should increase funding of mass media campaigns to both continually educate the public and encourage higher levels of self-referral to the NHS Stop Smoking Service. Every patient that expresses an interest in stopping smoking should automatically be referred to the NHS Stop Smoking Service.

#### The provision of the service and varenicline

Increasing the number of patients seen by the NHS SSS would necessitate its expansion. And, whilst the results of the service are excellent, there is scope for improvement.

Drug treatments are used by 90% of those who attend the NHS SSS<sup>61</sup> and have been shown to increase the effectiveness of the intervention by two or three times. The treatment options include nicotine replacement therapy (NRT), the antidepressant bupropion, and a newer drug, varenicline. Varenicline is a partial nicotine receptor agonist, meaning that it simulates some of the effects of nicotine, and simultaneously blocks any additional effect that may be derived from taking further nicotine. It is the most effective treatment option in the NHS SSS, with studies consistently demonstrating it to be superior to any other therapy.<sup>62</sup>

Experimental data shows that varenicline is 31% more efficacious than Nicotine Replacement Therapy and 52% better than bupropion between six months and a year after intervention.<sup>63</sup> The SSS data correlates these findings, showing that varenicline is about 25-30% more effective than other therapies.<sup>64</sup> However, the service only prescribes varenicline in 20% of cases, since it is often confined to patients who have failed with NRT. There is no good reason why all patients should not be offered it, especially when there is difficulty getting people into the service in the first place.

The National Institute for Health and Clinical Excellence (NICE) investigated the cost-efficiency of varenicline and how it compares to NRT and bupropion. Varenicline not only met the cost-effectiveness test, but it was found that “over a lifetime horizon varenicline dominated bupropion and NRT – that is, it was cheaper and more effective”.<sup>65</sup> This is based not only on the increased quitting rate, but also on a decreased rate of relapse that has been demonstrated in long term follow up.<sup>66</sup>

Currently, the NHS SSS costs £219 per successful quitter, excluding prescription charges. Including prescription charges, this cost rises to approximately £389.<sup>67</sup> We believe that there is significant scope for using more expensive drug treatments, especially when comparing the cost of varenicline in comparison with NRT, and its 25-66% increased effectiveness. Inverting the prescription rates between NRT and varenicline (meaning that varenicline was used in 67% of cases, and NRT in 20%) would cost an additional £36 million; however, almost 50,000 additional people would quit smoking, at a cost of £749 per additional quitter. The total cost per quitter would be increased to £430, however, this is still an impressive figure, and would save money in the long term.<sup>68</sup>

**Recommendation:** The NHS Stop Smoking Service should offer varenicline as first line drug treatment for all patients wishing to quit smoking.

## The market for Nicotine Replacement Therapy

The addictive component of cigarettes is nicotine, which is delivered extremely quickly into the circulation, and provides the rapid rush and relief which many smokers seek. Nicotine, in of itself, is only minimally

harmful, it is the other chemicals that are present in tobacco which cause cancer, restrictive lung disease, and the vast majority of cardiovascular disease and other life-threatening illnesses.<sup>69</sup>

Nicotine replacement can be used to help smokers wean themselves off tobacco. In those patients for whom the addiction to nicotine is too strong to break, the use of nicotine substitutes may be considered in order to reduce exposure to the harmful contents of tobacco smoke. NRT is currently available by prescription, dispensed by a pharmacist, and over-the-counter (OTC); the preparations vary slightly – gum, skin patches, nasal spray, and oral tablets - but the products are essentially the same. However, NRT is comparably expensive and much less prevalent than cigarettes, despite not having the substantial tax burden of tobacco.<sup>70</sup> While a packet of cigarettes costs £6.13, a packet of NRT gum costs £5.79.<sup>71</sup>

There is evidence which demonstrates that those who cannot stop smoking will smoke less if they have access to NRT.<sup>72</sup> Therefore, reducing the price and increasing the accessibility of NRT would help smokers consume less tobacco, encourage and assist those who want to stop, and help ex-smokers who are tempted to restart smoking. Encouraging manufacturers to enter the NRT market through deregulation, is the most crucial part of this strategy. NRT in the UK is much more expensive than comparative products in the U.S.A, indicating artificially high prices. Currently smokers do not have a clear financial incentive to switch cigarettes for NRT (if they do not wish to attend smoking cessation services for a prescription), and given that 30% of smokers want to quit for financial reasons,<sup>73</sup> the production of a price differential is crucial.

Costly and overly restrictive regulation of NRT is one of the key reasons that it is expensive in the UK. Comparing the minimal regulation of the tobacco market to the intense regulation of NRT by the Medicines and Healthcare products Regulatory Agency (MHRA), there is a clear and perverse disparity. Whilst the MHRA have recognised that the clear benefits of NRT outweigh their possible dangers,<sup>74</sup> their regulation is still a problem for market entry. However, it should be noted that the MHRA have recently licenced NRT for harm reduction, rather than just cessation.<sup>75</sup> Nevertheless, removing regulation as a barrier for firms to enter the NRT market would increase competition, and reduce prices. It has been suggested by the Royal College of Physicians that a new regulatory body should be established with responsibility for NRT and tobacco.<sup>76</sup> Alternatively, collaboration with foreign regulatory agencies, such as the Food and Drug Administration (FDA) in the U.S.A. may assist in encouraging NRT manufacturers who are established abroad, into the UK market.

**Recommendation:** Move to light-touch regulation of NRT by the MHRA and collaboration with foreign regulatory agencies, such as the Food and Drug Administration (FDA) to encourage a more competitive market with lower prices.

**Recommendation:** Introduce a legal obligation for NRT to be prominently stocked in all retailers that sell also tobacco products. This would also help those people attempting to stop smoking, who may suffer from cravings and be near to a cigarette retailer, but not an NRT retailer. Stocking NRT equally prominently would also remove some glamour from a cigarette display, and remind smokers of the health implications of smoking.

### Targeting pregnant mothers

In addition to the direct damage that smoking causes to their baby (which is manifested both in birth and throughout life<sup>77,78</sup>), a smoking mother greatly increases the chances of the child smoking.<sup>79,80,81,82</sup> Pregnancy is a crucial time to intervene, but pregnant mothers are consistently the most difficult group to

target. Drugs such as varenicline and bupropion are not licensed for use in pregnancy.<sup>83</sup> While NRT causes a minimal decrease in the number of mothers smoking, it is likely to reduce the amount they smoke, which results in increased babies' birth weight.<sup>84</sup> There is some evidence for the positive effect of counselling programs,<sup>85</sup> but the rates of pregnant mothers quitting smoking is not encouraging.

If counselling and drug treatments have only limited efficacy, then what are the options? A number of trials have investigated the role of financial incentives to stop smoking in pregnant women<sup>86</sup> and also the wider population.<sup>87</sup> The rationale of this intervention is to provide money for not smoking, so the choice to smoke is made more expensive thereby providing a greater incentive for pregnant smokers to quit. For example, if a pregnant mother spends £20 a week on cigarettes, and as a result is not eligible for a direct incentive of £10, then the choice to smoke costs £30 a week. Conventional figures on price elasticity (which admittedly may not be transferable to this population), would indicate a reduction in cigarette consumption of 20%.

By providing an obvious reason to stop smoking, mothers are given a widely acceptable excuse to opt out of the social norm of smoking. This prevents them from becoming isolated from their peer group. The use of direct financial incentives also provides health professionals with an opportunity to raise smoking cessation without risking confrontation. Midwives and other health professionals often report a reluctance to advocate cessation for fear of appearing judgemental and introducing conflict in to the relationship. An incentive scheme "sugars the pill", providing a non-threatening opportunity for both parties to discuss the risks of smoking.

The evidence gained from trials has led to a regional scheme to assess practical effectiveness of providing financial incentives for young, smoking pregnant women in deprived areas. The 'Give It Up For Baby' program started in Tayside in 2007.<sup>88</sup> This program used financial incentives in the form of grocery vouchers and an entitlement card allowing access to transport and leisure services. It also provided free NRT and pharmacy based support. By concentrating on the most deprived areas of Tayside, the program targeted health inequalities, interacted with pregnant mothers most in need of support, and identified those pregnant mothers in whom modest financial incentive was potentially the most effective both in smoking cessation and improving quality of life.

The initial results of the program were very encouraging.<sup>89</sup> In 2006, only 6 pregnant women made contact with smoking cessation services throughout Tayside, in 2008 after the program the figure was 170. The cost of the Tayside program was £1,700 per quitter. While this is significantly more expensive than the cost of conventional cessation services, it is still cost effective because this is a particularly difficult group to target and the benefits of pregnant women quitting smoking are significant: analysis by NICE has recently suggested a societal net benefit of over £500 million.<sup>90</sup> Using the above figures, it would cost £36 million to offer this scheme to pregnant mothers of, or below, the age of 20.

Other programs in Scotland, such as the 'Breathe' project in Glasgow<sup>91</sup> and 'Give it Up 4 Life' in Fife have demonstrated ways in which maternity services have increased referrals to specialised pregnant mother smoking cessation services. By having dedicated cessation staff who are well known to maternity services, a productive and effective working relationship can be fostered. Elsewhere in the UK, the Family Nurse Partnership (FNP) scheme is currently being trialled.<sup>92</sup> Data from the United States on schemes of this type has demonstrated a 25% reduction in smoking during pregnancy as a result of this type of program.<sup>93</sup>

It would be both efficient and straightforward to amalgamate FNPs with smoking cessation in pregnancy services. Some 90% of those offered FNP programs have accepted. This represents an extraordinarily high level of healthcare contact. The nurses involved in FNPs will already have training in smoking and smoking

cessation. Using this scheme to assist the provision of free NRT and financial incentives represents what is likely to be the optimal method of smoking cessation. Each nurse within the FNP program has a caseload of 25 families, and thus extending the service with £50 million would allow more than 40,000 families to be a part of the program.<sup>94</sup>

**Recommendation:** A specialist pregnancy stop smoking service should be established throughout the country, which could be as part of either maternity units, or the current NHS Stop Smoking Services. Direct financial incentives for smoking cessation should be offered to pregnant women of, or below, the age of 20. These services could easily be amalgamated with existing FNP programs.

### Preventing addiction in young adults

Unless we can intervene to break the cycle of addiction, then today's adolescents are tomorrow's smokers, and the day after – parents of smokers. Cigarette marketing has long been accused of targeting adolescents. There have recently been moves towards reversing this trend by limiting tobacco packaging and advertising, increasing the age at which tobacco can be bought, and banning cigarette vending machines.

However, social pressures from family and friends, combined with the cultural mystique of smoking continue to provide a powerful stimulus to smoke. Therefore, preventing addiction in adolescents is a crucial area in which to concentrate funds generated from smoking taxation.

NICE has issued guidelines on methods it recommends to prevent addiction in adolescents.<sup>95</sup> There is already a body of evidence indicating that mass media campaigns can be effective in reducing the prevalence of smoking in young people.<sup>96</sup> There is also evidence that community based interventions, most notably general health promotion schemes, reduce the incidence of smoking in young people.<sup>97</sup> These interventions use a variety of methods which are coordinated and targeted within a particular area to reduce smoking prevalence. They may include mass media, but are usually more extensive with a greater emphasis on health education.

In a report prepared for NICE, it has been estimated that a mass media campaign targeting young people would cost £10 million per year for five years.<sup>98</sup> The costs of such a campaign was subject to the NICE cost-effectiveness test and was found to be a highly cost-effective intervention at reducing smoking uptake.

**Recommendation:** Prevention of addiction is the crucial next step in reducing smoking prevalence. A mass media campaign specifically targeting young adults to prevent tobacco addiction should be introduced at a cost of £10 million per year.

### Summary: costing the proposals

A 5% increase in the tobacco taxation would raise approximately £400 million for HM Treasury. The costs of the above schemes aimed at stopping targeted groups from smoking are:

- £10 million on a mass media campaign to increase referral to the NHS Stop Smoking Service
- £36 million on increasing the use of the drug therapy varenicline
- £35 million expanding the NHS Stop Smoking Service
- £36 million on specialist cessation services for pregnant women, including financial incentives
- £50 million expanding the Family Nurse Partnership program
- £10 million for mass media campaigns to target young adults

This would leave over £220 million per annum for the Exchequer.

It is worth noting that tax income would decrease with a reduction in smoking prevalence. However, the cost of smoking to our society far outweighs its benefits to the Treasury and detailed cost and revenue changes over time would need further modelling.

## Appendix 1: Calculating the true cost of a packet of cigarettes

Multiple methods exist for conducting economic evaluations of healthcare and each have their merits depending on the goal of the evaluation. In this report we adopt a societal point of view because it takes the broadest outlook and is, from an economic perspective, always considered relevant.<sup>99</sup> The objective of this analysis is to ensure the cost of a packet of cigarettes reflects the true social cost of smoking.

In this societal analysis we have not included the value of a human life, although it is worth noting that valuations do exist and, indeed are used by Government departments. The figure calculated by the Department of Transport is frequently quoted,<sup>100</sup> and they value the cost of preventing a single casualty as £490,960 in lost output and £936,380 in human costs.

### Cigarette production, shipping and retail costs

The Tobacco Manufacturer's Association quote the retail price of a typical pack of cigarettes in the most popular price category as £6.13.<sup>101</sup> They indicate a tax burden of £4.67. Therefore, the difference between these values, £1.46 should indicate the costs to produce, ship, and retail the packet of cigarettes. A proportion of this cost will include a profit for the tobacco company, distributor and retailer.

### Healthcare costs

Cigarette smoking is known to cause a number of illnesses. By calculating the costs of these illnesses to the health service, and then attributing a proportion of these costs to the direct effect of smoking, a value can be produced. The huge amount of data collated by the NHS allows costs to be calculated reasonably accurately. Determining the proportion that should be allocated to the effect of smoking is more difficult.

In 1998, the health related costs of smoking were estimated to be approximately £1.5 billion.<sup>102</sup> Allender et al. recently repeated the estimate using more up to date data, and calculated the costs to be £5.2 billion.<sup>103</sup> Whilst the amount spent on illnesses such as lung cancers and cardiovascular disease is contemporaneous and likely to be accurate, the proportions that are allocated to smoking are debatable. Callum et al. produce a more conservative figure of £2.7 billion.<sup>104</sup> We give our range between these two figures, preferring the more conservative estimate in our final calculation.

### Loss of productivity

McGuire et al<sup>105</sup> estimated that £915 million annually is lost on the basis that average smokers spend ten minutes a day smoking, while light smokers and part-time workers would use approximately half of this time. The Royal College of Physicians (RCP) used similar initial assumptions on average smoking time to calculate that some £2.6 billion would be saved through the introduction of smoke-free legislation. Using McGuire's estimates of 5.2 million working smokers, with the RCP's estimates of ten minutes a day smoking reveals an intermediary figure of £2.9 billion.

It is true that smoking incidence has fallen since the introduction of smokefree legislation and the RCP report. Therefore we have expressed our range between £915 million and £3.2 billion, preferring our calculated value of £2.9 billion.

#### Absenteeism

A number of studies have demonstrated that smokers have an increased level of absenteeism on health grounds. There are a variety of estimates of the hours and days a smoker may be expected not to attend his workplace in comparison with a non-smoker. In a report for the London School of Economics (LSE), Professor Alistair McGuire<sup>106</sup> took a mean of ten international studies which have been published over the last 18 years. He concluded that smokers are absent for an extra 1.77 days a year in comparison with non-smokers. The National Institute for Clinical Excellence (NICE), however, based on more UK specific data, estimate that smokers miss an additional 33 hours of work.<sup>107</sup> This is a significant increment, amounting to three days a year more than McGuire's estimate.

McGuire's calculation for the cost of absenteeism due to smoking comes to £1.1 billion per annum. Using his estimates of smoking prevalence, average GDP per capita,<sup>108</sup> and the more UK specific NICE estimate, we calculate a value of £2.5 billion. Our range has therefore been expressed as a value between these figures, favouring the NICE value in the final calculation due to the UK focus of the data.

#### Loss of output

A loss of output refers to the loss of economic activity that is caused by smokers of working age dying prematurely. The higher death rate seen in smokers has been repeatedly demonstrated, and begins to become clear from very early in a smoking history. This elevated rate of trained workers dropping out of the economy has a significant impact on GDP. We use the human capital approach to estimate the loss.

The NHS Information Centre has estimated that 23% of all deaths among men and 14% of those among women are attributable to smoking.<sup>109</sup> According to these estimates 28,385 lives were claimed between the ages of 35-74 as a result of smoking, in 2008. Because the health effects of smoking tend to manifest later in life there are very few deaths among people younger than 35, therefore younger ages were excluded from the productivity loss calculation. To determine the number of working people that died from smoking we apply the ONS's employment rates by age group.<sup>110,111</sup> To account for losses in future earnings we made calculations for each 5-year age cohort as they would have moved through their working life to give a value for life time earnings. To estimate the future increase in wages, we apply the average rate of increase in real earnings calculated from ONS data. Since we make calculations of earnings for well into the future, it is necessary to apply a discount rate to these figures for life time earnings. Discount rates increase the value of money today above the value in the future to reflect people's preference for having benefits today rather than in the future.<sup>112</sup> We apply the HM Treasury real discount rates which are used by the Department of Health.<sup>113</sup> The result is a set of detailed calculations for the loss in productivity over the working life for all smoking related deaths by age cohort.

We calculate the total losses in productivity due to premature smoking related deaths to be £4.07 billion.

We made a number of assumptions in our calculation. First, we assumed that all those who died due to smoking in 2008 and did not return to the labour market would have lived a full life to their retirement and that their productivity would not have been affected by any other health problems. Second, we did not automatically assume that all workers left the labour market at statutory retirement age, because increasing numbers of people are choosing to work beyond the pension age.<sup>114</sup> We calculated a level of economic activity up to the 70-74 age cohort as employment rates for this age range are produced by the ONS. We

also based our calculation on the changes in retirement age brought in by the Pensions Act 2007, making the retirement age for individuals in younger cohorts different to those that died in older cohorts.<sup>115</sup>

Age cohort	Number of deaths in England 2008	Number of deaths attributable to smoking*	Number of deaths among employed individuals	Total losses in productivity (£ millions)
35-39	3,808	757	648	470
40-44	5,770	1,124	957	624
45-49	8,041	1,563	1,330	729
50-54	11,058	2,136	1,541	663
55-59	16,414	3,184	2,299	741
60-64	25,699	4,985	3,015	696
65-69	31,274	6,060	932	112
70-74	44,695	8,576	535	37
<b>Total</b>	<b>146,759</b>	<b>28,385</b>	<b>11,257</b>	<b>4,076</b>

\* The percentage of deaths attributable to smoking among men is 23% and 14% among women.

#### Costs of passive smoking

A recent landmark study of cardiovascular disease in Scotland after the introduction of smokefree legislation highlighted the deleterious effects of social smoke inhalation.<sup>116</sup> It showed a 17% reduction in admissions to hospital with acute coronary conditions which was predominantly due to the decrease seen in non-smokers. This value has been ratified by two subsequent meta-analyses of smokefree studies.<sup>117,118</sup> As important as the massive reduction in workplace and social exposure is, the majority of second hand smoke effects are seen in the home. It is conservatively estimated by the Royal College of Physicians that this accounted for over 95% of 12,200 deaths from passive smoking in 2003.<sup>119</sup>

Accounting for a reduction in smoking prevalence of a third (the RCP used estimates of 30% smoking prevalence), and the complete cessation of workplace exposure, an estimate of mortality of approximately 7,700 people per annum is highly conservative. Using the same methodology as above we calculate that the productivity loss of lives lost as a result of passive smoking is £713 million.

#### Environmental costs

As highlighted above, the cost of clearing up cigarette butts are estimated to be £342 million each year.

#### Fire costs

Fire is estimated to cause 1% of the global burden of disease, and fire costs are estimated account for 1% of gross domestic product (GDP). In the UK, total fire costs amount to £7 billion each year,<sup>120</sup> of which there is £2.52 billion of economic loss secondary to fatalities, injuries and property damage; £1.74 billion cost of the fire service; and £2.77 billion spent on anticipation of fire.

Whilst we have good data on ignition agents responsible for fires throughout the country, and a good idea of what fires cost, estimating the amount for which smoking is responsible is not straightforward. This is because whilst smoking accounts for less than 10% of accidental dwelling fires, it also accounts for approximately 50% of fatalities.<sup>121</sup>

Numerous estimates of around £100 million were made for the cost of smoking related fires to workplaces;<sup>122</sup> however, with the advent of smokefree legislation, these costs are likely to be significantly diminished.

In order to make a calculation of the economic impact of fires caused by smoking to the UK economy, we have used the average costs of domestic dwelling fires. The average cost of injury and fatalities have been tripled, given that smoking related fires are more than five times as likely to result in death and 150% as likely to cause injury compared to other domestic dwelling fires. We accept that this is an arbitrary number. We have then scaled this figure proportionally to include the costs of the fire service and cost incurred in anticipation of fire.

We calculate the costs of smoking related fire at £507 million annually. This cost is likely to be conservative as it is based on the 2004 value for costs of fire and completely excludes costs of fires other than those within the dwelling. To illustrate this underestimate, the estimated cost of smoking related fires in the United States was approximately \$7 billion in 1998.<sup>123</sup>

#### The consideration of business

When considering smoking economics, the role of the manufacture and sales of tobacco within the economy is often cited. Newsagents and similar small businesses may rely upon the sale of tobacco products, meanwhile many UK manufacturers make large profits from the wholesale of cigarettes.

These businesses certainly do contribute significantly to our economic output. British American Tobacco, for example, posted a £3.6 billion profit on a gross turnover of £33.9 billion in 2008.<sup>124</sup> Imperial Tobacco, meanwhile, made a profit of some £2.23 billion.<sup>125</sup> However, the majority of these profits are made from overseas sales. More importantly, however, are the thousands of newsagents that rely upon the sales of tobacco to remain profitable.

However, smoking impacts on business in a variety of ways, and, when viewing our current paradigm, losses should be considered alongside benefits. McGuire's analysis of the costs incurred by business as a result of smoking<sup>126</sup> reveals what he refers to as 'indirect costs' of £1.1 billion per annum. By 'indirect costs', he most directly means a loss of customer satisfaction.

Furthermore, previous studies<sup>127,128</sup> have demonstrated that, were people not to spend money on cigarettes, they would direct their expenditure elsewhere. Other leisure industries support a greater workforce, and have a significantly lower tax profile. This leads to an aggregate increase in employment, with consequent economic benefits. Indeed, they estimate that the benefits of to be derived from leisure spending going elsewhere would significantly outweigh the detrimental effects. For these reasons we exclude the role of business from our calculation.

#### True cost of a packet of cigarettes

As stated earlier, the objective of this analysis is to ensure the cost of a packet of cigarettes reflects the true social cost of smoking. We find the total societal cost of smoking is £13.74 billion. However, since cigarettes comprise 93.3% of the tobacco market the adjusted cost calculation for cigarettes alone is £12.82 billion.

The most recent figures given by the Tobacco Manufacturers Association shows there were 47 billion duty paid cigarettes consumed in 2007.<sup>129</sup> However, the TMA figures also show an average decline since 2000 of 1.32 billion cigarettes per year and we estimate that on this trend there would have been 43 billion cigarettes consumed in 2010. This equates to 2.15 billion packs of 20 cigarettes.



Therefore, in order to ensure that smoking is revenue neutral to society, the total taxation per packet should be increased to £5.96. This would make the current retail cost of a packet of cigarettes £7.42.

<b>Total Societal Costs of Smoking</b>				
	<b>Lower Margin (£ billion)</b>	<b>Middle Margin (£ billion)</b>	<b>Upper Margin (£ billion)</b>	<b>Preferred Value (£ billion)</b>
<b><i>Costs of Smoking</i></b>				
Healthcare Costs	2.7		5.2	2.7
Loss of Productivity	0.915	2.9	3.2	2.9
Absenteeism	1.1		2.5	2.5
Output Loss		4.1		4.1
Passive Smoking		0.7		0.7
Environmental Costs		0.34		0.34
Fire Damage		0.5		0.5
<b>TOTAL</b>				<b>13.74</b>

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