



## Regulation of cigarette smoke toxicity

The science of regulating cigarette smoke is the subject of two papers in this issue of the *Journal*.<sup>1,2</sup>

Ten points set out the strands of the scientific argument for regulation:

- *Smoking kills—through smoke.* Inhaled cigarette smoke kills 4400 New Zealanders annually.<sup>3</sup> All tobacco deaths in New Zealand are deaths due to smoking, and almost all are due to smoking manufactured cigarettes or cigarette tobacco.
- *The leading toxicants have been identified.* Of the 4000 or more smoke compounds, three gases—acrolein, butadiene, and hydrogen cyanide—account for 65% of the identifiable toxicity, and the next 10 account for most of the rest.<sup>1</sup>
- *The leading toxicants are VOCs* (volatile organic compounds), in the invisible gas phase of smoke. VOCs account for over 80% of total smoke toxicity.<sup>1</sup>
- *These toxicants have different effects.* Butadiene, for example, causes cancer; hydrogen cyanide is toxic to the cardiovascular system; and acrolein is toxic to the respiratory system.<sup>1</sup>
- *The regulator can estimate toxicity.* A method is described that enables any health ministry to test the leading toxicant emissions of all brands sold, and allot an overall relative toxicity score for every brand.<sup>1</sup>
- *Regulation can reduce toxicity.*<sup>1,2</sup> Leading toxicants would be tested regularly as a condition of continued sale, and highly toxic emitters excluded. Each year the permitted maximum levels can be reduced.
- *Emission differences highlight the need.* Substantial differences in emissions and in overall toxicity across brands argue the case for regulation.
- *Regulation is overdue.* Charcoal filters have been optional or token in cigarettes for the past 40 years, despite their known protective effects.<sup>2</sup>
- *Regulation will be worthwhile.* Smoke carcinogens identified to date account for over one-third of observed cancer risk.<sup>1</sup> Reduction in carcinogenic emissions thus translates into considerable potential for cancer risk reduction. Regulation can reduce cancer deaths by at least 80 a year<sup>2</sup> by employing charcoal filters.<sup>2</sup> Further deaths may be preventable by regulating to stop the sale of high-emission brands.
- *Fire deaths can also be reduced.* It makes sense to regulate for fire-safer cigarettes as has been done in the state of New York, at the same time as regulating to reduce smoke emissions. Cigarettes are designed to burn full length, and so when left unattended they do so, and can cause fires, killing several people annually, often nonsmokers.<sup>4</sup>

Beyond these new perspectives on smoke science, regulation of tobacco products involves other issues—of power and control, public safety, consumer rights, and

Government's duty of care towards smokers. Despite regulation, new brands will still be launched, and smoking will remain a dangerous activity.

Cigarette regulation is about *power*—who should control the toxicity of cigarette smoke—the Ministry of Health, or the cigarette firms? Leaving the responsibility with the smoker, by publishing toxicity ratings on the packet, assumes smokers will read the fine print and be able to source a less dangerous brand. The unregulated cigarette market, however, provides little choice. Cigarette firms have ignored the reports of their own scientists for 40 years on the safety advantages of charcoal filters.<sup>2</sup> As the firms have not protected their own customers, the time is right for Government to use its latent powers and regulate cigarette smoke toxicity in the public interest—of smokers.

Cigarette regulation is about the *public safety* of ¾ million citizens inhaling unduly dangerous cigarette smoke an average of 200 times a day. These people populate doctors' waiting rooms, and die at twice the rate of nonsmokers of the same age.<sup>3</sup> The case for regulation is self-evident. For example, the carcinogenic tobacco-specific nitrosamines (TSNA) varied by a factor of 66 across the top 10 New Zealand cigarette brands when tested unburnt.<sup>5</sup> And New Zealand's favourite 'mild' cigarette, Holiday Extra-mild, emerged as the most toxic of 37 international brands for which comparable data were obtainable.<sup>1</sup>

Cigarette regulation is about the *consumer rights* of smokers. No regulation, absolutely none, yet governs the inherent risk of cigarettes and their smoke, though Parliament in 1990 gave the Ministry of Health the necessary powers in the Smoke-free Environments Act. Smokers, who pay Treasury over \$5.40 in tax per packet, are entitled to some toxicity controls. For some mental health staff in secure units, work exposure to second-hand smoke is now recorded on each occasion; cigarette smoke is an official workplace hazard.

In contrast, smokers' rights are not protected. The cigarette firms' tests of their own brands by their own laboratories have seldom been audited independently by Government, and they only test nicotine, carbon monoxide, and tar for printing on the packet. This information is virtually useless. The nicotine yield accounts for less than 1% of the variance in nicotine absorption,<sup>6</sup> carbon monoxide accounts for less than 1% of total cigarette smoke toxicity.<sup>1</sup> Tar is a proxy measure for the 18% of total cigarette smoke toxicity associated with smoke solids,<sup>1</sup> but low-tar cigarettes are found to emit more toxicants overall, not less.<sup>1,2</sup> The Ministry of Health now has the opportunity to regulate to ban misleading labels, and reduce the offending toxicants in the smoke.

In reviewing the Smoke-free Environments Regulations, the Ministry of Health may decide to regulate for graphic health warnings on tobacco packets, to ban certain misleading descriptors, fully test tobacco product emissions, and publish the results. These are desirable aims, but insufficient by themselves. Disclosure alone has its limits—all brands contain the same leading toxicants in their smoke.<sup>1</sup> Cigarette smoke is dangerously and defectively toxic. Only regulated limits on harmful smoke constituents can reliably decrease smoke toxicity.

Regulation of smoke is part of Government's *duty of care* towards its addicted smoker- taxpayers—who contribute over \$850 million annually in excise. Smokers, whether unwilling, unable, unready to quit, or recent relapsers, face either giving up

on their nicotine, or continuing inhalation with a one-in-two risk of dying early.<sup>3</sup> Smokers face this 'quit or die' dilemma in increasing numbers. In the age group 35 years and over, in which nearly all smoking deaths occur, smoking prevalence decreased slightly (20.4% to 19.2%) between 1996 and 2002,<sup>7</sup> but the numbers smoking increased by 33,000 (10%) to 377,000, due to ageing of the population. Among Maori, the numbers at risk are also increasing, as smoking prevalence has stayed at around 50% since 1990.

Regulation of smoke toxicity provides a third way of sorts out of this dilemma. Strong regulation could save an estimated 80 smokers a year from fatal cancers,<sup>2</sup> out of 1700 cigarette cancer deaths a year.<sup>3</sup> Cardio-respiratory toxicity can also be reduced, but the health gain cannot be estimated.

Finally, despite regulation:

- *New brands will still be launched.* In regulating to reduce cigarette smoke toxicity, a major concern is that cigarette makers will make false claims and use safety as a selling point, as with king-size filters in the 1960s. Today, however, new cigarette brands face penalties for misleading claims and tobacco brand-name advertising.

As long as cigarettes remain legal to sell, Government will not stop cigarette firms introducing low emission brands—unless they make false product claims. New brands with apparently lower toxicity are being test-marketed and one is to be released in Australia within 12 months. Brands of this type when introduced, could halt the recent decline in adolescent smoking. The total smoking control programme may need to be activated further to meet this challenge.

Old or new, all brands need regulated limits on their toxicity. Health groups can lobby for firm and expeditious regulation. Regulations control the carcinogens permitted in manufactured food and beverages, and manufactured tobacco products should be no exception.

- *Smoking will remain a dangerous activity.* Any smoke mixed with nicotine is to a large extent irreducibly toxic, because the smoker needs to inhale more nicotine (and the toxic gases) on an hourly basis. Even if regulation could halve smoke toxicity, the risks of early death from smoking would be still 1 in 4—more dangerous than 12 continuous climbing seasons on the high peaks of Mt Cook National Park<sup>8</sup>—and without the views.

New Zealand is in a position to become the first country to effectively regulate cigarette smoke toxicity. Continuation of the present state of affairs—unregulated, unduly-toxic cigarette sales—is disastrous. 'Failure to act in these circumstances is negligence'.<sup>9</sup> Regulation is long overdue.

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