

Tobacco manufacturers' returns for the 2004 calendar year

Report to the Ministry of Health

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Summary

Aim	To analyse and report on the manufacturers' returns for the 2004 year, returns required by the Smoke-free Environments Act 1990.
Method	The 2004 returns were compared with previous returns, and correlated with other data from Statistics New Zealand. Analysis was by Excel spreadsheets. Duty free sales were not counted. Manufacturers' machine smoke tests on their own products were reported as received and not independently audited.
Setting	New Zealand national data was obtained from tobacco product manufacturers and importers.
Results	Fifteen companies supplied data. The results are given in tables in the body of this report, and in 24 additional tables (listed in Table 1 below), appended.

Since 1999 tobacco products consumption decreased 24%. All total tobacco products consumption measures (sales, tobacco used, excise data) showed small decreases in 2004.

Tobacco usage.

Total tobacco used in manufacture decreased 1 percent, from 812 g in 2003 to 793 g per adult in 2004, but by 19% since 1999. Per adult the decrease was 25 percent since 1999, and tobacco used in manufacture was more than halved (-53%) since 1990. (Table B2) Counting 1 gram of loose tobacco as one cigarette – reflecting how excise is levied - tobacco products per adult, including cigars, totalled 1000 sticks, finally achieving the Ministry of Health's policy target set in 1985. The trends are uneven from year to year.

Manufactured cigarettes. From 2003 to 2004 tobacco used decreased 2.3%.

Hand-rolled cigarette tobacco (RYO, roll-your-own) increased 0.5%. (Tables C, D1). From 2002 to 2004, tobacco used in manufactured cigarettes decreased 15% and RYO use increased 8.2%.

Pipe tobacco. Use declined, pipe tobacco accounting for only 0.2% of all tobacco used. (Table D 2, E1).

Cigars. Tobacco used in cigars accounted for 0.5% of all tobacco used. (Table B1, E1).

Reported sales

Manufactured cigarettes. Reported sales fell from 2398 million in 2003 to 2332 million in 2004. (Table G). Between 2002 and 2004, all top ten brands, accounting for 94% of manufactured cigarettes sold, lost sales volume. In 2004, however, three of the top four brands increased their sales, compared with 2003. (Table 2). The leading brand family, Holiday, in 2004 accounted for 31% of manufactured cigarettes sold - and for 10% of hand rolled cigarette tobacco.

Cigarette hand rolling tobacco. In contrast to manufactured cigarettes, reported sales of hand-rolled cigarette tobacco volume rose 4 %, from 803 in 2003 to 837 tonnes in 2004. BAT increased sales, while Imperial sales reduced. In 2004, the most popular brand, Port Royal increased its sales to account for 35% of the total market. The second most popular, Park Drive, increased sales by 2%, comprising 31% of the total market. Remaining major brands lost volume sales in 2004. Average retail price was 56 cents per gram, a total value at retail of \$466 million. (Table I.1)

Pipe tobacco. Sales further decreased in 2004, to 6.9 tonnes.

Cigars. Brands and weights varied greatly. Tobacco used in manufacture was 16.5 tonnes.

Smoke tests.

Tar. Sales weighted yields continued to reduce, from 12.4 mg per cigarette in 2001 to 11.5 mg in 2002 to 11.7 in 2003 to 10.8 in 2004.

Nicotine remained fairly stable: 1.1 mg per cigarette in 2001, 1.0 mg in 2002 1.05 in 2003, and 1.0 in 2004.

Carbon monoxide reduced from 12.1mg per cigarette in 2001 to 11.8 mg in 2002 to 11.5 mg in 2003 to 11.0 in 2004. The tar to nicotine ratio has changed slightly from 11.0 in 2001 to 11.3 in 2002 to 11.1 in 2003, to 10.4 in 2004.

Conclusion **Type of products sold.** Ever since 1990, cigarettes whether manufactured or hand-rolled, have accounted for 99% of tobacco used. (Table E1). Cigarettes are the most dangerous of all tobacco products.

Rate of decline in consumption. Tobacco used in manufacture for sale in New Zealand declined 25% per adult age 15 and over between 1999 and 2004, an average annual decline of 5.0%. This rate of decline is as rapid as at any time in the past. The rate of decline in per adult consumption during 1999-2004 (average 4.9% annual decrease) was 32% higher than in the 1990-1999 period (3.7% annual decrease).

Tax paid tobacco products per adult in 2004 decreased further to 1000 g per adult, the target set by the Comprehensive Tobacco Control Policy in 1985, 19 years before.

Tar. The low tar yields reported do not necessarily imply lower tar inhalation - most New Zealand low tar brands have ventilated filters and low nicotine-low tar emissions, which when combined in the same cigarette, encourage higher inhaled volumes of smoke.

Introduction

This report should be read in conjunction with the additional detailed tables A to I, listed in Table 1, and available in pdf format.

Background

Since 1991, the Smoke-free Environments Act 1990 has required New Zealand tobacco manufacturers and importers to report to the Ministry of Health for the previous calendar year on tobacco and additives used, and on tar and nicotine in cigarette smoke. Price and sales by brand also required by the Act, were reported by manufacturers from 1994 onwards. This report, for calendar year 2004 again reviews the quantities of tobacco products sold, focussing on tobacco itself, tar and nicotine yields in smoke, and on tobacco product sales.

Method

The returns of the tobacco manufacturers to the Ministry of Health were analysed on Excel spreadsheets, and collated with tax-paid releases of cigarettes and loose tobacco from Statistics New Zealand.

Tobacco and additives use. Each manufacturer or importer reported moist tonnage of tobacco and additives used by product category. To calculate total tobacco used (assuming zero moisture), 13.5 percent moisture was subtracted for manufactured cigarettes, 20 percent for cigarette tobacco, 19 percent for pipe tobacco, and 12 percent for cigars from moist weights. Additives are presented as comprising part of the weight of tobacco used in manufacture, and when this is done, the value can be reconciled with sales data. Cigar numbers were estimated based on 1 cigar per 2 g tobacco. Manufacturers are not required to report moisture. The moisture percentages were those supplied by BAT.

Tobacco product sales. For each brand variant, all firms reported quantity sold and the manufacturer-recommended packet price in December. The average of prices in consecutive Decembers (the excise rate is adjusted annually for inflation each December 1st) was used to calculate the average manufacturer-recommended retail price per cigarette during the calendar year. No allowance was made for trade variations above or below these recommended retail prices. To calculate total tobacco products sold, a million manufactured cigarettes were equated with one metric tonne of manufactured loose tobacco or cigars.

Table 1. 24 Additional tables.

Tobacco use tables	
A	Firms' tobacco use and sales, by tobacco product class, 2004
A.1	Tobacco used and cigarette sales, by all firms reporting
A.2	Sales in millions of sticks or tonnes, by firms
A.3	Tobacco used, by firms; tonnes.
B.1	Tobacco used in cigars, 1990-2004
B.2	Tobacco in all products 1990-2004
C	Tobacco used in manufactured cigarettes 1990-2004
D	Tobacco used in RYO cigarette and pipe tobaccos 1990-2004
D.1	Cigarette RYO tobacco
D.2	Pipe tobacco and all loose tobacco
E	Firms' market share of tobacco used.
E.1	Tobacco product classes by tobacco usage 1990-2004
E.2	Tobacco used, by firm; tonnes, 1990-2004
E.3	Firms' manufactured cigarette volume sales
E.4	Firms' share by volume of manufactured cigarettes sold
E.5	Firms' share of weight, of dry tobacco used
Additives	
F	Weight of additives used, 1990-2004
F.1	Additives in all tobacco products, and in manufactured cigarettes.
F.2	Additives in cigarette tobaccos.
F.3	Additives in pipe tobacco
F.4	Additives in cigars
Tobacco product sales	
G	Manufactured cigarettes 2004, smoke tests, price, volume, \$ sales, by brand
H	Cigarette prices, sales, and taxation, 1990-2004
H.1	Manufactured cigarettes
H.2	Hand-rolled cigarettes
H.3	The total cigarette market 1990-04, in current dollars
H.4	The total cigarette market 1990-04, in constant (1995) dollars.
I	Hand-rolling tobacco and pipe tobacco sales, 2004
I.1	Cigarette tobacco sales
I.2	Pipe tobacco sales

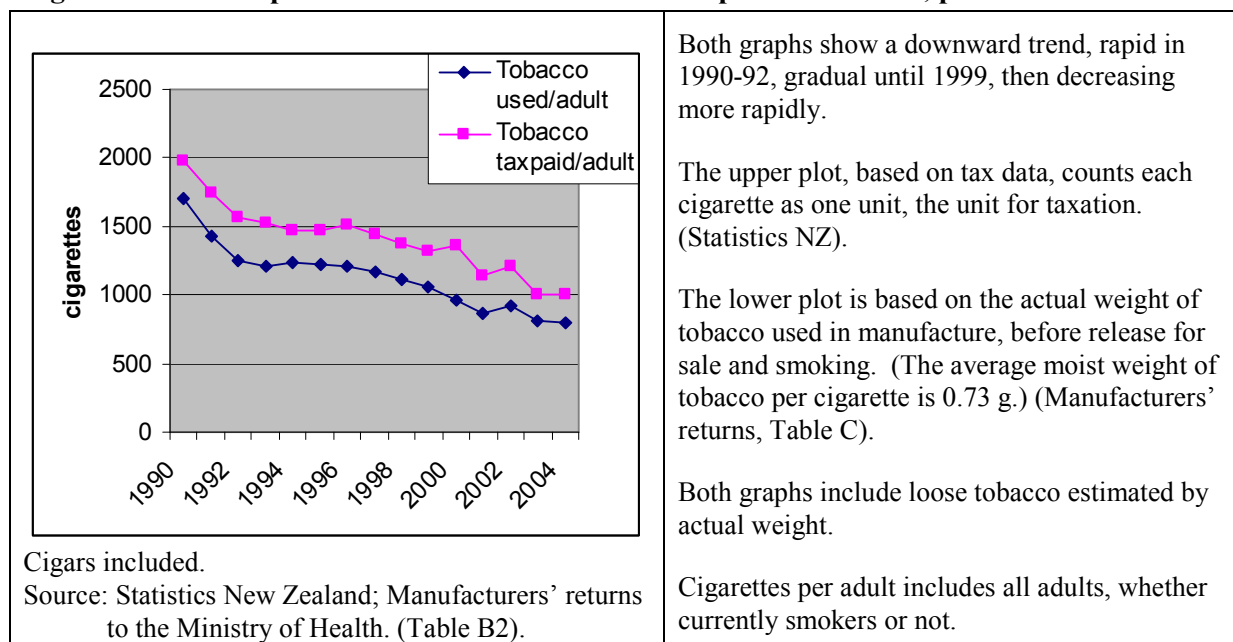
Smoke tests. Tobacco product manufacturers and importers reported smoke machine yields of tar and nicotine from their own laboratories as mg per manufactured cigarette, as specified in the regulations and schedules of the Act, that is, based on the ISO machine test method. Carbon monoxide (CO) reporting was required this year for the fourth consecutive year, and all except minor importers reported on CO. In 2004, no testing was required of other tobacco product classes. The test results were not audited independently of firms reporting.

Results

The two firms manufacturing in New Zealand (who also imported) and 13 importer-only firms, reporting for 2004 calendar year are listed in Table A.1. Approximately 93% of cigarettes, and 99% of RYO tobacco sold were manufactured in the factories of BAT (Napier) and Imperial (Petone); Philip Morris was the main cigarette importer.

Tobacco used in tobacco products

Figure 1. Tobacco products and total tobacco consumption 1990-2004, per adult



Tobacco used: trend. Overall, total (dry weight) tobacco used in tobacco products (Table 2, right hand column) fell by 44 percent in the 14 years following the Smoke-free Environments Act. Moist tobacco used per adult decreased 53 percent in this period. Most of the decrease was due to a halving of the number of manufactured cigarettes sold, and partly due to 13% less tobacco used per cigarette. Tobacco manufacturers reported increased sales of hand-rolled tobacco and cigars during this period. (Table 2).

Validity. Manufactured cigarette and hand-rolled tobacco releases, sales and usage in manufacture within each product class, were in approximate agreement.

Tobacco use: by product class. In 2004, of all tobacco (dry weight) used, 69 percent went into manufactured cigarettes, 30 percent into hand-rolled cigarette tobacco, 0.5 percent into cigars, and 0.2 percent into pipe tobacco. (Table E.1)

Table 2. Tobacco used in tobacco products sold within New Zealand, 1990-2001, moist weight

Year	Manufactured cigarettes released (Statistics NZ)	Tobacco used in manufactured cigarettes	Tobacco used per manufactured Cigarette	Tobacco used making hand-rolled cigarettes	Tobacco used in pipe tobacco	Tobacco used in cigars	Total tobacco used (dry weight)
	Millions	tonnes	grams	tonnes	tonnes	tonnes	tonnes
1990	4489	3770	0.84	591	27	3	3758
1999	3119	2358	0.76	727	12	18	2647
2000	3152	2092	0.66	721	9	24	2407
2002	2817	1988	0.71	742	9	16	2334
2003	2367	1720	0.73	799	8	13	2144
2004	2320	1689	0.73	803	7	16	2143
<i>% change</i>							
1990-99	-31	-37	-10	23	-56	500	-30
1999-04	-26	-28	-4	11	-50	-8	-19
1990-04	-48	-55	-13	36	-78	550	-43
Source	Statistics NZ	Table C.	Table C.	Table D.1	Table D.2	Table B.1	Table B2

The apparent increase in cigar usage in 2004 may be due to more accurate reporting.

Additives

Manufacturers used 119 tonnes of additives in tobacco products sold in 2004, 108 tonnes (92%) of it in hand-rolled tobacco. Additives in 2004 constituted 0.6% by weight of manufactured cigarette tobacco weight, 13 percent of hand-rolled cigarette tobacco weight, 14 percent of pipe tobacco, and 3.8 percent of cigar tobacco weight, and 4.7% of all tobacco product moist weight. This is a fairly consistent pattern over the years.

In reporting on 1999-2004 sales, most tobacco companies participated in supplying a common list of over 350 additives for cigarettes, with a maximum a percentage by weight (of unburnt product) supplied for each substance, one maximum for all brands. BAT and Imperial continue such a combined list. Lists for other product classes were also supplied.

Ammonia and sugars Following the display of much of the data at their website <www.pmintl.com> from April 2001, Philip Morris supplied data in hard copy of the names of ingredients used per brand, and the quantity limits for the compounds added, not per brand but for the product class, and not the precise quantities of additives and ingredients per cigarette for each brand. Sugars added were listed as totalling up to 5.2% of moist tobacco weight in each brand. This may reflect the greater use of ingredients in American blend cigarettes, such as Marlboro.

Weight of tobacco per cigarette. In 2004, BAT again supplied the weight of tobacco per cigarette by brand on its website, www.batnz.com. Almost all cigarettes were a uniform 83-84 mm in length, (One or two Philip Morris Marlboro brands were 100 mm length). Tobacco weight per cigarette, however, varied considerably – from 0.60 g to 0.82 g, and even within brand families. For example, Benson and Hedges special filter contained 0.75g, while its extra-mild variant contained 0.60 g. Except for Holiday Extra-mild (0.67 g), Dunhill (0.73g) and Pall Mall (0.70g), all extra-mild or super-mild variants contained 0.62 to 0.63 g of tobacco.

Accelerants in paper. Philip Morris' returns show that cigarette paper used by Philip Morris in manufactured Marlboro cigarettes contains potassium or sodium citrate in quantities up to 0.1% each of the moist tobacco weight of the cigarette, that is, not more than 2 mg per cigarette,¹ which means up to 5% of the weight of the paper wrapping the tobacco rod. Hand-rolled cigarette papers were not reported on in these returns. The few other ingredients mentioned in cigarette paper besides citrates were cellulose (the paper itself) and calcium carbonate, which does not burn well, and a minute quantity of adhesive. Other companies did not file separate information for the paper used in their cigarettes.

Smoke machine tests

Manufactured cigarettes. The Ministry of Health did not invoke Section 34 of the Smoke-free Environments Act to require companies to test their cigarettes in an independent laboratory at their own expense. Instead the Ministry of Health paid for two brands to be tested in 2002 for a range of priority toxicants, and reported these results in 2003. Manufacturers or importers, as required by law, tested tar, nicotine and carbon monoxide in the smoke of manufactured cigarette brands which they sold. The test results for the brands tested are displayed in Table G.

Table 3. Average sales-weighted yields of tar, nicotine and carbon monoxide; and tar/nicotine ratios, 2001-2004.

<i>Year</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>	<i>2004</i>
Tar mg/cigarette	12.4	11.5	11.7	10.8
Nicotine mg/cigarette	1.1	1.0	1.05	1.0
CO mg/cigarette	12.1	11.8	11.5	11.0
Tar /nicotine ratio	11.0	11.3	11.1	10.4

Cigarette tobacco, pipe tobacco and cigars: No smoke tests were required by the Ministry of Health, and none was reported by the companies.

Manufactured cigarettes

Sales trends by brand groups (Table 4)

Table 4. Volume sales trends by brand groups, manufactured cigarettes 2002-4

<i>Brand</i>	<i>2004 Sales millions</i>	<i>2003 Sales millions</i>	<i>2002 Sales millions</i>	<i>Rank by sales in 2004</i>	<i>2002-2004; % change in sales</i>
Holiday	716	703	767	1	-7
Benson & Hedges	335	333	357	2	-6
Horizon	297	303	329	3	-10
Winfield	288	283	314	4	-8
Pall Mall	167	207	243	5	-31
Rothmans	159	166	190	6	-16
Dunhill	108	104	120	7	-10
Marlboro	65	103	89	8	-27
Peter Stuyvesant	34	32	37	9	-8
John Brandon	31	34	48	10	-35
Total all 10 brands	2197	2267	2506		-12
Total all brands reported	2333	2398	2670		-13
Top 10 as % of total	94	95	94		

¹ Of importance with respect to cigarette fires. The weight of the paper on the tobacco rod is 40 to 50 mg. Citrate is added to help the paper (and the cigarette) to burn.

Source: Table G.

From 2002 to 2004, all top ten brands lost sales volume. Three of the top four brands increased their sales in 2004, compared with 2003. Notably, Holiday increased volume sales by 10 million, and Winfield increased sales by 5 million. The top ten brands accounted for 94% of total sales.

Sales trends by brand variant type (packet descriptor).

Of the ten most popular brand variants, mild variants occupied rankings 6th, 8th, 9th, and 10th (Table 5).

Table 5. Most popular brand variants of manufactured cigarettes in 2004 – volumes sold.

<i>Brand</i>	<i>Variant</i>	<i>Volume sold, millions</i>	<i>Rank, 2004</i>
Holiday	Special filter	458	1
Benson & Hedges	Special filter	251	2
Winfield	Special filter	187	3
Horizon	Special filter	160	4
Rothmans	Special filter	158	5
Holiday	Menthol Mild	125	6
Pall Mall	Filter	99	7
Holiday	Extra-mild	98	8
B& H Golden Mild	Special filter	69	9
Horizon	Mild	69	10
Total top 10 brand variants		1674	
Top 10 as % of total		72	

Source: Table G.

Number of brands on sale

The number of manufactured cigarette brand variants on sale, including different pack sizes, as judged from the number for which prices were supplied, (excluding duty free brands) was 152 in 2002, 149 in 2003, and 182 in 2004. Included in this number were a small number of sales packages of up to 480 cigarettes.

Cigarette tobacco

Table 6. Volume sales trends, by brand of hand rolling tobacco, 2003-4

<i>Brand group</i>	<i>2004 Sales, tonnes</i>	<i>2003 Sales, tonnes</i>	<i>2002 Sales, tonnes</i>	<i>Rank by Sales, 2004</i>	<i>2003-2004; % change in sales</i>
Port Royal	291	264	236	1	10
Park Drive	259	254	250	2	2
Holiday	83	88	88	3	-6
Horizon	63	64	52	4	-2
Drum	57	65	66	5	-12
Pocket edition	42	51	50	6	-18
Total all 6 brands	795	786	742		6
Total all brands reported	837	803	775		4
Top 6 as % of total	95	98	96		

Reported sales

- The most popular brand, Port Royal increased its sales to account for 35% of the total market in 2004. Negative sales are recorded for Philip Morris, signifying recall of product from retailers.
- The second most popular, Park Drive, gained 2%, to account for a further 31% of the total market.

- Remaining major brands lost volume sales in 2004. Average retail price was 56 cents per gram, a total value at retail of \$448 million. (Table 6)

Pipe tobacco

Reported sales

Declining sales (6.9 tonnes total) of pipe tobacco were dominated by Erinmore brand (4.8 tonnes), sold by British American Tobacco. Pipe tobacco sold at a recommended retail price of 56 cents per gram, with a total value at retail of \$3.9 million.

Cigars

Reported sales

Six importers reported tax paid sales. Brands were multitudinous, weight per cigar varied from cigarillos of about 1 gram tobacco to the largest cigars sold singly. Larger cigars are sold singly. Packet sizes also varied. Totals of tobacco and cigars sold during the year were in many cases omitted. Tobacco was estimated at 16.5 tonnes imported as cigars, comprising 0.5% of total tobacco used in tobacco products for sale.

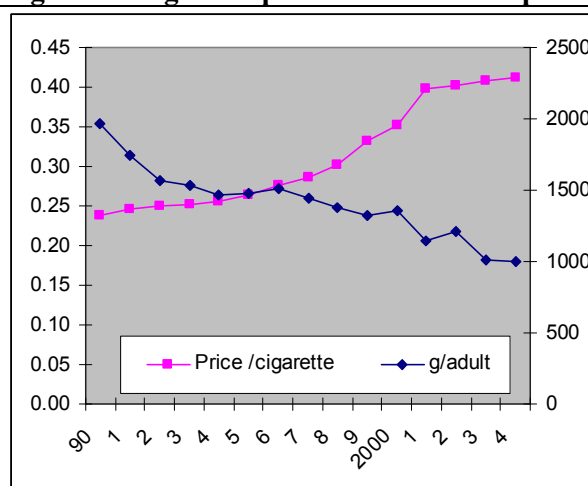
Tobacco trade: gross cigarette and cigarette tobacco sales

Consumer expenditure and revenue from sale of cigarettes and tobacco in current dollars

Total consumer expenditure on cigarettes and RYO tobacco. Based on reported volume sales, and the reported average recommended retail price through 2004, total manufactured cigarette sales in 2004 were estimated at \$1058 million (Table G); hand-rolled cigarette tobacco sales added \$466 million (Table I.1), making a total cigarette market of \$1.524 billion. Estimated on the basis of tax-paid releases, consumer expenditure was in close agreement at \$1526 million. (Table H.3)

Price versus consumption. Cigarette consumption (including RYO) decreased 38% since 1990, and by 49% per adult in this period. (Table B2.) This equates to a (high) price sensitivity of $49/86 = 0.71$, or a 10% price rise accompanied by a 7% fall in consumption. (ignoring other factors). (Figure 2).

Figure 2. Cigarette price versus consumption per adult, 1990-2004



The price is shown in constant 1995 \$.

Cigarette prices rose steeply in real terms from 1998 to 2000. Excise rates were raised above the level of inflation in those two years.

Each year from 1990, the excise rate was adjusted annually for inflation.

Price is estimated using the tobacco price index adjusted to 1995\$ prices, and taking 41.3 cents as the price for 2004
Hand rolled cigarettes are included.

Source: Consumption: Table B2. Price for 2004: Table G. Tobacco price index: Statistics NZ.

Government excise revenue from the sale of cigarettes and tobacco in constant dollars

Government share of the price. We estimate companies paid some \$890 million in tobacco tax (including import duty as well as excise but not including GST) for the calendar year 2004, a 15 percent increase in real terms since 1990. Since 2001, however, the government share per cigarette in real terms has not increased. The excise and GST as a percentage of recommended packet price varied – being a higher percentage than shown for budget brands, and lower for premium priced brands such as Dunhill.

Revenue. Excise revenue declined notably after 2000 when cigarette prices rose 20% in May that year due to taxation and company price increases. However after a dip in 2001, and recovery in 2002, revenue has declined further. Estimated revenue based on releases after tax paid decreased from \$971 million in 2002 to \$890 million in 2004. (Table H.3). However in real terms (1995 constant dollars), revenue declined by \$105 million in this period, from 866 million in 2002 to \$761 million in 2004. (Table H.4).

Figure 3. Revenue (constant dollars) versus consumption per adult, 1990-2004

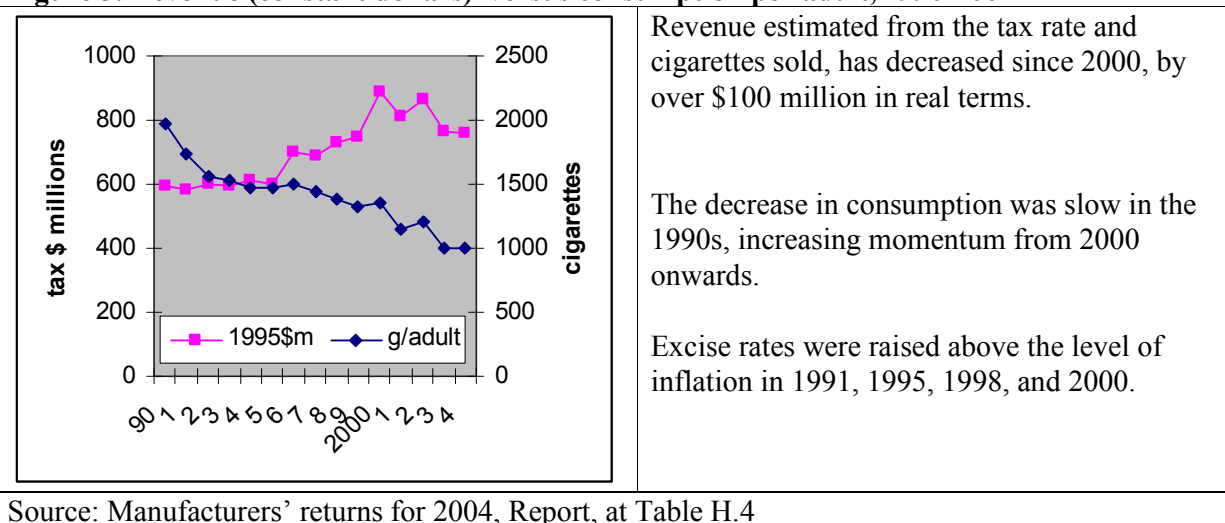


Table 7. Summary table of trends in taxes, prices, expenditure revenue and consumption of manufactured and hand-rolled cigarettes, 1990-2004

1995 NZ dollars	1990	2004	% change in 1995 \$
Tobacco excise \$ per cigarette or gram	0.13	0.24	86
Excise + GST \$ per cigarette or gram	0.16	0.29	83
Excise + GST as % of packet price	64	69	8
Estimated excise \$ millions	659	761	15
Price \$ per gram of product	0.24	0.41	69
Consumer expenditure estimated	1240	1305	5
Trade revenue \$ per gram of product	0.087	0.126	45
Trade revenue \$ millions	443	399	-10
Consumption tonnes, dry tobacco (Table 1)	3758	2128	-43

Source: Table H4, based on the average cigarette in each year (RYO or manufactured), and Table B2.

Trade share of the price. Since 2001, firms took 9.6% more revenue per cigarette in real terms, (up from 0.115 cents per cigarette to 0.126 cents in 2004). (Table H4.)

Trade gross receipts. The estimated gross sales of the trade increased 2% between 2003 and 2004, and by 3% since 2001. Overall, since 1990 gross sales by the trade in constant dollars *decreased* 10%, whereas excise receipts *increased* 15%. (Table H4).

Discussion

Advertising bans effects on marketing. The banning of advertising in 1990 did not stop the introduction of new tobacco product brands for sale. Today, Marlboro is one brand still receiving some promotion – through newscasts of Formula One races. Most countries have now signed the Framework Convention on Tobacco Control, so these sponsorships should gradually cease in the coming decade. Marlboro's sales decreased in 2004 (Table G), possibly due to competition for the now limited display space at retail.

Holiday brand. In 2004 the Holiday brand group accounted for 31 percent of all manufactured cigarette sales. It is a low cost brand with its regular brand variants (1.1 mg nicotine yield) in the high nicotine category while its other brand variants yield less on ISO machine testing. This is a brand that started in Australia and New Zealand. During the last year, Holiday further changed its front face pack design to depict a colourful, carefree stylised beach and holiday scene. This graphic seems to be powerful enough to attenuate the dire warnings that *Smoking kills*.

Hazard monitoring:

Range of products tested: manufactured cigarettes tested but not hand-rolled cigarettes. Only manufactured cigarettes were tested. In 2004 however, nearly one-third (32%) of the tobacco smoked was in hand-rolled cigarettes. Hand-rolled cigarettes are not monitored for hazard content in any way.

Range of tests performed. Government, public health agencies and smokers do not know if one brand is more harmful than another, though many smokers mistakenly believe that very low tar cigarettes are less harmful. The present system of testing all superficially and only one or two in depth, does not permit rational decisions, as to which cigarette a smoker wishing to keep smoking should choose, or by the Ministry wishing to regulate the highest emission cigarettes off the market. With $\frac{3}{4}$ million adults continuing to smoke despite widespread publicity to quit, this is no small matter. The Ministry of Health had the foresight to commission a paper that prioritised toxicants. (Fowles and Bates, 2000. www.ndp.govt.nz) This paper and others (Laugesen and Fowles 2005) provide a rationale for informing smokers and regulators alike of the toxicity of the emissions of various brands, and provide a rational regulation of a wider range of toxicants in a rational manner, to the best of current knowledge.

In contrast, the present regulatory system only requires measurement of tar, nicotine and carbon monoxide and relies on the ISO machine smoking test. This test is carried out in the manufacturers' own laboratories, currently without external audit, is used to only test manufactured cigarette brands. Information available does not monitor inter-brand, year-on-year, or inter-batch variation or total carcinogen emission levels, as suggested by Ministry of Health commissioned research reported at www.ndp.govt.nz

The Smoke-free Environments Act provides powers for surveillance of tar and nicotine yields in smoke. For the control of other substances, including major carcinogens, harmful constituents need to be named in regulations under the Act. No such regulations are yet in place.

Tar. Tar is a proxy measure for the 19% of total cigarette smoke toxicity associated with smoke solids, and does not measure the 80% of toxicity in the gas phase of smoke, nor the major carcinogens in that gas phase such as butadiene. There is a strong case for not only not requiring tar testing, and tar labelling on packets, but banning tar ratings altogether. Addicted smokers, lacking reliable information, are forced to use these ratings, often in conjunction with descriptors such as mild or low tar, to gauge smoke toxicity.

Carbon monoxide. Measurement of CO is routine in many jurisdictions. This gas, however, accounts for less than 1% of total cigarette smoke toxicity. (Laugesen and Fowles, editorial NZMJ 15 April 2005). The present reliance on testing CO as a representative measure of gas phase toxicity would appear misplaced, although CO could be continued as a minor component of a wider set of routine measures of more powerful toxicants.

Tobacco weight is the main determinant of the volume of sidestream smoke, and after controlling for puffing intensity and cigarette design, may also affect the volume of mainstream smoke. There is thus a strong case for regulating to require no more than 0.65 g of tobacco per cigarette, and also perhaps to encourage this trend through taxation, by creating an extra category of tobacco weight, of under 0.66 g, that attracted less tax. Manufacturers would stand to gain, as tobacco is a major fraction of the cost of cigarette production.

Gas phase carcinogens. The current data collected in these returns do not inform New Zealand smokers as to their own brand's emissions, or how hand-rolled variants compare, nor which brand to turn to, if one brand is shown to be more toxic. There is a case for regular and random testing for major toxicants, beginning with the top selling brands.

Nicotine. Nicotine yield accounts for less than 1% of the variance in nicotine absorption between brands, according to official surveys undertaken by Jarvis et al in the UK (Laugesen and Fowles editorial NZMJ 2005). This is due to low yield (low tar and low nicotine) brands, causing increased smoke inhalation, not detected by the smoke tests used. The nicotine content in (unburnt) cigarettes sold, is a reliable and simple test, which can be audited by any chemical laboratory within New Zealand, without the need of any expensive smoke machine testing overseas. Such a test can then detect variation between brands and from month to month. There is a case for replacing the monitoring of nicotine yield by regular and random checks of nicotine content.

What manufacturers were not required to report: cigarette-design-related factors. In 1990 the importance of cigarette design as it affected smoke intake was not understood within the then Department of Health. Consequently manufacturers were not required by the Act to report on cigarette engineering design details used in each brand, such as pressure drop across the filter, ventilation of the filter, filter efficiency, content of the filter, and fire propensity. These factors are now known to importantly affect the delivery of toxicants, and merit inclusion at the next legislative opportunity to revise section 31 of the Smoke-free Environments Act 1990.

Conclusion

Additives are discussed, but the focus of this report remains firmly on the harm from tobacco smoke.

The Ministry of Health is this year reviewing the Smoke-free Environments Regulations governing these annual returns. Some of the issues with respect to tests used and data gathered are mentioned above.

With the findings of research commissioned by the Ministry of Health, (Fowles et al. at www.ndp.govt.nz) the focus has shifted to the toxicants in the gas phase of smoke, and the current 2004-5 Regulatory Review could be an opportunity to name a set of harmful constituents in smoke, which can provide, in the light of current knowledge, a more rational basis for monitoring cigarette smoke toxicity.

Electronic reporting on a template could assist the reporting companies, and help standardise and speed up the annual collation of the results. This is especially true for cigar sales reporting.

Acknowledgements

This report was commissioned by the Ministry of Health, who forwarded copies of the returns on which this report is based.