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Tobacco control: present and future

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The history of tobacco control in the twentieth century can be summed up by the phrase 'too little, too late'. The century saw the proliferation of the most deadly form of tobacco use: cigarette smoking. Until the 1970s, no government took serious action to protect its citizens. In fact, probably the most effective global tobacco control 'strategies' to date have not been motivated by health concerns: they have been inaccessible or uneconomic markets for tobacco companies and a cultural taboo on women smoking. Economic development has led to massive increases in male cigarette smoking in developing countries but even now <10% of women in non-Western countries such as China, Russia and India smoke. With 'westernization', this picture is changing. Without drastic action to get current smokers to stop, the annual rate of tobacco-related deaths will grow from 5 million in 2006 to 10 million in 2025. Without further action to prevent take up of smoking, the subsequent death toll will be even higher. The recently enacted World Health Organization (WHO)-initiated Framework Convention on Tobacco Control (FCTC) can mitigate this impending disaster but only if it is implemented according to the spirit and not just the letter of the articles contained therein. Specific tobacco levies in every country should be the primary means of kick-starting the process, with the proceeds being used exclusively to fund other tobacco control initiatives, including product regulation.

Keywords: tobacco control; smoking; smokeless tobacco

Tobacco use killed ~5 million people in 2006 [1]. On current projections, this figure will rise to ~10 million in 2025 [1]. Many of those who are killed and many more who are not will suffer severe disability for a large portion of their lives (Table 1). Most of the disease and disability comes from smoking, although some results from the use of 'smokeless' forms, primarily preparations that are chewed or held in the mouth ('oral' tobacco). The goal of tobacco control is to reduce this burden of death and disease.

The obvious strategy is to make it illegal to manufacture or sell tobacco products, with harsh sanctions for those who break the law. With tobacco use endemic in society and such powerful commercial

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Table 1 Fatal and serious non-fatal disorders for which tobacco use is a known or probable cause or exacerbating factor

Smoking		
Cancer of the lung	Leukaemia	Infertility
Cancer of the larynx	Chronic obstructive pulmonary disease	Spontaneous abortion
Cancers of the oral cavity	Pneumonia	Stillbirth
Cancer of the nasopharynx	Asthma attacks	Low birth weight
Cancer of the oropharynx and hypopharynx	Coronary heart disease	Conduct disorder in offspring of women who smoke during pregnancy
Cancer of the oesophagus	Aortic aneurism	Sudden Infant Death Syndrome
Cancer of the liver	Cerebrovascular disease	Low back pain
Cancer of the cervix	Peripheral vascular disease	Osteoporosis
Cancer of the stomach	Vascular dementia	Tuberculosis
Cancer of the urinary tract, kidney, ureter and bladder	Macular degeneration	Type II diabetes
	Cataract	Peptic ulcer disease
	Hearing loss	Surgical complications
Smokeless tobacco use*		
Cancer of the oral cavity		

Sources: All [2, 3] except vascular dementia [4], macular degeneration [5], low back pain [6], tuberculosis [7], diabetes [8], conduct disorder [9], surgical complications [10] and smokeless tobacco [11].
Smokeless tobacco is also potentially implicated in heart disease, but the data on this are conflicting. See http://www.deathsfromsmoking.net for estimates of numbers for each country and region.
*These vary greatly in concentrations of carcinogens and therefore risk.

interests at stake, there is no political will to adopt this kind of measure. The nearest any country that has come to it is Bhutan where the sale of cigarettes has been made illegal. Therefore, other means have to be found to reduce tobacco-related harm.

What constitutes a tobacco control strategy?

Tobacco control can involve (i) influencing the behaviour of current or potential tobacco users, (ii) limiting how far the tobacco industry can seek to influence their behaviour and (iii) reducing the harm from use of tobacco products.

Influencing the behaviour of users or potential users

Table 2 summarizes a simple taxonomy of approaches designed to influence behaviour patterns. This can provide a framework for understanding how existing tobacco control methods work and how they might be developed in the future.

The aim here is to reduce the number of people who use tobacco by preventing young people from starting or motivating those who have

Table 2 The epicure taxonomy of approaches to influencing behaviour

Education	Increasing knowledge and understanding about the behaviour and its effects
Persuasion	Actively attempting to shape attitudes and behaviour through argument, imagery, etc.
Inducements	Making the desired behaviour more attractive
Coercion	Making the undesired behaviour less attractive
Upskilling	Providing training or instruction on how to achieve the desired behaviour
Regulating access	Restricting opportunities to engage in the undesired behaviour
Empowerment	Making it easier to engage in the desired behaviour

started to stop. Using the taxonomy above, this can involve (i) education about the health effects of tobacco use and the benefits of stopping, (ii) use of persuasive techniques to foster negative attitudes to tobacco use, (iii) 'quit and win' type contests to incentivize smokers to stop, (iv) economic coercion through taxation and social coercion through public disapproval, (v) booklets, leaflets, Internet sites and so on providing instruction on how to stop successfully, (vi) prohibiting sales of tobacco to minors, restricting where people can smoke and so on and (vii) providing medication or psychological support for those wanting to stop tobacco use.

Limiting the activities of the tobacco industry

Curbing the tobacco industry's efforts to get people to start smoking and not to stop could involve (viii) prohibiting marketing activities, (ix) preventing the industry from making unfounded claims about reduced health risks from products such as 'low tar' cigarettes and in principle (x) preventing them from engineering their products to make them more attractive or harder to give up.

Reducing harmful use

As noted earlier, smoking (including hand-rolled cigarettes, pipes, cigars and bidis) is by far the most harmful method of using tobacco [3, 12]. Smokeless products are two or more orders of magnitude less harmful, although they vary in this regard [11]. Nicotine itself appears to pose only minor risks to most people in the doses obtained from tobacco [13]; so, if one considers tobacco as primarily a means of ingesting nicotine, there is scope for reducing tobacco-related harm by (xi) introducing regulation to force the tobacco industry to reduce the delivery of toxins by their products and (xii) promoting switching from more harmful forms of nicotine ingestion to less harmful ones.

Tobacco control up to the present

Until recently, a major factor limiting the growth of cigarette smoking globally was probably the inaccessibility of markets or the lack of purchasing power in those markets, but this situation changed radically in the latter half of the twentieth century and continues to do so. Apart from this, the extent to which the 12 approaches listed above have been applied in different countries or regions has largely dictated the extent of tobacco-related harm experienced in those areas. The following paragraphs discuss approaches that have restricted growth in, or led to a reduction in, tobacco use, starting with what has had the most impact thus far.

Social coercion

Historically, by far, the most effective form of tobacco control has involved social coercion and in particular the existence of a strong taboo against women smoking. Even now, most of the world's women face strong social pressures not to smoke, and smoking prevalence is much lower than in men [14]. In China, India and the Russian Federation, for example, smoking prevalence in women is <10%. Relaxation of this taboo in these societies represents a major threat to the world's health [15]. The tobacco industry is exploiting this trend by aggressively promoting cigarettes to this new market [14]. In some regions in the West, such as California, it has been suggested that more subtle social coercion has played some role in the decline in smoking prevalence [16].

Education and persuasion

Education and persuasion have probably played a major role in decreasing smoking prevalence in some Western countries [17]. The effects of this kind of approach cannot be quantified by direct observation because there are so many potentially confounding factors. However, educating smokers about the harm caused by smoking and media advocacy and specific campaigns to shape social norms surrounding smoking were probably responsible for the downturn in smoking prevalence in the United Kingdom and the United States in the 1970s [18]. In these countries, mass media campaigns have probably had a much smaller effect in recent years [19]. However, this may reflect the modest budgets available to those devising the campaigns.

Warning labels on packaging and promotional material is another approach that is commonplace. A direct effect on prevalence following the introduction of warning labels has not been detected, but recent evidence suggests that pictorial warnings may have some impact [20].

Tax increases

Raising the cost of tobacco use has proved quite an effective tobacco control strategy [18, 19, 21]. On average, a 10% increase in the cost of smoking results in an estimated 4% reduction in the consumption of cigarettes (a 'price elasticity' of 40%). This figure is higher in developing than developed countries [18], higher in younger than older smokers [18], higher in lower income smokers [22] and higher in pregnant smokers than non-pregnant smokers of the same age [23].

A reduction in consumption does not equate to a similar size of reduction in smoking prevalence. Some of the decrease in consumption results from continuing smokers reducing the number of cigarettes they smoke per day. This would still represent a benefit, were it not the case that these people appear to smoke each cigarette more intensively and end up with the same amount of smoke exposure [24]. The effect of price rises on smoking prevalence appears to be over half the effect on total consumption [25]. In China, for example, the total elasticity has been estimated at 65%, with a 'participation' (prevalence) elasticity of 44% [26].

France recently increased the price of cigarettes by 40% in the space of just over 1 year. This was accompanied by a 31% decrease in consumption and a temporary doubling in calls to their smoking cessation helplines and purchasing of medications to aid cessation [27].

A major issue that arises in relation to tax increases is that of smuggling and tax fraud. In the United Kingdom, it is estimated that ~40% of cigarettes (including hand-rolled) have not had UK duty paid on them (and in most cases no duty of any kind) [28]. The average cost of such cigarettes is half of that of legitimate cigarettes [28]. Any taxation policy needs to be accompanied by vigorous and adequately funded law enforcement to combat this problem.

Smoking restrictions

Comprehensive bans on smoking in workplaces and indoor public areas also appear to have had an effect. The main reason for introducing such bans is to protect the health and comfort of non-smokers, but bans can clearly motivate smokers to try to stop and may make it easier for them to succeed. The recent ban in Ireland appears to have reduced smoking prevalence by 2% within the first 2 years [29]. A similar ban has been put into force in parts of the United States and Australia and in Norway, Scotland, New Zealand and Italy, with England due to follow in summer of 2007. Partial bans have been introduced in countries as diverse as Spain, India and Iran, although the degree of compliance and enforcement appears to be variable. Such partial bans appear to have minimal effect on smoking prevalence [18].

Provision of smoking cessation treatments

Increasing access to effective treatments to aid smoking cessation is an approach that has recently grown in popularity. The United Kingdom was the first country to introduce a national smoking cessation treatment programme funded through general taxation. Other countries have since followed suit, including Japan and Taiwan. Since 2000, in the United Kingdom, any smoker is entitled to receive behavioural support from a trained smoking cessation advisor or as part of a stop-smoking support group as well as a course of nicotine replacement therapy (NRT) or bupropion [30]. In addition, smokers can purchase NRT from pharmacies and some shops. In 2005, ~2 million smokers in the United Kingdom used NRT (and to a much lesser extent bupropion) to help them stop smoking, and the effectiveness of this treatment on permanent cessation can be estimated at ~2–3% (The permanent cessation effect is about half that of the 6-month continuous abstinence rates typically reported in meta-analyses.) [31]. In addition, ~600 000 smokers in the United Kingdom used medication plus behavioural support, and this will have helped an estimated 5% to stop permanently [32]. So treatment to aid cessation in the United Kingdom created ~90 000 ex-smokers in 2005. This represents 0.75% of the 12 million smokers in the country. Approximately one in four adults smoke, so the total effect on smoking prevalence will be ~0.2%. With less widespread access to treatment, the effect in other countries will be lower.

Restricting tobacco promotion

Many countries now restrict or ban the promotion of tobacco products. There is little evidence that restrictions short of a comprehensive ban have any effect, but comprehensive bans do appear to have an effect over time [18]. It seems likely that once the product has acquired a positive image among certain groups, that image is largely self-sustaining. Moreover, existing smokers do not need advertising to keep them smoking, most are addicted. However, in non-Western markets, banning all forms of promotion of tobacco products may slow the rising tide of smoking by preventing overt exploitation of the aspirations of these populations.

Restricting sales of tobacco to minors

Many countries do not permit the sale of tobacco products to minors (in the United Kingdom, for example, children <16 years) [18]. As currently implemented, it is not clear whether this measure has had any significant

impact. One difficulty is that children often obtain cigarettes from older friends or siblings or from vending machines [33].

Stop-smoking materials

There is little evidence to date that booklets, leaflets or other self-help materials have a significant impact on tobacco use. A Cochrane review estimated a potential effect on cessation among those who use self-help materials of up to 1% [34].

There is now a burgeoning of Internet sites to help smokers to stop. Two recent randomized trials of an Internet site offering tailored support in smokers also using NRT showed evidence of modest but clinically and statistically significant effectiveness [35, 36]. A significant problem concerns the lack of quality control of stop-smoking Internet sites, and almost none of those that are in widespread commercial use has been evaluated in empirical trials or provide properly audited data on success rates, including those for which users have to pay.

Incentivizing smoking cessation

The most common form of incentivization of smoking cessation is the Quit-and-Win competition in which smokers register and then enter into a prize draw if they are abstinent at some defined future time point. There have been positive evaluations of this kind of approach [37], but there are concerns about the possibility of misuse, and thus far they have played a very small role in tobacco control strategies.

Preventing mis-claiming by the tobacco industry

After the failure to act once the harm caused by smoking became known, the 'low tar story' probably represents the biggest failure of tobacco control in the twentieth century. Once the health effect of smoking started to be publicized, the tobacco industry set about re-engineering its products to provide the impression that they were safer. Filters were introduced to trap the toxic tar droplets, and ventilation holes were punched into the cigarette paper to dilute the smoke. The tobacco industry marketed these 'low-tar' cigarettes in a way that was designed to reassure smokers, so that they would continue to smoke [38]. In fact, these cigarettes delivered to human smokers, as opposed to government smoking machines, roughly the same levels of toxins as the old cigarettes. This was because smokers simply adjusted the way they smoked to compensate for the changes [39].

The failure of governments to prevent the mis-selling of low-tar cigarettes probably resulted in many thousands of tobacco-related deaths of smokers who would have stopped had they appreciated the true harmfulness of the new products. Labelling brands with claims such as 'mild' or 'low tar' was recently banned in the European Union, but it may be too late now for it to have much effect.

Preventing engineering of tobacco products to promote addiction

Since its early days, the cigarette has changed radically to make it easier to smoke and more palatable while delivering nicotine rapidly in whatever quantity the smoker may desire. New evidence from studies in other species suggests that flavour and palatability may contribute in important ways to the addictive potential of the cigarette. It appears that nicotine is not strongly rewarding in isolation, but it makes other modestly pleasant stimuli that are associated with it much more powerfully rewarding [40]. Thus, it may be the combination of the sweet smell of tobacco and other sensations associated with smoking together with the nicotine 'hit' that is the lethal addictive cocktail. There has been no attempt to regulate the tobacco industry to prevent the engineering of cigarettes to make them more addictive.

Requiring the tobacco industry to reduce the harmfulness of their products

Inhaling tobacco smoke will never be anything other than very harmful. However, there are ways of engineering cigarettes to reduce the harm to human smokers. One method is to use tobacco that is missing some of the known carcinogens such as tobacco-specific nitrosamines. Another is to reduce the 'tar-to-nicotine ratio'. If, as seems likely, smokers are seeking a particular quantity of nicotine, smoking can be made less hazardous by giving this to them with lower concentrations of other toxins [41]. The most extreme version of this would be a pure inhaled nicotine delivery device. Tobacco companies have begun to invest in producing what has come to be known as potentially reduced exposure products (PREPS), which are designed to deliver very low levels of tar [42]. However, they have not been forced to do so, and the pace of development has probably been slower than it would be if governments were to set low absolute limits on the delivery to humans of toxins in cigarette smoke.

Tobacco companies are also developing new oral tobacco products that can deliver high doses of nicotine relatively rapidly [43]. These are without question much safer than cigarettes, but there has been no pressure to develop these products from governments. On the contrary, this

form of tobacco is banned throughout the European Union except in Sweden where it has been in widespread use for many decades.

Promoting switching to less dangerous forms of nicotine intake

No government has yet promoted switching to less hazardous forms of tobacco use. Many smokers in Sweden appear to have adopted the strategy anyway, and switching from cigarettes to snus (their particular form of oral tobacco) by millions of smokers has probably led to a reduction in smoking prevalence and tobacco-related deaths [44, 45]. The concern of some tobacco control advocates is that allowing the promotion of safer forms of tobacco use would undermine the efforts to encourage people to be entirely free from tobacco and might even, though a 'gateway effect', increase smoking prevalence [46].

The future of tobacco control

It is tragic but true that if we can just keep the number of tobacco-related deaths at their current level of ~5 million per year, then this will represent a major achievement in tobacco control. Unfortunately, we are extremely unlikely to be able to achieve even that goal. The reductions in deaths in countries such as the United Kingdom will be more than matched by massive increases in countries such as China. Globally, the biggest challenge facing the tobacco control community is to try to avert this impending disaster.

The global response to the threat from tobacco has been the Framework Convention on Tobacco Control (FCTC) (http://www.who.int/tobacco/framework/en/). This is the first ever global health treaty. It represents a landmark achievement that, if ratified and implemented, would without question prevent suffering and premature death of millions of people over the coming decades. Table 3 summarizes the main national obligations set out in the treaty.

To date, 168 countries have signed the treaty, and 137 have ratified it. At the time of writing, countries that have signed but not ratified it include Haiti and the United States.

Immense achievement as it has been to get this far, the impact of the treaty will be marginal without an even greater effort to ensure that its provisions are implemented in accordance with the spirit and not just the letter of its articles.

Comprehensive bans on promotion and marketing would have some impact, particularly in emerging markets. Smoking bans of the kind seen in Ireland could also have a part to play but will probably only be effective if the ground is prepared, so that there is widespread public support for them.

Table 3 National obligations in the Framework Convention on Tobacco Control

Signatories will
ban the promotion of tobacco products
require large health warnings on all tobacco product packaging
ban deceptive labelling such as 'low tar'
ban smoking in indoor public areas and workplaces
implement specific measures to combat tobacco smuggling
consider using taxation as a means of reducing tobacco consumption
regulate toxin delivery by tobacco products
require disclosure of tobacco product ingredients
consider litigation to make tobacco companies pay for the harm caused by their products
endeavour to include tobacco cessation treatment in national health programmes
seek to prohibit distribution of free tobacco products
prohibit sales of tobacco products to minors

Probably the most important element of a tobacco control strategy in non-Western countries would be massive education and persuasion campaigns. This would be very expensive, and it is unlikely that these countries would feel able to expend the resources required to achieve this. The obvious way of kick-starting this process is for every country to impose a levy either on tobacco products or on tobacco industry profits, specifically for the purposes of funding tobacco control. A levy on tobacco would result in an immediate reduction in smoking prevalence. The funds could then be directed to tobacco control task forces in each country under legislation that would mean that they could not be clawed back by governments to spend on other activities. Concerns that such price rises could disadvantage the poor have probably been overplayed and in any event must be weighed against the substantial health gains in this group [47]. Treatment programmes to aid cessation have a useful part to play, and these could be funded by the levy.

If governments have the courage to do it, much stricter regulation of toxin exposure from tobacco products should be a major plank of future tobacco control. Existing and proposed regulations on smoke constituents from manufactured cigarettes are very unlikely to make a substantial difference because they continue to allow high levels of exposure to human smokers. Tobacco companies should be put on notice that beyond some designated timescale (e.g. 5 years), their products will not be permitted to deliver more than trace amounts of known carcinogens or other toxins. This can be achieved with smokeless products [48], so that such regulation could see the end of smoked tobacco as the dominant means of ingesting nicotine.

The other obvious source of funds for tobacco control is litigation. The history of attempts to get the tobacco industry to pay damages to healthcare systems or smokers suffering from smoking-related diseases is largely one of failure [49], but the Unites States scored a significant success with the Master Settlement Agreement in which many tobacco

companies settled with 46 US states for more than $200 billion to be paid over 25 years.

Even in the United States, the legislative framework is far from conducive to civil action against the tobacco industry. Thus, the first step would be changing the legislative framework, so that the tobacco industry can be made to pay in full for the personal, social and economic harm caused by its activities. If every country in the world were to do this, it would represent a very significant step towards achieving the goals of the FCTC. Setting up this framework could be paid for by the kind of levy described above.

Conclusion

The history of tobacco control in the twentieth century can be characterized by the phrase 'too little, too late'. Several decades elapsed from the demonstration that cigarettes are deadly to the point where any government felt it necessary to take serious action. It is only very recently that there has been adequate legislation to protect non-smokers from toxic exposure to cigarette smoke. No attempts were made until very recently to prevent the tobacco industry, pretending that they had developed safer cigarettes. There has been no serious attempt to regulate the products to make them genuinely safer. Treatments to aid cessation have emerged, but for most smokers in the world, they are too expensive or unavailable, and even where they are in widespread use, they can only have a small impact on smoking prevalence. Governments have mostly failed to undertake the kind of campaigns necessary to make its citizens feel genuine concern over the harmful effects of smoking. Until very recently, the tobacco industry has been allowed to market its products without regard to their inherent harmfulness.

Although some countries have succeeded in reducing adult smoking prevalence to <25%, the global picture is dismal. In the next 20 years, we will reap the grim harvest of the recent increase in male smoking in non-Western countries, and now we face the threat of a massive increase in smoking among women aspiring to what are seen as Western values. Success in tobacco control will be measured not by a *reduction* in tobacco-related deaths but by how far we can prevent these from *increasing* from their current figure of 5 million annually. FCTC offers a glimmer of hope, but only if countries around the world sign up to the spirit and not just the letter of the articles it contains. Doing this requires funds that most governments can ill afford.

Urgent attention needs to be given to kick-start the process with an immediate tobacco levy, the proceeds to go towards a coordinated tobacco control strategy that includes a substantial and sustained campaign

Table 4 Seven elements of an effective tobacco control strategy

A levy on tobacco products to fully fund the national tobacco control programme
Setting a timetable for strict regulation of tobacco products to prohibit delivery of significant levels of toxins
Extensive and sustained public education and persuasion campaigns
Legislative changes to facilitate litigation or levies on profits to make tobacco companies pay the full cost of the harm caused by their products
Complete bans on marketing and promotion of tobacco products
Complete bans on smoking in indoor public areas and workplaces
Treatment programmes to help addicted smokers to stop

of education and persuasion. Countries should also use the funds to prepare the ground for changing the legislative framework to make the industry pay for the harm it is causing. The tobacco levy, a tobacco control task force, extensive and sustained campaigns to educate and persuade smokers of the true costs of smoking, much stricter regulation of toxins delivered by tobacco products, denying the tobacco industry the opportunity to market their products and banning smoking in all indoor public areas and workplaces (Table 4) are measures that apply as much to Western countries such as the United Kingdom as to developing countries such as China.

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Conflicts of interest

The author undertakes research and consultancy and has received hospitality and travel funds from companies that develop and manufacture aids to smoking cessation including Pfizer, GSK, Novartis and Sanofi-Aventis. He also has a share in a patent for a novel nicotine delivery device.

Biographical details

Professor West graduated with a BSc in Psychology from UCL in 1977; then, after 2 years in the civil service, he returned to UCL to do a PhD, which he gained in 1983. As a postdoctoral researcher, he worked under Michael Russell at the Institute of Psychiatry studying the nicotine withdrawal syndrome. He left to become a lecturer, then senior lecturer at Royal Holloway, London University, from where he went in 1991 to St George's Hospital Medical School where he was made professor in 1996.

He was appointed to his current post as professor of Health Psychology and Director of Tobacco Studies at the CRUK Health Behaviour Unit, UCL in 2003. He researches patterns of smoking and smoking cessation and methods of encouraging and supporting smokers to stop.

References

1 World Health Organization. *World Health Report 2002*. Geneva: World Health Organization, 2002.
2 US Department of Health and Human Services. *Surgeon General's Report. The Health Consequences of Smoking*. Washington: Office on Smoking and Health, 2004.
3 International Agency for Research on Cancer. *Tobacco Smoke and Involuntary Smoking*. Geneva: WHO and IARC, 2002.
4 Roman GC. Vascular dementia prevention: a risk factor analysis. *Cerebrovasc Dis* 2005;**20**(Suppl. 2):91–100.
5 Seddon JM, George S, Rosner B. Cigarette smoking, fish consumption, omega-3 fatty acid intake, and associations with age-related macular degeneration: the US twin study age-related macular degeneration. *Arch Ophthalmol* 2006;**124**(7):995–1001.
6 Power C, Frank J, Hertzman C, Schierhout G, Li L. Predictors of low back pain onset in a prospective British study. *Am J Public Health* 2001;**91**(10):1671–8.
7 Watkins RE, Plant AJ. Does smoking explain sex differences in the global tuberculosis epidemic? *Epidemiol Infect* 2006;**134**(2):333–9.
8 Meisinger C, Doring A, Thorand B, Lowel H. Association of cigarette smoking and tar and nicotine intake with development of type 2 diabetes mellitus in men and women from the general population: the MONICA/KORA Augsburg Cohort Study. *Diabetologia* 2006; **49**(8):1770–6.
9 Wakschlag LS, Pickett KE, Kasza KE, Loeber R. Is prenatal smoking associated with a developmental pattern of conduct problems in young boys? *J Am Acad Child Adolesc Psychiatry* 2006;**45**(4):461–7.
10 Moller AM, Villebro N, Pedersen T, Tonnesen H. Effect of preoperative smoking intervention on postoperative complications: a randomised clinical trial. *Lancet* 2002;**359**(9301):114–7.
11 Critchley JA, Unal B. Health effects associated with smokeless tobacco: a systematic review. *Thorax* 2003;**58**(5):435–43.
12 Nelson DE, Davis RM, Chrismon JH, Giovino GA. Pipe smoking in the United States, 1965–1991: prevalence and attributable mortality. *Prev Med* 1996;**25**(2):91–9.
13 Benowitz NL. *Nicotine Safety and Toxicity*. Oxford: Oxford University Press, 1998.
14 Mackay J, Eriksen MP. *The Tobacco Atlas*. Geneva: World Health Organization, 2006.
15 Mackay J, Amos A. Women and tobacco. *Respirology* 2003;**8**(2):123–30.
16 Alamar B, Glantz SA. Effect of increased social unacceptability of cigarette smoking on reduction in cigarette consumption. *Am J Public Health* 2006;**96**(8):1359–63.
17 Laugesen M, Scollo M, Sweanor D *et al*. World's best practice in tobacco control. *Tob Control* 2000;**9**(2):228–36.
18 Jha P, Chaloupka FJ. *Curbing the Epidemic: Governments and the Economics of Tobacco Control*. Washington, DC: World Bank, 1999.
19 Levy DT, Nikolayev L, Mumford E. Recent trends in smoking and the role of public policies: results from the SimSmoke tobacco control policy simulation model. *Addiction* 2005;**100**(10):1526–36.
20 Hammond D, Fong GT, McDonald PW, Cameron R, Brown KS. Impact of the graphic Canadian warning labels on adult smoking behaviour. *Tob Control* 2003;**12**(4):391–5.
21 Ranson MK, Jha P, Chaloupka FJ, Nguyen SN. Global and regional estimates of the effectiveness and cost-effectiveness of price increases and other tobacco control policies. *Nicotine Tob Res* 2002;**4**(3):311–9.
22 Wilson N, Thomson G. Tobacco tax as a health protecting policy: a brief review of the New Zealand evidence. *N Z Med J* 2005;**118**(1213):U1403.

23 Colman G, Grossman M, Joyce T. The effect of cigarette excise taxes on smoking before, during and after pregnancy. *J Health Econ* 2003;**22**(6):1053–72.
24 Adda J, Cornaglia F. Taxes, cigarette consumption and smoking intensity. *Am Econ Rev*, in press.
25 Ding A. Youth are more sensitive to price changes in cigarettes than adults. *Yale J Biol Med* 2003;**76**(3):115–24.
26 Meng Q. *The Effect of Cigarette Prices on Smoking Decision and Intensity in China*, 2004. http://www.ecu.edu/econ/ecer/kevinpaper.pdf (5 November 2006, date last accessed).
27 Observatoire Français des Drogues et des Toxicomanies. *Tableau de bord mensuel Tabac*, 2006. http://www.ofdt.fr/ofdtdev/live/donneesnat/tabtabac.html (5 November 2006, date last accessed).
28 Chief Medical Officer. *Annual Report of the Chief Medical Officer on the State of Public Health*. London: Department of Health, 2005.
29 Action on Smoking and Health. *Impact of Smoke-Free Legislation in Ireland*, 2006. http://www.ash.org.uk/html/publicplaces/html/irelandimpact.html (5 November 2006, date last accessed).
30 McNeill A, Raw M, Whybrow J, Bailey P. A national strategy for smoking cessation treatment in England. *Addiction* 2005;**100**(Suppl. 2):1–11.
31 West R, DiMarino ME, Gitchell J, McNeill A. Impact of UK policy initiatives on use of medicines to aid smoking cessation. *Tob Control* 2005;**14**(3):166–71.
32 West R. *Smoking and Smoking Cessation in the UK: 2004*. 2005. http://www.rjwest.co.uk.
33 Fuller E. *Smoking, Drinking and Drug Use Among Young People in England in 2004*. London: Health and Social Care Information Centre, 2005.
34 Lancaster T, Stead LF. Self-help interventions for smoking cessation. *Cochrane Database Syst Rev* 2005;(3):CD001118.
35 Swartz LH, Noell JW, Schroeder SW, Ary DV. A randomised control study of a fully automated internet based smoking cessation programme. *Tob Control* 2006;**15**(1):7–12.
36 Strecher VJ, Shiffman S, West R. Randomized controlled trial of a web-based computer-tailored smoking cessation program as a supplement to nicotine patch therapy. *Addiction* 2005;**100**(5):682–8.
37 Hey K, Perera R. Quit and Win contests for smoking cessation. *Cochrane Database Syst Rev* 2005;(2):CD004986.
38 Hammond D, Collishaw NE, Callard C. Secret science: tobacco industry research on smoking behaviour and cigarette toxicity. *Lancet* 2006;**367**(9512):781–7.
39 Djordjevic MV, Hoffmann D, Hoffmann I. Nicotine regulates smoking patterns. *Prev Med* 1997;**26**(4):435–40.
40 Palmatier MI, Evans-Martin FF, Hoffman A *et al*. Dissociating the primary reinforcing and reinforcement-enhancing effects of nicotine using a rat self-administration paradigm with concurrently available drug and environmental reinforcers. *Psychopharmacology (Berl)* 2006;**184**(3–4):391–400.
41 Russell MA. Low-tar medium-nicotine cigarettes: a new approach to safer smoking. *Br Med J* 1976;**1**(6023):1430–3.
42 Gray N. The ethics of policies for the prevention of tobacco disease. *Acta Oncol* 2004;**43**(1):8–10.
43 Stepanov I, Jensen J, Hatsukami D, Hecht SS. Tobacco-specific nitrosamines in new tobacco products. *Nicotine Tob Res* 2006;**8**(2):309–13.
44 Furberg H, Bulik CM, Lerman C, Lichtenstein P, Pedersen NL, Sullivan PF. Is Swedish snus associated with smoking initiation or smoking cessation? *Tob Control* 2005;**14**(6):422–4.
45 Ramstrom LM, Foulds J. Role of snus in initiation and cessation of tobacco smoking in Sweden. *Tob Control* 2006;**15**(3):210–4.
46 Gray N. Mixed feelings on snus. *Lancet* 2005;**366**(9490):966–7.
47 Warner KE. The economics of tobacco: myths and realities. *Tob Control* 2000;**9**(1):78–89.
48 McNeill A, Bedi R, Islam S, Alkhatib MN, West R. Levels of toxins in oral tobacco products in the UK. *Tob Control* 2006;**15**(1):64–7.
49 Altria. *History of Tobacco Litigation*, 2006. http://www.altria.com/media/03_06_01_00_fundamentals.asp (5 November 2006, date last accessed).