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Health NEW ZEALAND

Research and policy advice to reduce
heart disease, cancer and smoking

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4 October 2004

John Stribling
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Ministry of Health
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Dear John

**Submission on the Review of the Smoke-free Environments
Regulations 1999.¹**

Health New Zealand congratulates the Ministry of Health for carrying out this much needed review. Our submission focuses particularly on Tobacco product testing and content regulation.

Health New Zealand Ltd is a consultancy established in 1995, providing research and policy advice to reduce cancer, heart disease and smoking. Health New Zealand aims to advance science and public information to stop cigarettes and other smoking tobacco products killing New Zealanders.

This submission is based on 20 years experience in tobacco policy work, in the Department of Health and Public Health Commission, and 9 years consulting practice under the name of Health New Zealand. This work has included analyzing the annual returns from tobacco manufacturers since 1991.

Since the Department of Health appointed me to work on tobacco control policy 20 years ago this month, over 80,000 New Zealanders have died from smoking cigarettes. Another 20,000 or so would have died if death rates had continued as at the height of the mortality epidemic. If the best marketing efforts of the cigarette manufacturers had been unopposed, cigarette smoking would have killed around 100,000 smokers in the last 20 years. Advertising and smoking

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restrictions, higher excise rates, and more recently, substantial quit smoking campaigns have dented but not eliminated tobacco deaths.

Tobacco product regulation is another policy which can be expected to reduce mortality provided that regulation ensures that the smoke itself is made less toxic. To eliminate tobacco mortality will require a reduction in smoking itself.

The lethality of tobacco products is transmitted by smoke or fire – mainly smoke

Of the 4000+ annual tobacco deaths, 99.9% are transmitted by cigarette smoke, inhaled at the rate of around 100 puffs per day, during a smoking career of 20-70 years. The 0.1% remainder of deaths is due to fire rather than smoke.

We trust that deaths by fire will also be addressed in this review.

We welcome the opportunity to reply to the excellent consultation document. To assist the Ministry with the very real difficulties of meaningful testing of tobacco products from a health viewpoint, our company hopes to be able to offer a service for testing of the toxicity of New Zealand cigarettes, including hand-rolled cigarettes preferred by Maori, in the near future.

Sincerely

(signed)

Murray Laugesen QSO

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MoH Question

1 The considerations for policy makers appear to be complete. More important is the context in which this review is taking place.

In the 1960s and 1970s industry arguments largely held sway in society and with government. In recent years, since the original Act was drafted, events have tipped the balance in favour of society and regulation.

Litigation in the United States has greatly decreased the credibility of the tobacco manufacturers.

Exposure of inconsistencies Also 40 million pages of erstwhile secret tobacco documents on the internet have exposed the inconsistencies of manufacturers who publicly said or did differently from what their scientists were internally reporting.

Warnings

MoH Questions

- 2 We support inserts only if there is research support that these are read. In general if the message needs to be simple enough to put on the packet, rather than in it.
- 3 Costs to industry. No comment.
- 4-8 We would prefer to support Option 4 in which pictorial and text warnings are combined for the reason that a percentage of the population are not able to read English. With immigration this percentage may now represent many thousands. With the help of graphic illustrations, those who can't read can understand.
- 9-13 Pictorial warnings are supported, in conjunction with text.
- 14 The area of tobacco pack used for the health warning and information should be much larger than at present; 60 % is not excessive. The pictures may be an embarrassment to smokers, but the government has a duty to ensure that the public are warned in the strongest terms – short of using skull and crossbones, which is usually reserved for poisons that kill rapidly.

Regulation of misleading product descriptors

Regulating to require descriptors to be truthful is essential, and we support full scale efforts in this direction to ban misleading descriptors entirely.

[We also support strong action to reduce the actual toxicity of the smoke Please refer to our later recommendations on this.]

Since the Smoke-free Environments Act was formulated in 1990, revelations in tobacco documents and further scientific studies have shown that manufacturers had misled US regulators and smokers, with respect to tar yields of smoke.

New Zealand research. Our own research has confirmed this – for low tar brands, we have shown the toxicity is some 19% higher than for regular brands, other factors being equal.² For example, Holiday Extra-Mild smoke was more toxic than Holiday regular brand,³ when tested by Labstat International Inc in 2003 for the Ministry of Health, and so the company descriptor, in this case the actual brand name, was misleading.

We believe that this makes it essential that the Ministry of Health takes charge of all communications on the packet, and also critically review the tar labels which it currently requires under the 1999 regulations.

The packet as an advertisement

The glossy cellophane wrap, the distraction graphics of the Holiday packet, the Formula-1 news-clip-linked colours of the Marlboro packet, are all part of cigarette marketing efforts. These aspects provide the backdrop to the warnings, and despite any warning, will tend to encourage purchase.

It is against the public good to permit such a lethal product to continue to be packaged so attractively.

Health New Zealand submission

- 1 Regulations should be written with the deliberate aim of decreasing the attractiveness of tobacco packaging.
- 2 At the next opportunity, the Act itself should be changed to place cigarettes and tobacco for sale out of sight in all shops to which under-18s have access.

MoH Questions

- 16 Option 2 is supported because it would seem to keep messages fresher for longer and to allow a wider range of messages to be issued.
- 17 Number of warnings in circulation should be as many as needed to communicate a wide range of messages, and Option 2 (rotation of a different set every year in a two year cycle) would allow for this best.
- 18 Option 2 would mean more printing costs, but the basic packet design would not have to change.

² Laugesen M. Fowles J. NZ MJ April 2005. Appendix 2.

³ Fowles J. Chemical composition of tobacco and cigarette smoke in two brands of New Zealand cigarettes. Porirua: ESR, final report revised 25 August 2003.

19. **Te Reo Maori.** 25% of smokers are Maori. Not all Maori smokers read Maori, but if Maori health groups believe more Maori warnings would help, that should be considered favourably. Otherwise the current level of warnings is a start. It would be helpful to know how many can read Maori as first or even second language, compared with other languages.

MoH questions

20. The Ministry of Health has to take full responsibility for health information on the packet, as it is put there on the Ministry's recommendation to government, and it is government that takes responsibility for permitting the continued sale of tobacco products. If it were part of a voluntary agreement the situation might be different.
21. Attribution of health information to the Ministry should be mandatory.
22. Cigar health warnings should be very similar if not the same. Cigar smoking increases the risk of early death for cigar smokers, particularly if they have previously learnt to inhale on cigarettes. The niceties of reduced risk for the minority of cigar smokers who are cigar-only smokers is difficult to communicate.

23. Oral tobacco being imported for personal use from Sweden or anywhere else does not need to include warnings about lung damage. For cigars and pipes, warnings as for cigarettes and tobacco are justifiable.

24. Labelling of cigars should be on the cigar if sold loose, or on the packet if sold by the packet.

25. 0.2% rule is supported. But enforcement is essential. Marlboro with several percent of sales, after all these years still sell Australian packets with an Australian phone number to call.

26-7 Health New Zealand supports a referral to the Quitline. The wording should be as suggested by the Quitline.

- 28 Option 4 – narrative is best, because the numbers and chemical names are mostly meaningless to the average smoker in the case of toxicants; in the case of tar, these are largely irrelevant to the actual toxicity of the cigarette. Option 4 with simple narrative messages is best. This avoids unrealistic competition among manufacturers for the benighted smoker's

custom to reduce nitrosamines for example, when nitrosamines account for less than one percent of carcinogenic risk.

29 For industry.

30 RYO, pipe cigar information. As for 28.

31 As for 29.

32-34 The shortest delay for implementation should be allowed for the most popular brands, as these have the highest turnover, and have the greatest public health importance. The time allowed for an imported popular brand such as Marlboro if imported from Australia should be no more than a week more than for local brands.

35-36 Formalised review. Three years is suggested to maintain freshness of warnings. Information that may need to be reviewed could be pushed down into schedules and the Director General required to revise these regularly without such details requiring a regulatory review.

37. Option 3 is preferred. – because:

Tar, nicotine and carbon monoxide are currently measured but have little relation to risk, and are in any case largely irrelevant to toxicity. Most of the toxicity is in the volatiles in the vapour phase.⁴ Mild is not necessarily mild. Menthol though probably no more toxic, makes smoking more acceptable to taste. Mere warnings such as quoted “it has not been established that ‘low yield cigarettes are safer’ would merely emphasise that they are safer.

Every device, such coats of arms in trademarks, which imply status, or colours carefully pre-tested for smokers’ approval, or implying health-favourable or market-promoting differences between say, blue for low tar and red for regular, and green for menthol, have no place on the packet of a product that has led to the death of thousands. Tombstone designs are more appropriate.

38 We agree that the Act would need to be amended in due course. Meantime however, the Ministry could stop requiring the placement of misleading information such as tar and nicotine and CO on the packet, as if this was a measure of toxicity of the cigarette, when most of the toxicity is due to individual volatiles in the vapour phase.

The current regulations requiring this need to be rescinded for a start.

We assume that while cigarettes continue to be sold, and while their smoke is regulated under section 31, then there is no bar to different brand variants being sold provided they do not use attractive additives such as menthol, or misleading labels such as mild or light. They would need to be labeled differently. Brand X no. 1, Brand X no. 2. The use of named rather

⁴ Fowles J. Dybing E. Application of toxicological risk assessment to the chemical constituents of cigarette smoke. Tobacco Control 2003; 12: 424-30.

than numbered variants would spawn a new generation of names and descriptors such as cloves, aloe vera, Vitamin E, folic acid, or nitrosamine-free.

- 39 What are the barriers to a ban? If the current descriptors are banned, then Section 31 has to be strengthened, to make the smoke less toxic. Instead of merely telling addicted smokers how toxic their product's smoke is, the cigarette manufacturers need to be regulated into supplying cigarettes that are not as toxic as before. For even with disclosure, as no cigarettes yet use effective charcoal filters, which brand would an addicted smoker turn to if his usual brand was rated as too toxic?

Disclosure by tobacco companies

1) **The guiding principle** here is that as over 4000 deaths a year are caused by cigarette smoke. The default position should therefore be for the law to place **the onus on the cigarette maker to disclose** all ingredients and all design details.

Health New Zealand recommendation

That product design should be included in the requirements for disclosure when the Act is next revised.

2) The frequency of disclosure.

Annual testing for the presence of leading toxicants is insufficient; it should be three to four times a year. Annual-only testing is a major weakness in the proposed disclosure regime.

A report filed as required on January 31, may be based on tests in February of the previous year, allowing the cigarette maker to use tobacco from a different more toxic source for 11 months of the year. It is not necessary to imply that would be deliberate, but as now, it is permitted.

An amendment to the Act should be sought to ensure more frequent testing, disclosure and reporting.

Rationale.

During the course of one year, during which time over 4000 smokers die from inhaling cigarette smoke, the country of origin of the raw tobacco, and hence the levels of carcinogenic heavy metals in the tobacco may change. Just as the New Zealand countryside has known hotspots for arsenic and PCPs and other pesticides, in tobacco growing areas of developing countries, without the tobacco buyers necessarily knowing the local situation, the source of the crop and the toxicity of each bale of tobacco could be expected to vary somewhat. Cigarette smoking is dangerous enough for NZ smokers, and the monitoring should require cigarette companies to test and disclose the toxicant levels in their tobaccos, and the smoke, at least every three to four months.

The cost of more frequent disclosure can be counterbalanced by confining such frequent disclosure to

- a) the top 16 or so toxicants listed in Table 1 of the consultation document, and to
- b) the most popular cigarettes and tobaccos – the cigarettes of the ten leading brand families, and of the leading five or so hand rolling tobacco brands.

3) The focus of disclosure should be on the tobacco smoke in most cases, rather than on the product. (But see our comment 3.3 below on unburnt tobacco).

3.1 Disclosure of smoke emissions. The enormous difference in mortality risk between cigarette smokers and snuff users makes it clear that smoke is far more toxic than the tobacco, and it is the toxicants in smoke that reach the lungs – carried there by the smoke. Thus emission testing is far more important than tobacco testing.

3.1.1 Only mainstream smoke needs to be tested. Sidestream smoke has been of great interest during the campaign to ban smoking in workplaces, but does not in our opinion justify the expense of testing. In fact the amount of tobacco in the cigarette is the main determinant of sidestream smoke emission toxicants from that cigarette.

3.2 Disclosure of sales by regions – industry accountability to DHBs

Now that district health boards are accountable for public health programmes, it is essential to require that cigarette manufacturers in their annual reports disclose (quarterly if possible) their sales to the Ministry of Health, reporting on total cigarette and hand rolled tobacco sales volumes by district health board area and Territorial Local Authority. We would hope that under their recently heralded social responsibility programmes, the cigarette manufacturers would welcome this opportunity to co-operate, and moreover to supply this information in a timely manner on a quarterly basis, electronically. The information is after all, vital to industry sales and marketing promotions. We would like to see it shared more widely.

Recommendation

- a) That all tobacco firms reporting under section 35 to the Ministry of Health by January 31 be required to report total annual cigarette and hand rolled tobacco sales volumes nationally and by each territorial local authority region.
- b) That Ministry of Health then collate the replies into a total industry-wide sales volume figure for each District Health Board to use to monitor the effectiveness of its tobacco control programmes.
- c) That the Act be amended if necessary to require such reports to DHB.

3.3 Disclosure of toxicants in unburnt tobacco

In addition to testing smoke, there is a case for testing unburnt tobacco for:

1) **Tobacco.** The leading toxicant is tobacco itself, and its weight (per cigarette) should be disclosed for each brand variant, as disclosed for example, on the www.batnz.co.nz website.

Table 1 Nitrosamines and heavy metal concentrations in New Zealand tobaccos

ug/g dry weight (ppm)	Total TSNA*	Arsenic #	Cadmium #	Chromium #	Nickel #	Lead #
<i>Tobacco in regular manufactured filter cigarettes</i>						
Rothmans	0.9	0.14	1.15	0.73	3.02	0.62
Dunhill	0.3	Na	Na	Na	Na	na
Winfield	0.5	0.15	0.96	1.82	3.35	0.65
Marlboro	6.6	Na	Na	Na	Na	na
John Brandon	0.4	Na	Na	Na	Na	na
Longbeach	1.6	Na	Na	Na	Na	na
Horizon	0.1	0.14	0.80	0.82	1.81	1.25
Holiday	0.3	0.16	0.93	1.39	4.19	0.75
Pall Mall	0.2	0.14	0.92	0.96	5.32	0.92
Benson & Hedges	0.6	0.17	0.92	1.53	2.22	1.06
<i>Regular cigarette tobaccos for hand rolling</i>						
Holiday	1.2	0.18	0.22	1.36	1.74	0.64
Drum	2.5	0.11	0.46	1.44	1.91	0.58
Park Drive	1.8	0.10	0.48	1.46	1.95	0.66
Pocket edition	0.3	0.18	0.34	1.49	1.6	0.58
Port Royal	1.2	0.16	0.78	2.01	1.90	0.68
Mean all brands	1.23	0.15	0.72	1.36	2.64	0.76
Median	0.6	0.15	0.80	1.44	1.95	0.66

Excluding Marlboro, hand rolled tobacco (mean 1.40, mean 0.82) contained a higher concentration of TSNA than manufactured cigarettes (mean 0.54, sd 0.46) ($p=0.02$ for pooled variances, $p=0.016$ not pooled).

Note: TSNA values of 0.05 indicate a not quantifiable value, but detectable at twice this value.

na Data not available.

*Wahlberg I. Swedish Tobacco Company, 2004.

Fellows SK, Symons RK and Laugesen M. Composition of cigarette tobacco and tobacco products. Report for the Ministry of Health, as part of a contract for scientific services. Porirua: ESR. 1996. © Health New Zealand.

2) **Nitrosamines.** Nitrosamine levels reflect the care the manufacturer has taken to supply the market with low nitrosamine tobaccos, and nitrosamine levels in smoke will tend to be lower if the levels in unburnt tobacco are low.

In 2004 at the request of Health New Zealand, Swedish Tobacco tested unburnt tobacco from the ten leading cigarette brands. These results have been combined

with the heavy metal results obtained in 1996 by ESR. The result shows that Marlboro is an outlier.

Nitrosamines are particularly expensive to test, but they contribute much less than one percent to the total carcinogenic risk of smoking Holiday Extra Mild, due to the low nitrosamine levels in NZ tobaccos.

And, as Table 1 shows, it would only be necessary to test one brand (Marlboro, imported from USA) – the rest hardly require more than random monitoring, just to ensure that a manufacturer does not relax and use tobacco of high nitrosamine content. (High nitrosamine content tobacco will become cheaper, and perhaps tempting to use, as the demand for low nitrosamine tobacco grows).

This cost should be reduced by not testing for nitrosamines more often than absolutely necessary. Nitrites in tobacco influence nitrosamine content, and it may be possible to set a ceiling for nitrites instead of endlessly testing for nitrosamines. Swedish Tobacco are very experienced at testing for nitrosamines, and may be able to comment on frequency of monitoring.

Also one would need to know whether the testing cost is the same whether NNN only or all the others also, are tested. NDMA can be tested as a volatile for low marginal cost if SIFT-MS is used.

There seems little point in testing for NNN, NNK, NDMA and NP, when these tests are very expensive, as even when all are added up, they account for a very small percentage of total carcinogenic toxicity. (However there may be little extra cost in testing four rather than two nitrosamines.)

3) Heavy metals. These are difficult to detect in smoke. Most brand reports of smoke show some cadmium and lead but do not quantify arsenic. A low level of arsenic is gratifying, but a first line of defence is to test the unburnt tobacco. ESR did this in 1996 for the leading cigarette and tobacco brands, and found appreciable amounts of heavy metals. (Table 1)

4) The focus should be on the leading toxicants.

Table 1 in the consultation document, could now be updated to match that of Fowles in Tobacco Control with Dybing, December 2003, rather than remain based on Fowles 2000. If this is done, then acetamide and ethylene oxide should be added.

15 toxicants is sufficient, as these account for well over 95% of the toxicity. In fact three toxicants – 1,3-butadiene (cancer), acrolein (respiratory disease) and hydrogen cyanide (cardiovascular disease) in New Zealand cigarettes account for about two thirds of the total toxicity.⁵

⁵ Laugesen M, Fowles J. NZMJ April 2005. See Appendix 2.

This leads to the possibility that for economy's sake, frequent monitoring of these three leading toxicants could be sufficient for all brands (apart from the five to ten highest selling brand variants), provided the small number of compounds tested was balanced by frequent reporting, such as every calendar quarter.

A suggested list of 15 or so toxicants to be tested.

We would suggest NNN for which cancer potency is known, and NDMA which is a volatile and more easily measured. Subtracting NNK and NP, and adding acetamide and ethylene oxide, 15 toxicants should suffice.

5. Tar labeling is misleading the smoking public and should be phased out

Tar labeling is favoured by cigarette companies. It helps sell cigarettes, and in New Zealand only a third of smokers are smoking low tar cigarettes –a low proportion by western country standards, indicating considerable potential to sell more if only low tar was more popular. But as a proxy measure of harm from smoking it is misleading, and it persists because the current 1999 regulations enshrine it.

- 1) **Tar varies in its toxicity**, (most of the tar in the Eclipse cigarette is glycol); tar is not a reliable indicator of overall toxicity, or for public information.
- 2) **Tar is negatively correlated with toxicity** Comparing 15 regular Canadian brands measured by Labstat using the intensive method, tar was highly correlated with nicotine. ($r=0.66$) So when toxicity is measured by dividing by nicotine, the correlations of tar with toxicity are negative. (Laugesen and Fowles 2004)
- 3) **Tar only correlates with those toxicants found in tar, not with vapour phase toxicants.** Tar was positively and highly correlated with only one of the priority toxicants in Table 1 of the consultation document: NNN ($r=0.70$). It also correlated positively with Cadmium ($r=0.62$). NNN and Cadmium are both found in the tar. (Laugesen and Fowles 2004)
- 4) **Tar contains no more than 5%⁶ of the overall toxicity** Based on the analysis in 2003 of Holiday Extra-Mild, we found that particulates, which include tar, contributed no more than 5% of total estimated overall identifiable toxicity (apart from hydrogen cyanide half of which is equally present in the vapour phase) (Laugesen and Fowles 2004). Toxicity resident in the tar comes

⁶ Nov. 2005: This estimate does not allow for the one third to one half of the hydrogen cyanide found in the particulate phase, in which case the particulate phase may account for up to 19% of the toxicity of Holiday Extra-mild. (Laugesen & Fowles NZMJ 2005 Appendix 2)

from heavy metals and nitrosamines and to a lesser extent from polycyclic aromatic hydrocarbons. In total, tar and particulate matter did not contribute more than about 11%⁷ of the carcinogenic risk of cigarette smoking for Holiday Extra mild. (Laugesen and Fowles 2004).

Percentage toxicity from tar may be higher for other brands in other countries. It is low for New Zealand because nitrosamines and heavy metals are low in most New Zealand tobaccos. (Table 1 this submission).

So Health New Zealand supports the Australian method of pack labeling and we believe tar should not be mentioned.

Nicotine and CO labelling

Health New Zealand would also like to see the abolition of nicotine yield labeling, and CO labeling, in favour of text as for Australia.

MoH question.

40. Health New Zealand supports

- 1) limitation of additives,
- 2) reporting of additives accelerants and constituents in the unburnt cigarette (tobacco and paper),
- 3) reporting of emissions in the smoke.

41. Commercial secrecy opposed. There is no reason why the public should not be told what is added to their cigarettes. The case for commercial secrecy is much overblown, as expensive technology today allows competitors to detect trace compounds in competitors' products; yet these same companies would deny this information to the consumer whose life is on the line by smoking them.

Health New Zealand is opposed to regulation that requires the Ministry of Health to be entrusted with tobacco product 'disclosures' that are not shared with the public. The Ministry of Health can seldom act alone to oppose the tobacco companies without public support, which depends in turn on a fully informed public. Thus being entrusted with commercial secrets about lethal products puts the Ministry in a weak position where it is accountable by knowing, but powerless to act because the media and the tobacco control agencies are unable to support the Ministry.

42. The compliance costs associated with disclosure options. See 44.

Additive disclosure. The current system is hopeless for regulation, with hundreds of compounds and flavours, each containing multitudinous unknown chemicals. This obfuscates the whole subject, and would drown the regulators in fruitless paperwork if extended to brand variants. The Philip Morris website shows only a few additives for each of their brands, and is much better for

regulatory purposes.⁸ Regulations could then require that any additive had to be justified as to why it should be added. The amounts of these few additives should be stated for each brand variant, if and perhaps only if, the names suggest a bioactive or toxic product, affecting the airways, addiction or sweetness, or known to result in chemical reactions causing these effects.

Menthol is the main additive in cigarettes. It is not correct to regard menthol as part of the tobacco constituents, as some tobacco company websites may do. Menthol is not an essential part of the cigarette.

No disclosure is necessary for menthol – it is stated on the packet - and it is obviously put there to make smoking more pleasant and acceptable, and women smokers in particular seem to like it. Although not essential to smoking, menthol makes smoking more desirable to young people.

Disclosure and content control go together The case of menthol highlights the futility of additives disclosure alone– when the problem also requires activation of section 31 to ban such an additive.

Questions

43 Which approaches to testing of testing tobacco products if any do you think bears further consideration?

1. **Abandon tar as the basis for monitoring** and public information. Companies would be free to use this privately, as a manufacturing tool, which is what it was designed for.
2. **Adopt the measurement of individual toxicants** and use them to create an overall relative toxicity score as explained by Laugesen and Fowles 2004 (Appendix 2).
- 3 **Abandon testing of sidestream smoke.**
4. **Rely on one smoke test method only, such as Massachusetts intensive**, or Canadian intensive method. If only one is used, the Massachusetts method is a better guide, giving results based on 50% of ventilation holes closed.

44. **Other approaches to testing.** Are there any other approaches which could be considered?

Exhaled breath measurement of the toxic boost provide a cost effective alternative to smoke testing.⁹

⁸ Nov. 2005: Similarly, Imperial's website lists ingredients as simply tobacco and water for its regular NZ brands.

⁹ Nov. 2005: This approach awaits further development of the technology. Some obsolete text deleted.

Cost implications

Re 42. The compliance costs are presently large. However, cost could be reduced considerably. Health New Zealand plans to shortly offer detection of all the VOCs (volatile organic compounds) listed in Table 1 and a few more besides. Details will be posted on Health New Zealand's website www.healthnz.co.nz as soon as the service is available.

MoH Question 45. What are the cost implications of the option of making regulations under section 33 of the Smoke-free Environments Act 1990 to require tobacco companies to undertake more extensive constituent testing of tobacco products. What laboratory capacity would be required to achieve this?

Re 45. Anything more than tar nicotine and carbon monoxide will involve considerable cost. This cost is ultimately borne by the (poor) smoker, and so tests done should be kept in reasonable bounds.

For this reason, as above, we recommend that the testing regime be under the control of the Ministry of Health, and to ensure independent audit, the precise place and timing of sampling not revealed in advance to manufacturers.

Suggested testing schedule – which brands, which toxicants, and how often

All testing should be required to be paid for by the manufacturer, at an independent laboratory of the government's choosing. National capability should be developed to do the tests within New Zealand.

- **For all brands** frequent (quarterly) testing.
- **For top ten or so brand variants** test all 15 or so priority toxicants four times a year.
- **For all other brands test only the most toxic of the toxicants** – butadiene, acrolein and cyanide, and possibly one or two others, plus of course nicotine. Remaining priority toxicants should be tested annually. Test on a random basis.
- **Test unburnt tobacco** on a continuous sampling basis at retail, on a random spot basis, to test for heavy metals and nitrosamines.

Tobacco product modification and harm reductionOverriding principle:

The smoker as a consumer, has a right to tobacco products no more dangerous than necessary.

Health New Zealand takes the view that the continuing smoker, facing a one in two death risk from continued smoking, deserves the primary consideration, over and above putative future risks to population health from making smoking appear to be a little less dangerous, encouraging some to take up smoking.

Health New Zealand says that:

1) Disclosure alone needs to be backed up with down-regulation of toxicant emissions under section 31.

2) Some things such as citrate in paper, and unburnt tobacco, can be regulated now, as the necessary disclosure has already been achieved by research,¹⁰ or as in the case of unburnt tobacco the methods of testing are not in dispute.

3) the plan for toxicants can proceed as with car exhaust pollutants, to require all brands to come below the present median value within a year, without necessarily knowing what the values will be in advance.

4) The overall toxicity of a brand can now be estimated and therefore regulated.¹¹

This gets around the problem of having to set limits on all toxicants separately as in the above paragraph.

5) Novel tobacco products from overseas should all be subject to the same regulatory regime. If a given brand such as Eclipse or Accord was found to be much less toxic than any other brand when rigorously tested, then other brands would be required to reach those toxicant emissions levels as a condition of continued sale, as Section 31 already gives power to accomplish.

Health New Zealand supports the urgent activation of Section 31, as a

1) signal to New Zealand smokers that they have rights as consumers to a product no more dangerous than necessary.

2) signal to cigarette manufacturers that the 1 in 2 death risk of continuing smokers is extreme, and all reasonable measures will be taken to regulate a reduction of any and all reducible risks in cigarette smoke. Only in this way will cigarette manufacturers be encouraged to invest in less dangerous cigarette designs.

3) method of reducing the government's risk of being sued. Smokers – nearly 1200 die of lung cancer annually. – may otherwise claim that the government knew how to make smoking less dangerous but did nothing. (Example, charcoal filters).

The Ministry's own tests released in August 2003¹² (Fowles 2003) showed that the one New Zealand brand fully tested, Holiday Extra-mild (selected because it was the most popular mild brand on sale) had the highest toxicity of 37 international brands tested at the same laboratory by the same intensive method. (See Laugesen and Fowles NZMJ 2005 Appendix 2)

¹⁰ Laugesen, Duncanson, Fraser et al. Tobacco Control 2003. See Appendix 3 for the abstract.

¹¹ Laugesen, Fowles. NZMJ April 2005. See Appendix 2 for the abstract.

¹² Fowles J. Chemical composition of tobacco and cigarette smoke in two brands of New Zealand cigarettes. Porirua: ESR, final report revised 25 August 2003.

Health New Zealand takes the view that cigarettes (and tobacco for smoking) should be regulated concurrently, in three ways, to achieve three aims:

1) **Regulation to reduce fire propensity, and make them self extinguish.**¹³

A poll of New Zealand smokers shows that they would support making cigarettes to be self-extinguishing. Now that New York State has regulated for fire safe cigarettes, it is time New Zealand did also. Removal of the accelerant citrate is a first step and activation of section 31 could achieve this. An amendment to bring cigarette design under control of the Act is likely to be necessary for various reasons - cigarette design affects 2) and 3) below.

2) **Regulation to reduce the addictive burden.** Reduce nicotine content down to 10 mg at first, then after a year down to 8 mg. A lower nicotine content would make it somewhat easier for smokers to quit, though it may be too difficult to reduce nicotine any further than this (unless a more satisfying alternative to medicinal nicotine was available). Mandatory reduction of nicotine content of cigarettes could be done under section 31, down to say, a 12 mg ceiling, but below about 9 mg when it would become noticeable, an amendment to the Act might be necessary, to allow debate in the media and in select committee.

2.1 Compensatory smoking

If tar is not reduced, compensatory oversmoking does not occur.^{14 15 16 17} Compensatory or over smoking is caused by the commercial low yield cigarette, which has both a low nicotine and low tar yield. But tar as well as nicotine are important in whether compensatory smoking occurs or not. Only when both are lowered does compensatory smoking occur. Lowering one but not the other (as can be observed with research cigarettes and now that Vector's Quest cigarettes are on the US market) does not cause compensatory smoking.¹²

3) **Regulation to reduce toxicity of the smoke.(carcinogens and cardiovascular and respiratory toxicants).** (Fowles 2003). Much more could be done, in two main ways:

1) Adopt design and content of the least toxic brands

As Appendix 2 shows, recent comparisons of Holiday Extra Mild with 37 brands from Canada and Australia, show that HEM was the most toxic,

¹³ Laugesen, Duncanson, Fraser et al Tobacco Control 2003. See Appendix 3 for abstract.

¹⁴ Benowitz NL, SRNT Conference, Arizona, 2004. Abstract PA6-4. 2004.

¹⁵ Rose J, Behm F. Effects of low nicotine content cigarettes on smoke intake. *Nicotine Tob Res* 2004; 6: 309-19.

¹⁶ Dixon M, Kochhar N, Prasad K, Shepperd J, Warburton DM. The influence of changing nicotine to tar ratios on human puffing behaviour and perceived sensory response. *Psychopharmacology* 2003; 170: 434-442.

¹⁷ Hasenfratz M, Baldinger B, Battig K. Nicotine or tar titration in cigarette smoking behaviour? *Psychopharmacology (Berl)* 1993; 12: 253-8.

and its cancer toxicity could be 37% lower if it was redesigned to that of the least toxic Canadian brand.

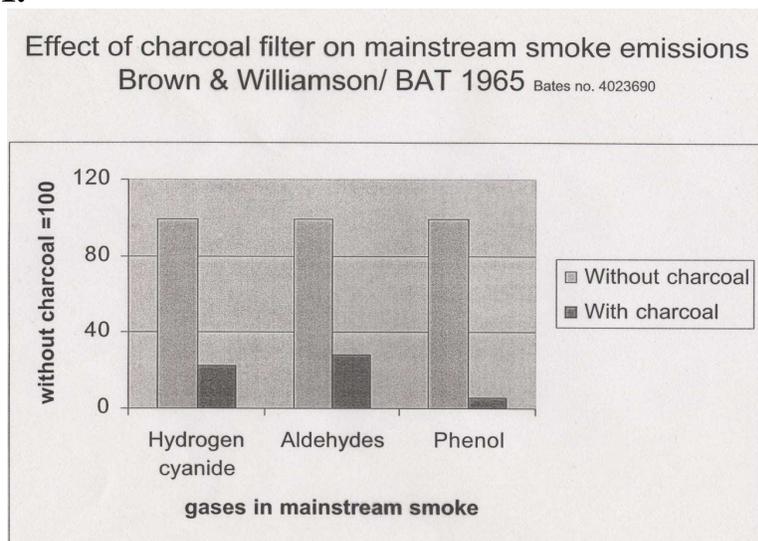
2) Mandate the use of truly effective charcoal filters. (See Appendix 1.)

Tests commissioned in 2004 by Health New Zealand at Labstat showed that locally sold Mild Seven brand's charcoal filter was largely ineffective in reducing VOCs in tobacco smoke. (Appendix 1) We sought but failed to obtain any evidence that Kent charcoal filters were any better.

VOCs account for most of the toxicity of cigarette smoke, and most VOCs can be removed by charcoal filters. All cigarettes should be required to provide an effective charcoal filter, before they can be sold in New Zealand. (This requires an amendment to the Act, *but regulation can require reduction of emissions to the levels achievable by such filters.*)

Because the currently used cellulose acetate filters help to remove particulates, the filter required is a combined charcoal and acetate filter. Meantime, the focus should be on using section 31 to reduce toxicant levels to the levels achievable by using effective filters.

Figure 1.



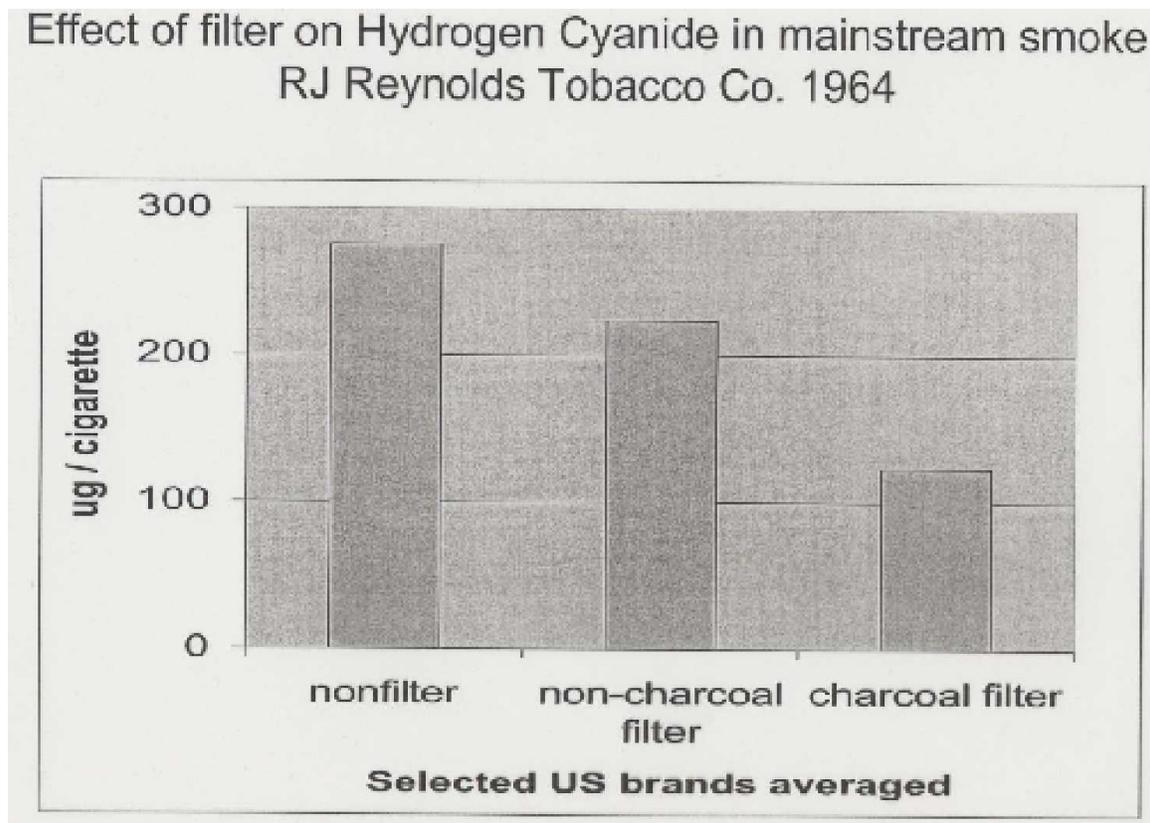
based on data from British American Tobacco Company. 54 page document, circa 1965. Guildford miscellaneous collection. www.tobaccodocuments.org/guildford_misc/402368992-9045.html Accessed February 2004.

Similar reductions in volatiles as shown in Figures 1 and 2 have been found in other cigarette company documents.

Cigarette manufacturers appear to be all in agreement that charcoal filters can be effective in reducing volatiles in the smoke. However none is using them to reduce risk to smokers across all their brands in a demonstrable manner yet. Charcoal filters taste differently, and so are not the first brand choice for New

Zealand smokers. Mandating them in all brands by regulation will be needed to make it happen. Charcoal filters are not currently manufactured in New Zealand, but this could change if such filters were mandatory.

Figure 2.



based on data from Cundiff RH. The spectrophotometric determination of hydrogen cyanide in cigarette smoke. 8 June 1964. RJ Reynolds collection. Bates no. 50094 596.
www.tobaccodocuments.org Accessed February 2004.

4) The regulation of unburnt tobacco

Recommendation of a standard for unburnt tobacco

Regulations should be enacted to enforce a standard. However sweet agreement from the cigarette manufacturers cannot be expected until the Ministry of Health convinces them that it is serious about achieving the targets and will bar brands which do not conform.

A standard of this nature could be useful immediately in providing a standard for prohibiting entry if necessary even for private use for those oral tobaccos

imported from India and Pakistan, or from anywhere else, which are suspected of being as carcinogenic as the same products in their country of origin.

Table 2. Harmful Constituents; recommended upper limits for the unburnt cigarette.

Harmful constituent/ cigarette	Recommended upper limit	Rationale
Tobacco, moist weight, mg	650	Many cigarettes sold by BAT in New Zealand contain less than this amount. www.britishamericantobacco.co.nz
Citrate in paper, mg	0.05*	Cigarette paper in hand rolled cigarettes contains less than this amount.
Volatile nitrosamines ug/g	0.001	Swedish snus, 2003**
Arsenic ug/g	0.163#	Mean of 16 NZ brands in 1996.
Cadmium ug/g	0.914#	Mean of 16 NZ brands in 1996.
Chromium ug/g	1.199#	Mean of 16 NZ brands in 1996.
Lead ug/g	0.847#	Mean of 16 NZ brands in 1996.
Nickel ug/g	3.142#	Mean of 16 NZ brands in 1996.
Ethylene oxide	Zero.	A human carcinogen.

Note: all constituents are measured on a dry weight basis.

*Laugesen, Duncanson, Fraser et al. Hand rolling cigarette papers as the reference point for regulating cigarette fire safety. Tobacco Control 2003; 12: 406-10.

Fellows SK, Symons RK and Laugesen M. Composition of cigarette tobacco and tobacco products. Report for the Ministry of Health, as part of a contract for scientific services. Porirua: ESR. 1996.

**Wahlberg I. Swedish Tobacco Coy. personal communication, 2004.

1) for control of toxicants. We recommend that unburnt tobacco be required to conform to the current Gothiatek standard for Swedish oral tobacco (See Table 2) This is not arduous. The only outlier is Marlboro, manufactured in the USA. We understand Philip Morris has started to reduce nitrosamine levels, but regulation should not wait for one company to reduce nitrosamines when other companies already have. The main toxicant in tobacco products is tobacco. There is good reason therefore to reduce the amount of in each cigarette.

Tobacco weight per cigarette (average 0.71 g¹⁸) can be reduced to below 0.65 g, an 8 % reduction. Although almost all New Zealand cigarettes are a uniform 84 mm in length, tobacco per cigarette varied 0.60g to 0.82g among British American brands, and even within brand families. For example Benson and Hedges special filter contained 0.75g, while its extra-mild variant contained 0.62 g. Except for HEM (0.67 g), Dunhill and Pall Mall, extra-mild or super-mild variants contained

¹⁸ Laugesen M. Tobacco manufacturers' returns for calendar year 2002, Report to the Ministry of Health, Wellington: MoH, 2003.

0.62 to 0.63 g of tobacco.¹⁹ Tobacco weight is the main determinant of the volume of sidestream smoke. Smoke either goes into sidestream or mainstream, and so after controlling for puffing intensity and cigarette design and other variables, will likely determine the amount of mainstream smoke available for inhalation.

- 2) **For control of residual pesticide levels** in tobacco, a standard is required. Gothiatek standard is quoted by Swedish Tobacco, but we have not seen it.

Questions

47, 48. Regulating additives or design – other costs and benefits

The case for regulating under section 31 to regulate smoke and tobacco products.

- 1 Children and the elderly deserve protection from cigarette fires from smokers discarding manufactured cigarettes inadvertently in the same building.
- 2 Adolescents deserve better protection from addiction to smoking tobacco.
- 3 Smokers over the age of 35 or so, face a 1 in 2 death risk from continued smoking.

Some public health advocates, concerned for population health, may argue that if regulated cigarettes are perceived to be less dangerous than more young people may be encouraged to take up smoking, and former smokers may be tempted to relapse.

This risk of increased smoking can be controlled, given the comprehensive tobacco control policies now in place. If youth smoking did increase, increased tobacco taxation could reduce it. Reduced toxicity cannot be guaranteed to result in reduced future harm, as not enough is known – and will not be for 20 years in the case of lung cancer.

The risks of increased smoking are putative and mostly in the future, due to either (a) Young people more tempted to take up smoking. Not all will still be smokers at age 35, and their mortality will not discernably increase unless they smoke beyond this age.⁹ Even then any excess mortality risk is mostly 40-50 years in the future.⁹ (b) Former smokers relapsing back to smoking tend to be recent quitters, with still-elevated risks due to previous smoking. If they relapse

¹⁹ British American Tobacco NZ. What's in your brand? www.britishamericantobacco.co.nz

to smoke reduced-toxicity cigarettes, then their mortality risk will certainly increase, but hopefully not as much as from unregulated cigarettes.

100 000 to 200 000 future deaths from smoking Against these putative risks we have to balance up the 1 in 2 early death risks noted above, as applied to the 377,000 smokers age 35 and over, who continue to smoke.⁸ Thus after allowing for some to quit smoking, or die of other causes, between 100,000 and 200,000 expected future deaths can be predicted from cigarettes as designed, manufactured and sold to date, among those already 35 and over.

These 377,000 smokers now aged 35 and over, inhale some 100 times per day, inhaling smoke containing many toxicants simultaneously. For example, smokers inhale the carcinogen and respiratory toxicant acetaldehyde at levels 100 times the level measured in outdoor air in a Christchurch industrial estate in winter.

These 377,000 includes some who have less choice or coping ability, due to addiction, mental illness or incarceration. For all these people, ensuring that cigarettes sold are not any more dangerous than necessary is most important.

Obligations of the Crown to Maori in reducing smoking mortality

One in three Maori die from smoking. (Laugesen and Clements 1998. www.tpk.govt.nz) There may possibly, however, be other reasons, in the cigarette, that contribute to the high death rate. The favoured cigarette among Maori is a hand-rolled cigarette, or RYO (roll-your-own). Moreover, RYOs are usually smoked without filters. Maori smoking prevalence is not reducing.²⁰

We have urged in past annual reports on the manufacturers' returns to the Ministry of Health that hand rolled cigarettes should be smoke tested for toxicants. One brand of manufactured cigarettes was tested in 2003. Despite the difficulties this can now hopefully be extended to RYO cigarettes.

²⁰ Nov. 2005: Maori smoking prevalence reduced in 2004, but the rate of decline even so, is such that it would take over 100 years at present rate, for Maori smoking to reach near to zero.

Appendix 1

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Scope for regulation of cigarette smoke toxicity: the case for including charcoal filters

Murray Laugesen, Jefferson Fowles

Abstract

Aim To compare the emissions toxicity of two manufactured cigarette brands, one with and one without a charcoal filter, in the light of manufacturers' laboratory research findings on the properties of charcoal filters.

Method Emissions of Mild Seven charcoal filter brands, regular (labelled '12 mg tar') and Light (labelled '9 mg tar') purchased in 2004, were compared with those of Holiday Extra-mild brand (9 mg tar, acetate filter), purchased in 2002. All emissions were tested under intensive machine smoking conditions by Labstat International Inc., Kitchener, Ontario.

Results The Mild Seven brands contained a small amount of charcoal, its black granules visible against the white acetate filter. The charcoal filter in the brands tested did not reduce toxicity to the extent expected, though they gave significantly lower emissions for the respiratory- toxicants acrolein (14%–17% lower, $p \leq 0.01$) and formaldehyde (26–37% lower, $p \leq 0.01$). Reductions were not significant for acetaldehyde, and actually higher for hydrogen cyanide. Overall, estimated cardiovascular-respiratory toxicity was not reduced, whether based on toxicant emissions or the toxicant to nicotine ratios. Of the packet labels, neither tar yield (mg) nor the descriptors 'mild', 'light', or 'extramild', or 'charcoal filter' for these three brands was associated with any reduction of the combined respiratory—and cardiovascular toxicity of mainstream smoke, as measured by leading toxicants tested by the intensive method. Previously secret documents from cigarette companies, including British American Tobacco, reported reductions of 75%–80% in hydrogen cyanide, acetaldehyde, acrolein, and formaldehyde in mainstream smoke from addition of charcoal to the filter. We estimated that an effective charcoal filter could reduce a brand's overall relative toxicity score for identifiable toxicant by over 40%.

Conclusion Since 1965, major cigarette firms have known from their chemists that many smoke toxicants, including hydrogen cyanide and acrolein, were removable by manufacturing the cigarette with a charcoal filter. To this day, few brands have charcoal filters. The best known, Mild Seven, contained a token charcoal filter only. In neither Japan nor New Zealand did this brand lower cardiovascular toxicant emissions in smoke. In the Smoke-free Environments Act, Government has the power to lower smoke emissions by regulation, but no regulations are in place. The Act does not give power to add filters to cigarettes, but does give power to lower smoke emissions to the level attainable by using a charcoal filter, which could reduce smoke emission toxicity to a large extent. Regulation to require effective charcoal filters is now long overdue.

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Scope for regulation of cigarette smoke toxicity according to brand differences in toxicant emissions

Murray Laugesen, Jefferson Fowles

Abstract

Aims To explore the scope for regulating to reduce the toxicity of manufactured cigarettes sold in New Zealand (NZ), based on published toxicant emissions by brand.

Methods Internet searches of published cigarette smoke emissions of 13 toxicants chosen on risk assessment principles, for 20 British Columbian, 15 Australian brands, and one NZ brand, Holiday Extra-mild (HEM), tested by Health Canada intensive smoke machine method at Labstat Inc, Kitchener, Ontario, as a ratio of toxicant to nicotine yield. We estimated relative overall smoke toxicity per disease group and per brand, after adjusting for the published cigarette-attributed mortality fractions for cancer, cardiovascular, and respiratory disease.

Results After allowing for nicotine yield, filter ventilation, and compensatory over-smoking, there were significant differences between brands, with the NZ brand estimated to be the most toxic. Low-yield cigarettes (<0.9 mg nicotine ISO) were estimated to be on average 19% more potent overall than medium-yield cigarettes ($p < 0.01$). Of toxicants identified and measurable in smoke; 1,3-butadiene accounted for 45% of cancer potency; hydrogen cyanide for 89% of cardiovascular; and acrolein for 97% of respiratory potency—these three toxicants accounting for 65% of identified brand potency. Individual toxicant emissions varied across brands by a factor of 1.5 for carbon monoxide, to 32 for lead. Compared with HEM, one Canadian brand, 'Export A full flavor', carried a 37% lower cancer risk. This lower risk was largely due to differences in nicotine yield, lowering the toxicant/nicotine ratio.

Conclusions Cigarettes, unregulated, are unduly dangerous. Though many smoke toxicants cannot yet be quantified, risk assessment based on current data suggests that regulation could partly reduce identifiable cancer risk, and possibly eliminate the *excess* cardiovascular and respiratory toxicity of HEM, when compared with regular Canadian brands. The first goal should be to reduce emissions of the leading three toxicants, in addition to more effective charcoal filters. Tobacco smoke, unlike unburnt or non-smoking tobacco, contains toxic gases and trillions of reactive oxygen species molecules per puff, and will remain inherently harmful. Regulation could usefully part-reduce smoke toxicity exposure for continuing smokers, while not relenting on efforts to assist smokers and society to be quit of smoking.

NZMJ 15 April 2005 URL: <http://www.nzma.org.nz/journal/118-1213/1401/> © NZMA

RESEARCH PAPER**Hand rolling cigarette papers as the reference point for regulating cigarette fire safety****M Laugesen¹, M Duncanson², T Fraser³, V McClellan⁴, B Linehan⁵ and R Shirley⁶****Abstract**

Aim: To compare the burning characteristics of the tobacco and paper of manufactured and hand rolled cigarettes, and set a fire safety standard of manufacture to largely reduce the fire risk from discarded cigarettes.

Methods: (1) Cigarette extinction test of ignition strength: 40 cigarettes per brand, lit and placed on 15 layers of filter paper, in accordance with ASTM test standard E2187-02. (2) Citrate extracted by 0.1N hydrochloric acid from cigarette papers and from tobacco in manufactured cigarettes, the supernatant analysed by high performance liquid chromatography using ultraviolet visual light spectrophotometer. (3) Survey of 750 nationally representative adults age 18 years and over, by telephone, including 184 smokers.

Materials: (a) New Zealand made Holiday, and Horizon, and US made Marlboro manufactured cigarettes; (b) US manufactured Merit with banded paper; (c) Holiday, Horizon and Marlboro hand rolling tobaccos, hand rolled in Rizla cigarette papers; (d) manufactured cigarettes as in (a), reconstructed using Rizla hand rolling cigarette papers.

Results: 1. (a) For each brand of manufactured cigarettes, 40/40 burnt full length; (b) for Merit banded paper cigarettes 29/40 (73%) burnt full length; (c) for each brand of hand rolled cigarettes 0/40 burnt full length; (d) 0/40 manufactured cigarettes reconstructed with Rizla hand rolling paper burnt full length. 2. Citrate content: (a) In manufactured cigarette papers: 0.3–0.8 mg; in tobacco of manufactured cigarettes: Holiday 0, Horizon 0, Marlboro 8.8 mg; (b) Merit: in banded paper 0.418 mg; in tobacco 10.23 mg; (c) In hand rolled cigarettes: in the papers < 0.08 mg; in hand rolled tobacco 13.3–15.0 mg; (d) In hand rolling papers of reconstructed cigarettes: < 0.018 mg. 3. Requiring manufactured cigarettes to compulsorily self-extinguish when left unattended was supported by 67% of smokers, 61% of manufactured cigarette smokers, 82% of hand rolled smokers, and by 68% of non-smokers.

Conclusion: The wrapping paper is a key determinant of whether or not unpuffed cigarettes burn their full length. Using international test methods, popular brands of manufactured cigarettes all burnt full length, but none did so when re-wrapped in hand rolling cigarette paper. This provides a ready-to-hand smoker acceptable standard for reducing ignition potential from manufactured cigarettes, as a basis for regulation or litigation.