



## Effective tobacco control is key to rapid progress in reduction of non-communicable diseases

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Non-communicable diseases (NCDs)—including cardiovascular diseases, chronic respiratory diseases, cancer, and diabetes—account for about 60% of global deaths, mostly in countries of low or middle income. Tobacco use accounts for a sixth of these deaths.<sup>1</sup>

As a response, a high-level meeting (including 34 heads of state) held in September, 2011, at the UN adopted the Political Declaration of the High-Level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases.<sup>2</sup> The declaration acknowledged the global effect of NCDs, particularly those that are most prominent: cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes.

It also recognised that these prominent diseases are “linked to common risk factors, namely, tobacco use, alcohol abuse, an unhealthy diet, physical inactivity and environmental carcinogens”.<sup>2</sup> Although tobacco is known to cause these diseases, and lowering tobacco use reduces their frequency and associated health-care costs or delays their onset, these benefits are assumed to take decades to materialise because it takes a long time to see the health benefits of a reduction in smoking use in young people, and for heart disease, lung disease, and cancer to develop. As a result, the perceived short-term economic benefits of producing tobacco products, rather than reducing tobacco’s disease burden, often dominate policy making.

Evidence obtained since 2000, however, shows that important benefits of reducing smoking accrue quickly; a reduction in tobacco use rapidly decreases NCDs and health-care costs within 1 year.<sup>3,4</sup> The risk of an acute myocardial infarction drops immediately on smoking cessation, and continues to fall rapidly during the first year, nearly returning to the risk of a never-smoker in about 5 years.<sup>3</sup> California’s large-scale tobacco control programme started to reduce heart disease death rates after 1 year; after 9 years, the age-adjusted death rate from heart disease dropped to 13% below the rate predicted without the programme.<sup>4</sup> Similarly, an aggressive tobacco control programme in one Texas county (that combined media and cessation programmes) led to substantial decreases in acute myocardial infarction.<sup>5</sup>

This rapid change is consistent with the fact that tobacco smoke exposure not only contributes to the development of atherosclerotic disease, but can also trigger acute coronary events through smoke’s immediate effects on platelet and vascular endothelium function.<sup>6,7</sup> Implementation of strong smoke-free laws has generally been followed by rapid decreases in hospital admissions for acute myocardial infarction: the average decline was 17% in the USA, Italy, Scotland, Canada, Ireland, France,

England, and Argentina 1 year after the laws took effect and grew to about 30% after 3 years.<sup>6,8–12</sup>

Elimination of exposure to second-hand smoke is associated with an immediate positive effect on respiratory function in bartenders,<sup>13</sup> and smoke-free laws have been shown to rapidly reduce hospital admissions for respiratory disorders in several countries.<sup>14–16</sup> In the US state of Arizona, asthma hospital admissions dropped by 22% 1 year after strong smoke-free legislation (that included workplaces, restaurants, and bars) took effect;<sup>14</sup> in Scotland, there was a 13% decrease per year in childhood asthma admissions after the introduction of a smoke-free law;<sup>15</sup> and in Canada, respiratory admissions decreased by 33% 2 years after a smoke-free restaurant law.<sup>16</sup>

Lung cancer was the first disease to be causally linked to smoking, and smoking is the leading cause of lung cancer. In 2008, lung cancer was the main cause (18·2%) of all cancer-related deaths worldwide,<sup>17</sup> and it has one of the poorest survival rates of any cancer.<sup>18</sup> Population-based efforts to lower tobacco use, mainly cigarettes, have reduced rates of lung cancer.<sup>19–22</sup> A 2008 US annual report to the nation on the status of cancer<sup>19</sup> documented declines in the incidence of and death rates from all cancers and reasoned that “reductions in tobacco use provide the largest single opportunity to prevent nearly a third of cancer deaths through the application of existing knowledge”. The authors of another US study concluded that reductions in tobacco use in the last half of the 20th century accounted for about 40% of the decrease in overall male cancer death rates and prevented at least 146 000 lung cancer deaths in men between 1991 and 2003.<sup>20</sup>

The benefits of reduced smoking in terms of cancer rates do not take decades to begin to appear. In addition to reductions in deaths from heart disease deaths, the California tobacco control programme was followed by drops in lung-cancer incidence beginning 2 years after the programme was implemented. 10 years later, rates were 14% lower than predicted,<sup>21</sup> and they reached a steady state after about 16 years.<sup>22</sup> The incidence of bladder cancer also decreased after 3 years, although this finding did not reach statistical significance ( $p=0\cdot067$ ).<sup>21</sup>

Because of the rapid effect of tobacco control policies on NCDs, that strong tobacco control programmes are associated with measurable reductions in health-care costs is not surprising. These benefits appear quickly and grow over time.<sup>23,24</sup> The California tobacco control programme cost US\$1·4 billion during its first 15 years, and saved \$86 billion in direct health-care costs, a 61 times return on investment.<sup>24</sup> After 15 years, health-care costs

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were 7·3% below those projected without the programme. These savings include only direct health-care expenditure, such as physicians and hospital services, not indirect costs associated with reduced productivity, lost wages, or compromised quality of life. Accounting for these savings would substantially increase the overall benefits of the tobacco control programme. A similar programme in Arizona also showed a high return on investment, although it was smaller than in California, probably because of a focus on young people and not directly confronting the tobacco industry.<sup>20</sup> Some of the short-term health-care cost savings will be incurred later since everyone eventually dies, but society wants people to live longer lives in good health.<sup>25,26</sup>

Loss of tobacco tax revenues is sometimes used to argue against tobacco control. Indeed, the 3·6 billion packs of cigarettes not smoked during the first 15 years of the California tobacco control programme reduced state tobacco tax revenues by about \$3·1 billion.<sup>24</sup> Addition of these lost revenues to the programme's overall cost yields \$4·5 billion, which is a small proportion of the \$86 billion in reduced health-care costs.

Although these programmes have major positive effects on NCDs and their associated health-care costs, they reduce tobacco industry income because fewer people smoking means fewer cigarettes sold. For example, the 3·6 billion fewer packs of cigarettes smoked during the California programme cost the multinational tobacco companies about \$9 billion in pre-tax sales.<sup>23,24</sup> This money is not, however, removed from the economy, since it will simply be spent on other goods and services.<sup>27</sup> Indeed, the money not spent on tobacco is likely to be spent on locally produced goods and services that have a higher economic multiplier effect than tobacco does when it is exported to multinational corporations.<sup>27</sup>

Shifting of spending away from tobacco improves household standards of living and investments in human capital.<sup>28–33</sup> In high-income economies, spending on tobacco products accounts for a substantial proportion of low-income household budgets,<sup>28–31</sup> which could be reallocated to other basic needs such as food, education, and health care. In middle-income countries, tobacco use lowers the household standard of living and human capital levels because money to purchase tobacco comes at the expense of other crucial necessities.<sup>32–34</sup> Findings from an analysis of spending in Bangladesh showed that if poor citizens stopped using tobacco and reallocated 69% of their expenditure on tobacco to food, 10·5 million fewer people would be malnourished and the daily rate of child deaths from malnutrition would be halved.<sup>33</sup>

The UN declaration recognised the importance of the WHO's Framework Convention on Tobacco Control (FCTC)<sup>35</sup> as an NCD reduction strategy, and recommended acceleration of the implementation of this treaty.<sup>2</sup> Because of the high financial stakes, the multinational tobacco industry vigorously opposed the FCTC.<sup>36</sup> Despite this opposition, the treaty came into force in 2005, and as of

June, 2011, had been ratified by 173 parties, showing that tobacco industry opposition can be overcome if the political will to do so is there. The FCTC and its implementation guidelines provide an evidence-based framework for efforts to lower the rate of NCDs by addressing the institutional and individual factors that promote tobacco use.

Much remains to be done. The tobacco industry continues to oppose FCTC ratification and legislation allowing effective implementation. As a result, the declaration took the unusual step of explicitly declaring a “fundamental conflict of interest between the tobacco industry and public health”.<sup>2</sup>

The declaration called for the implementation of WHO's 2008–15 Action Plan for the Global Strategy for the Prevention and Control of Noncommunicable Diseases, which recommends that member states implement six tobacco control policies based on the FCTC (strong clean indoor air laws, increased price, banning of advertising and promotion, education and prevention, cessation services, and monitoring of tobacco use and prevention policies).<sup>37</sup> However, as of 2009, less than 10% of the world's population was covered by an FCTC demand-reduction measure and tobacco control remained severely underfunded.<sup>1</sup>

An important FCTC shortcoming is the absence of a monitoring body to which violations can be reported. The declaration acknowledges that NCD prevention and control requires “collective and multisectoral action by all Member States and other relevant stakeholders at local, national, regional, and global levels”.<sup>2</sup> As global agencies and UN member states design and implement NCD plans, they have the opportunity to build on the FCTC, and to establish a coordinated global strategy to reduce tobacco-induced NCDs, to resist pressure from the multinational tobacco companies, to call for rapid funding and national FCTC implementation, and for world leaders to prioritise health over trade.<sup>36</sup> Fulfilment of these aims is particularly important to the economic futures of countries of low or middle incomes. Leaders who make a commitment to funding a global programme addressing these issues<sup>1</sup> can be confident that there is good evidence showing that effective programmes not only reduce tobacco use and the attendant NCDs in the short term, but make an important contribution to curbing health-care costs and improving standards of living and human capital levels immediately, with increasing benefits over time.

#### Contributors

SG developed the concept and wrote the first draft of the paper. MG did additional literature searches to add details and prepared revisions of the Viewpoint.

#### Conflicts of interest

We declare that we have no conflicts of interest.

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## References

- 1 Beaglehole R, Bonita R, Horton R, et al. Priority actions for the non-communicable disease crisis. *Lancet* 2011; **377**: 1438–47.
- 2 UN General Assembly. Draft resolution: political declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases. Sept 16, 2011. <http://daccess-dds-ny.un.org/doc/UNDOC/LTD/N11/497/77/PDF/N1149777.pdf?OpenElement> (accessed Sept 23, 2011).
- 3 Lightwood JM, Glantz SA. Short-term economic and health benefits of smoking cessation: myocardial infarction and stroke. *Circulation* 1997; **96**: 1089–96.
- 4 Fichtenberg CM, Glantz SA. Association of the California tobacco control program with declines in Cigarette consumption and mortality from heart disease. *N Engl J Med* 2000; **343**: 1772–77.
- 5 McAlister AL, Huang P, Ramirez AG, Harrist RB, Fonseca VP. Reductions in cigarette smoking and acute myocardial infarction mortality in Jefferson County, Texas. *Am J Public Health* 2010; **100**: 2391–92.
- 6 Institute of Medicine. Secondhand smoke exposure and cardiovascular effects: making sense of the evidence. Washington: National Academy Press, 2009.
- 7 Surgeon General. How tobacco smoke causes disease: the biology and behavioral basis for smoking-attributable disease. Rockville: Public Health Service, Office of the Surgeon General, 2010.
- 8 Lightwood JM, Glantz SA. Declines in acute myocardial infarction after smoke-free laws and individual risk attributable to secondhand smoke. *Circulation* 2009; **120**: 1373–79.
- 9 Meyers DG, Neuberger JS, He J. Cardiovascular effect of bans on smoking in public places: a systematic review and meta-analysis. *J Am Coll Cardiol* 2009; **54**: 1249–55.
- 10 Mackay DF, Irfan MO, Haw S, Pell JP. Meta-analysis of the effect of comprehensive smoke-free legislation on acute coronary events. *Heart* 2010; **96**: 1525–30.
- 11 Sims M, Maxwell R, Bauld L, Gilmore A. Short term impact of smoke-free legislation in England: retrospective analysis of hospital admissions for myocardial infarction. *BMJ* 2010; **340**: c2161.
- 12 Ferrante D, Linetzky B, Virgolini M, Schoj V, Apelberg B. Reduction in hospital admissions for acute coronary syndrome after the successful implementation of 100% smoke-free legislation in Argentina: a comparison with partial smoking restrictions. *Tob Control* 2011; published online May 20. DOI:10.1136/tc.2010.04.2325.
- 13 Eisner MD, Smith AK, Blanc PD. Bartenders' respiratory health after establishment of smoke-free bars and taverns. *JAMA* 1998; **280**: 1909–14.
- 14 Herman P, Walsh M. Hospital admissions for acute myocardial infarction, angina, stroke, and asthma after implementation of Arizona's comprehensive statewide smoking ban *Am J Public Health* 2011; **101**: 491–96.
- 15 Mackay D, Haw S, Ayres J, Fischbacher C, Pell J. Smoke-free legislation and hospitalizations for childhood asthma. *N Engl J Med* 2010; **363**: 1139–45.
- 16 Naiman A, Glazier RH, Moineddin R. Association of anti-smoking legislation with rates of hospital admission for cardiovascular and respiratory conditions. *CMAJ* 2010; **182**: 761–67.
- 17 Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. Estimates of worldwide burden of cancer in 2008: Globocan 2008. *Int J Cancer* 2010; **127**: 2893–917.
- 18 American Cancer Society. Lung and bronchus. In: Cancer facts and figures 2010. <http://www.cancer.org/acs/groups/content/@nho/documents/document/acspc-024113.pdf> (accessed Feb 27, 2011).
- 19 Jemal A, Thun MJ, Ries LA, et al. Annual report to the nation on the status of cancer, 1975–2005, featuring trends in lung cancer, tobacco use, and tobacco control. *J Natl Cancer Inst* 2008; **100**: 1672–94.
- 20 Thun M, Jemal A. How much of the decrease in cancer death rates in the United States is attributable to reductions in tobacco smoking? *Tob Control* 2006; **15**: 345–47.
- 21 Barnoya J, Glantz S. Association of the California tobacco control program with declines in lung cancer incidence. *Cancer Causes Control* 2004; **15**: 689–95.
- 22 Pierce JP, Messer K, White MM, Kealey S, Cowling DW. Forty years of faster decline in cigarette smoking in California explains current lower lung cancer rates. *Cancer Epidemiol Biomarkers Prev* 2010; **19**: 2801–10.
- 23 Lightwood J, Glantz S. Effect of the Arizona tobacco control program on cigarette consumption and healthcare expenditures. *Soc Sci Med* 2011; **72**: 166–72.
- 24 Lightwood JM, Dinno A, Glantz SA. Effect of the California tobacco control program on personal health care expenditures. *PLoS Med* 2008; **5**: e178.
- 25 Rappange DR, van Baal PH, van Exel NJ, Feenstra TL, Rutten FF, Brouwer WB. Unrelated medical costs in life-years gained: should they be included in economic evaluations of healthcare interventions? *Pharmacoeconomics* 2008; **26**: 815–30.
- 26 van Baal PH, Feenstra TL, Polder JJ, Hoogenveen RT, Brouwer WB. Economic evaluation and the postponement of health care costs. *Health Econ* 2011; **20**: 432–45.
- 27 Warner K. Health and economic implications of a tobacco-free society. *JAMA* 1987; **258**: 2080–86.
- 28 Busch SH, Jofre-Bonet M, Falba TA, Sindelar JL. Burning a hole in the budget: tobacco spending and its crowd-out of other goods. *Appl Health Econ Health Policy* 2004; **3**: 263–72.
- 29 Thomson GW, Wilson NA, O'Dea D, Reid PJ, Howden-Chapman P. Tobacco spending and children in low income households. *Tob Control* 2002; **11**: 372–75.
- 30 Siahpush M. Socioeconomic status and tobacco expenditure among Australian households: results from the 1998–99 household expenditure survey. *J Epidemiol Community Health* 2003; **57**: 798–801.
- 31 Pu CY, Lan V, Chou YJ, Lan CF. The crowding-out effects of tobacco and alcohol where expenditure shares are low: analyzing expenditure data for Taiwan. *Soc Sci Med* 2008; **66**: 1979–89.
- 32 John RM. Crowding out effect of tobacco expenditure and its implications on household resource allocation in India. *Soc Sci Med* 2008; **66**: 1356–67.
- 33 Efroymson D, Ahmed S, Townsend J, et al. Hungry for tobacco: an analysis of the economic impact of tobacco consumption on the poor in Bangladesh. *Tob Control* 2001; **10**: 212–17.
- 34 Xin Y, Qian J, Xu L, Tang S, Gao J, Critchley JA. The impact of smoking and quitting on household expenditure patterns and medical care costs in China. *Tob Control* 2009; **18**: 150–55.
- 35 WHO. Framework Convention on Tobacco Control. 2003. <http://whqlibdoc.who.int/publications/2003/9241591013.pdf> (accessed June 1, 2011).
- 36 Mamudu HM, Hammond R, Glantz SA. International trade versus public health during the FCTC negotiations, 1999–2003. *Tob Control* 2011; **20**: e3.
- 37 WHO. 2008–2013 action plan for the global strategy for the prevention and control of noncommunicable diseases. 2008. [http://whqlibdoc.who.int/publications/2009/9789241597418\\_eng.pdf](http://whqlibdoc.who.int/publications/2009/9789241597418_eng.pdf) (accessed Sept 22, 2011).