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Clearing the Air: The Taxation and Regulation of Reduced-Harm Nicotine Products

Canada's structure of nicotine and tobacco excise and sales taxation reflects a bygone era; one that predates the development of technologies that separate nicotine from combustion. The time has come to review how the spectrum of nicotine-containing products is taxed and regulated.

Ian Irvine and Samuel Hampsher-Monk

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Clearing the Air: The Taxation and Regulation of Reduced-Harm Nicotine Products

by Ian Irvine and Samuel Hampsher-Monk

- **Taxes on combustible cigarettes in Canada account for almost 70 percent of their final price. Under the most recent excise tax impositions, some low-risk products carry a combined excise and sales tax imposition that also forms a high percentage of the price paid by the consumer.**
- **High levies on combustible tobacco products may be justified by the negative health consequences of smoking, but e-cigarettes (vapes), heated tobacco products, and snus/oral pouches are one or two orders of magnitude less risky than cigarettes. As a result of high prices for legal combustibles, a thriving illegal market accompanies the legal market. An illegal market has also emerged for non-combustible products since the early 2020s.**
- **However, new generation non-combustible nicotine products can be an effective means of quitting smoking, especially when other interventions have proven unsuccessful. This paper argues that government impositions of taxes and levies on alternative products should reflect these realities, while non-tax policies must be put in place to deter youth uptake.**

1 Introduction

Since entering the Canadian marketplace in the late 2000s, the proliferation of next-generation products (NGPs) – comprising e-cigarettes, heated tobacco, snus (a moist smokeless tobacco product made from shredded tobacco leaves), and tobacco-free oral nicotine pouches – has presented regulators with a significant opportunity to reduce smoking-related harms. Simultaneously, NGPs challenge regulators to discourage uptake by those who do not already smoke, especially youth. Optimally, the structure of taxation and regulation on NGPs would do both.

As with most other countries that have witnessed the proliferation of NGPs, Canada has struggled to develop and implement policies that balance both of these imperatives. While NGPs are all safer than combustible cigarettes, they deliver nicotine, the primary psychoactive ingredient, in doses and (in the case of e-cigarettes and heated tobacco products [HTPs]) in a manner that more closely resembles cigarettes

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than nicotine replacement therapy products (NRTs) such as gum and patches. That makes next-generation products effective substitutes for combustible cigarettes and increases the potential for dependence.

That's also what makes them such effective cessation aids. Russell (1996) noted that nicotine keeps people smoking the cigarettes that kill so many, but it is combustion and pyrolysis – the heating of organic material – that generate the tars and other toxins responsible for smoking-related morbidity and mortality, not the nicotine itself. Commercial NGPs allow those with a psychophysiological need (or merely a desire) to use nicotine a chance to do so without incurring the harms caused by cigarette smoking. NGPs are not novel in this respect: nicotine replacement therapies were added to the World Health Organization's (WHO) list of essential medicines in 2009, and their use increases the odds of successful quitting. However, the popularity of commercial NGPs used by smokers to quit and reduce smoking has grown rapidly: vapes are now more popular than NRTs, and evidence suggests that they are more effective cessation aids, too (Lindson et al. 2024).

In Canada, e-cigarettes have been the dominant category of NGPs. In the sub-populations with the highest prevalence of e-cigarette use, the Canadian Tobacco and Nicotine Surveys (CTNS) indicate that smoking rates have collapsed. However, older cohorts where smoking rates (and harms) are greatest are not switching to NGPs like e-cigarettes or as readily as younger groups. Fully realizing the potential opportunity to reduce smoking-related harms requires not only the availability of NGPs but also other incentives for health-positive substitutions. Regulations and taxation levels play a crucial role in determining the utility of NGPs for smoking cessation (Yong et al. 2017). Regulations that differentiate between NGPs and combustible cigarettes provide additional incentives for switching away from cigarettes.

Canada's debate about NGPs has been defined more by concerns about youth access than concerns for the well-being of the 3.8 million Canadians who continue to smoke, half of whom (without quitting) can be expected to die prematurely as a result (Doll et al. 2004). Given the reputation of the "Big Tobacco" companies, which now own several of the major NGP brands, some skepticism towards the industry and its claims to have produced safer products is understandable. But recently enacted restrictions, including flavour bans, punitive taxation and limitations on nicotine content, indicate that broad demand reduction has been adopted as a policy strategy. This generates a false equivalency between NGPs and their far more harmful combustible counterparts, which perpetuates the devastating toll of smoking-related diseases and premature mortality.

Under Canada's *Tobacco and Vaping Products Act*, manufacturers are not permitted to make health claims regarding the relative safety of their products – even though Health Canada states on its website that e-cigarettes carry much lower risk. Further, no producer or vendor may advertise the fact that e-cigarettes have been found to be more effective smoking cessation aids than NRTs. In 2022, fewer than one in five Canadians believed that e-cigarettes are less harmful than cigarettes, and just 3.9 percent surveyed recognized that they are "very much less harmful than cigarettes" (Canadian Tobacco and Nicotine Survey 2022). Harm perceptions are critical in life-and-death decisions, and Canadians are ill-informed.

The increasingly restrictive regulatory environment for NGPs contrasts starkly with the risk tolerance with which alcohol, cannabis, and gambling are regulated in Canada. Alcohol and cannabis are sold in a myriad of flavours, for example. Rather than adopting an impractical zero-risk standard, regulation in those contexts is used to mitigate, to the extent possible, avoidable risks. This pragmatic approach is essential because the alternative is disastrous: both economic theory and historical analogy remind us that "blunt" strategies intended to eliminate the demand for popular products drive consumer demand to illicit analogues with a slew of attendant social harms.

Whether our goals for regulation are to safeguard product standards, generate public revenues, maximize public health or minimize youth access, the creation of a punitive tax-driven illicit market is not conducive to those goals.

One objective of this *Commentary* is to explore how contemporary NGP regulations and taxation in Canada may misinform consumers by failing to differentiate between products with different risk profiles, as well as encourage the consumption of more toxic alternatives. We propose changes to the fiscal and non-fiscal management of NGPs in Canada to steer product selection down the "risk continuum." We are simultaneously conscious of the need to protect youth from the dependence-forming nature of nicotine in any form. Preventing the sale of these products to youth and promoting information on every aspect of nicotine and tobacco are policies we support and advocate.

For several years now, an extensive body of literature has documented that NGPs carry substantially reduced risks. The UK's Royal College of Physicians first stated in 2015 that e-cigarettes are 95 percent less risky than combustibles,[1] and subsequent reviews have arrived at the same conclusion. The *Cochrane Database of Systematic Reviews* (2023) provides evidence that e-cigarettes are a more effective quitting mechanism than other, primarily NRT, approaches. In an enlightening paper, Balfour and twelve colleagues (2021) – all former presidents of the Society for Research in Nicotine and Tobacco – conducted a broad review of the literature and, on that basis, advocated for the public health community to pay more attention to e-cigarettes' potential to reduce smoking-related death and disease, better communication regarding the relative risks of smoking and vaping, and policies designed around relative risk-communication. This literature forms our anchor in developing policy.

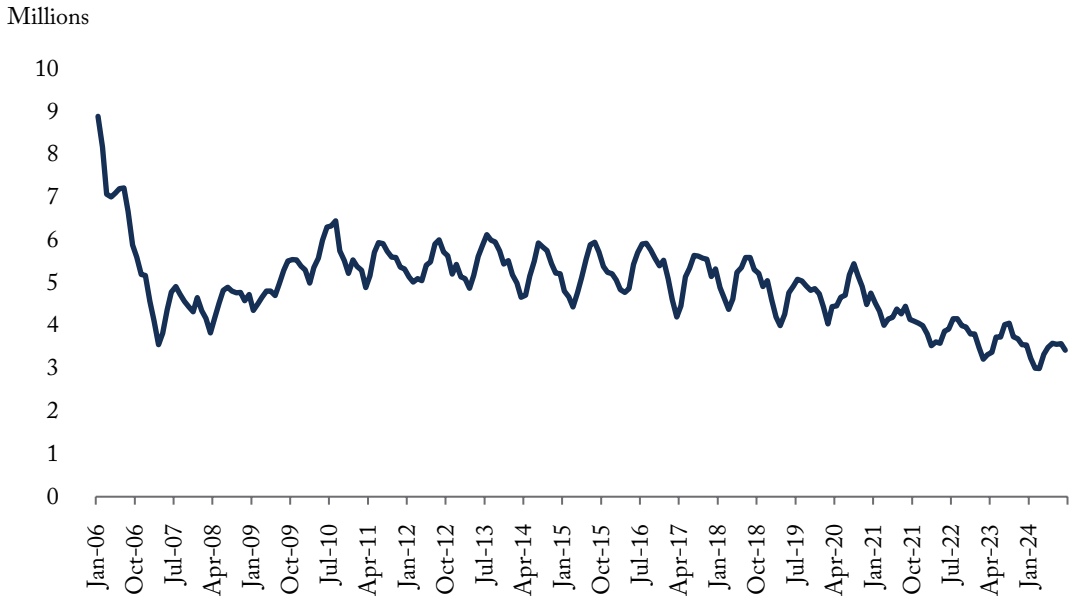
Despite the extensive research available, the tenets of harm reduction have not been universally accepted. A meta-analysis by Glantz et al. (2024) in the *New England Journal of Medicine* proposed that, inter alia, vapers and dual users do not always register better health outcomes than smokers. But a fundamental flaw in the study was that most of the papers reviewed used cross-sectional data, not longitudinal data on the same subjects over time. Many of the individuals in the reviewed studies were dual users or even sole vapers who had a decades-long history of smoking. What was being observed as an outcome, therefore, was likely to be the residual effects of long-term smoking rather than the proximate effect of more recent e-cigarette use.

At this juncture, it is appropriate to comment on the terminology we use, particularly to distinguish between the words addiction and dependence. Criteria used in defining addiction are given in the *Diagnostic and Statistical Manual for Mental Disorders* (American Psychiatric Association 2022). We interpret this material, in a general way, to mean that addiction is a severe form of dependence insofar as it carries severe negative outcomes, whereas dependence does not necessarily involve such harmful outcomes.[2]

1 See: Public Health England. 2015. "E-Cigarettes Around 95% Less Harmful Than Tobacco Estimates Landmark Review." London: Government of the United Kingdom. August 19. https://www.gov.uk/government/news/e-cigarettes-around-95-less-harmful-than-tobacco-estimates-landmark-review.

2 To exemplify: combustible cigarettes are addictive because nicotine is a very difficult drug to quit, and the typical outcomes from smoking are ill health and early death. In contrast, an individual who must have a double espresso each morning to wake up but who experiences no negative health consequences of doing so could be described as being caffeine dependent, but they are not addicted in the clinical definition. We view NGPs as falling into the dependence category. E-cigarette users may be heavily dependent upon nicotine to get through their "normal" day (especially where "normal" life involves high levels of stress), but the attendant medical consequences, if any, pale in comparison to those associated with riskier alternatives. This does not mean there is zero risk associated with the dependence category. But if the risks between vaping and smoking differ by at least one order of magnitude, we think this is a sensible characterization of the products.

Figure 1: 3-Month Lagged Cigarette Quantity Sales



Source: Statistics Canada. 2025. "Table 16-10-0044-01: Tobacco, Sales and Inventories, Monthly Production." Ottawa: Government of Canada.

To conclude this introduction, our approach recognizes that nicotine comes in many forms, some vastly more dangerous than others. Consequently, public policy's role is to ensure that individuals who might derive a benefit (perceived or real) from its use are informed of the risks that accompany its different forms while erecting barriers to its use in the case of youth. Undue obstacles should not be placed in the path of adults who desire nicotine, particularly in the presence of a resilient illegal sector.

II Data: Consumption and Sales of Cigarettes and E-Cigarettes

Measured either by the number of cigarettes sold per annum or the prevalence of "current" smokers in the health survey data, smoking continues to decline in Canada. Figure 1 depicts the quarterly sales of cigarettes in Canada during the period in which NGPs have become available. Strong seasonality is evident, with the summer months experiencing higher sales and smoking. The sharp decline beginning in 2006 was not accompanied by a proportional decline in smoking in the Canadian Tobacco Use Monitoring Surveys (CTUMS), strongly suggesting a surge in illicit market sales. Thereafter, the growth in sales between October 2006 and July 2010 is not matched by an increase in smoking prevalence in the same surveys, indicating that the illicit market was losing market share to the regulated market during this period.

From 2011 until 2018, the decline in cigarette sales was minimal. Population growth offset the modest reductions in per capita cigarette sales in this period. Between September 2011 and September 2018, the rate of decline in sales was just under 1 percent, with an accompanying growth in population of the same amount, making for an annual decline in sales per capita of 2 percent. In contrast, the period from 2018 to 2024 witnessed both greater declines in sales and increased population growth. The annual rate of change jumped to 6.5 percent, combined with a population

growth rate of 1.8 percent, resulting in a decline of more than 8 percent per annum in sales per person. This unprecedented decline coincides with the arrival of Juul and Vuse e-cigarettes in the Canadian marketplace. While e-cigarettes were already being sold in Canada prior to this period, they were initially sold primarily in specialty vape shops. Subsequently, the availability of these new models, widely available in corner stores and gas stations across the country, appears to have spearheaded a switch to non-combustible forms of consumption (Hampsher-Monk et al. 2024).

While there are no publicly available data for total e-cigarette sales prior to 2023, market growth is evident in the Euromonitor reports (2020, 2022) and Nielsen data based on gas and convenience stores, both of which indicate a surge in e-cigarette sales in those outlets from 2019 onwards (Hampsher-Monk et al. 2024). In broad terms, the Euromonitor reports suggest a dollar value of the market between $1.5 and $2.5 billion at market prices in the years 2020 to 2022. The gas and convenience sector, once established, accounted for about 30 percent of the total.

The spike in cigarette sales in 2020 coincides with the closure of illicit production facilities on Indigenous lands for three months during COVID-19. This temporarily diverted regular buyers of those products to legal markets. The subsequent decline in sales may partially reflect a switch between legal and illegal markets (O'Riordan 2024) rather than solely a decline in cigarette consumption. With steadily increasing prices for legal products, illegal products have become relatively less expensive and, therefore, more likely to attract demand.

Nevertheless, smoking prevalence statistics from the Canadian Community Health Survey (CCHS) do indicate a major population-level decline in smoking prevalence between 2015 and 2022. As indicated in Table 1, the prevalence rate for the population aged 12 and above, based on past 30-day use, was 17.7 percent in 2015, 15.8 percent in 2018, and 11.6 percent in 2022. The declines in self-reported smoking in the survey data suggest that the decline in cigarette sales was not all attributable to consumers switching from legal to illegal cigarettes. The decline in smoking was not uniform across age cohorts. The table also indicates that, between the years 2015 and 2022, those aged 18-34 saw a decline from 22.1 to 10.7 percent, and the daily smoking rate among teens fell from 4.1 to just 0.3 percent. Older groups, meanwhile, saw very little decline. Tellingly, it is the younger cohorts that displayed the largest increases in e-cigarette use, with older people much slower to take up vaping, suggesting a substitution effect.

From 2015 to 2022, the CCHS shows that while the number of smokers declined from 5.3 to 3.8 million, the number of e-cigarette users in 2022 stood at 1.9 million. Hence, the number of nicotine users has not declined – rather, the form of consumption has changed dramatically.

III Excise Levies and Sales Taxes

Nicotine pouches, smokeless tobacco, HTPs, e-liquid and combustible tobacco are each "taxed" according to a product-specific schedule in Canada. In addition to federal excise and sales taxes, provinces may impose their own, resulting in a patchwork of different final retail prices across the country. Technically, the term "taxes" should be reserved for sales taxes and distinguished from excise levies, which are imposed on a per-unit basis rather than on a value-of-sale basis. Despite this, common usage frequently subsumes both value and per-unit impositions under the term "taxes."

Relative Risk

This paper is grounded in the premise that relative risk should be a key parameter in the setting of tax rates, and it is a useful starting point to consider. While we cited several sources earlier on this subject, it may be useful to gather information on the different risks associated with various NGPs. Such a heuristic illustration is provided in Figure 2.

Table 1: Smoking Prevalence in Canada, 2011-2022, percent of Age Group

CCHS (age)	2011	2013	2015	2016	2017	2018	2019	2020	2021	2022
Total >11			17.7	16.9	16.2	15.8	14.8	12.9	11.8	11.6
12 - 17			4.1	3.6	3.5	3.2	2.5	1.8E	1.1E	0.3
18 - 34			22.1	21.1	19.2	19.2	17.2	14.9	11.4	10.7
35 - 49			19.5	18.9	18.6	18.2	16.9	15.1	14	14
50 - 64			21	20.1	19.5	18.4	18.4	16.1	16.3	16.1
>64			9.8	9.5	9.8	9.7	9.1	8.4	8.7	8.9
CTADS (age)	**2011**	**2013**	**2015**		**2017**	**2018**				
15-19	11.8	10.7	9.7		7.9					
20-24	21.5	17.9	18.5		16					
25-34	23.7	18.5	14.4		17.9	25-44				
35-44	15.7	16.7	15.4							
45-54	20.2	16.3	13		14.1	45+				
55+	13.4	10.8	10.6		15.5	25+				

Note: E denotes use with care.

Sources: Upper block from the Canadian Community Health Survey; lower block from the Canadian Tobacco Alcohol and Drugs Survey for 2013, 2015, and 2017, and the Canadian Tobacco Use Monitoring Survey for 2011.

We stress that uncertainty bounds, or confidence intervals, surround all such estimates, and thus, the values need not be accepted as characterizing reality with 100 percent certainty. That said, the figure is a useful means of encapsulating and visualizing risk. In this paper, when we use the terminology "an order of magnitude less risky" or "at least an order of magnitude less risky," we are referring to the products associated with the right-hand bars in the figure – the estimates associated with them are less than 10 percent of the risk associated with combustibles.

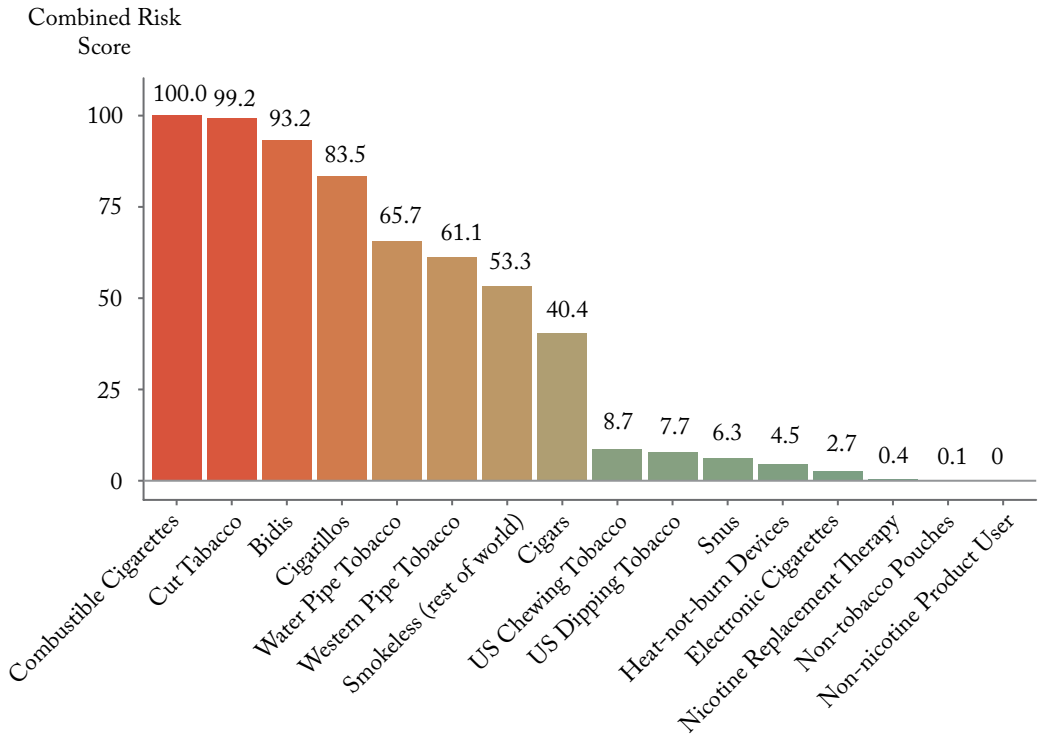
Rates

Cigarettes: Cigarettes carry a federal excise component, a provincial excise component, and federal and provincial sales taxes. Physicians for a Smoke-Free Canada (PSFC 2024) presents an informative table on the composition of the final price by province – reproduced here as Table 2.

The table assumes a retail markup of 10 percent over the excise-inclusive wholesale price. Sales taxes make up the final component. Despite differences in excise taxes across provinces, the overall picture is that taxes and other government charges make up roughly two-thirds of the final retail price. Quebec and Ontario have the lowest retail prices. In concrete terms, a typical retail price of $16.50 generates perhaps $5.50 for the commercial sector and $11.00 for the government.

Oral nicotine pouches and smokeless products: Nicotine pouches, also termed modern oral products, contain synthetic nicotine and other vegetable-based materials. Smokeless tobacco, in contrast, and as the name implies, contains tobacco leaves. Swedish-tyle snus falls in the latter category.

Figure 2: The Relative Risk Spectrum of 15 Nicotine Product Categories



Note: The relative risk hierarchy of the 15 categories of nicotine products. Adapted from Murkett et alxi with permission.

Source: *Global State of Tobacco Harm Reduction*, Briefing papers, 2023.

The tobacco in snus is now pasteurized and thus provides an unfavourable breeding ground for bacteria. Combined with the lack of combustion, each of these products results in low rates of morbidity and mortality relative to smoking.[3]

As early as 1994, Rodu and Cole (1994) reported that even allowing for the (very low) probability of oral cancer causing a death, the use of smokeless tobacco was about two orders of magnitude less risky than cigarettes. Today, oral pouches are also cleaner than oral tobacco due to pasteurization. On a risk-proportionate basis, there is no reason to tax this product near the level of cigarettes.

In Canada, pouches are regulated either as herbal products under the Natural Health Products Regulations (Government of Canada 2024) or as tobacco products. Prior to going to market, the herbal product must be approved for safety by Health Canada and may not exceed 4 mg of nicotine per pouch. Products that contain tobacco leaves are subject to excise levies and may contain more than 4 mg of nicotine per pouch. Health Canada approved Imperial Canada's Zonnic pouches as a herbal product in late 2023. Other applications are likely in process. The structure of the excise levies on tobacco pouches or smokeless

3 See: Quit Like Sweden. 2024. "Let's Quit Like Sweden." https://quitlikesweden.org/.

Table 2: Taxes on a Carton of 200 Cigarettes in Canadian, April 17, 2024

Per 200 Cigarettes	Whole-sale	Retail (10%)	Excise Taxes			Sales Taxes Applied to Tobacco				Cost of a Package of 20 Cigarettes
			Federal	Prov.	Total	GST	PST	HST	Total	
	($)		($)			(percent)				($)
BC	44.10	14.63	37.15	65.00	102.15	5	7		12	18.02
AB	44.10	14.13	37.15	60.00	97.15	5			5	16.31
SK	44.10	14.03	37.15	59.00	96.15	5	6		11	17.12
MB	44.10	14.13	37.15	60.00	97.15	5	7		12	17.40
ON	44.10	11.82	37.15	36.95	74.10			13	13	14.69
QC	44.10	12.11	37.15	39.80	76.95	5			5	13.98
NB	44.10	13.23	37.15	51.04	88.19			15	15	16.74
NS	44.10	14.03	37.15	59.04	96.19			15	15	17.75
PE	44.10	14.03	37.15	59.04	96.19			15	15	17.75
NL	44.10	14.63	37.15	65.00	102.15			15	15	18.50
NT	44.10	15.01	37.15	68.80	105.95	5			5	17.33
NU	44.10	14.13	37.15	60.00	97.15	5			5	16.31
YT	44.10	15.13	37.15	70.00	107.15	5			5	17.47

Note: Cigarettes are sold in Canada at different prices depending on the brand; the retail and wholesale price of the same brand of cigarettes will vary by location depending on the contractual arrangements between manufacturers and retailers. See Callard, Cynthia D., and Neil Collishaw. 2019. "Cigarette Pricing One Year After New Restrictions on Tobacco Industry Retailer Programmes in Quebec, Canada." *Tobacco Control* 28: 562–565.

Source: Physicians for a Smoke Free Canada (2024).

tobacco replicates the levies on loose-leaf tobacco used in heated tobacco products and described below.

E-liquid: The liquid in vaping devices is subject to federal and provincial excise levies plus sales taxes. E-liquid is marketed in three major forms: disposable prefilled pods, disposable devices, and refillable tanks/pods. E-liquid has a maximum permissible nicotine concentration of 20 mg/mL and is taxed on a volume basis, regardless of the concentration.

Until the early 2020s, most prefilled pods contained no more than 2 mL of liquid. The capacity of refillable pods was also rarely above 2 mL. Disposables, likewise, had small volumes until 2022. However, today in Canada and the US, disposables frequently contain 20 mL, or occasionally 30 mL of liquid – almost as much nicotine as a carton of cigarettes. These large capacities are incentivized by the excise structure.

At the federal level, e-liquid is taxed at $1.12 per 2 mL up to a capacity of 10 mL and $1.12 per 10 mL beyond that. Hence, a 30 mL bottle of juice is subject to a federal excise levy of $7.84, and a 60 mL bottle to a levy of $11.20.

For disposables, a 10 mL device is subject to a federal excise levy of $5.60, an 18 mL disposable is subject to a levy of $6.72, whereas a 10 mL disposable plus an 8 mL disposable together are subject to an excise charge of $10.08. The non-linear excise schedule means that larger capacities offer consumers better value for money relative to small-capacity devices.

Box 1: Provincial Excise Variation and Packaging Effects on Heated Tobacco Prices

The provinces also levy a rate that varies enormously from one jurisdiction to another. For example, British Columbia's levy is more than three times that of Ontario or Quebec.

Since one heated tobacco stick weighs approximately 0.3 grams, and one snus pouch weighs even less, the effective rate of tax on heated tobacco and smokeless tobacco may be extremely high. To illustrate, a pack of 20 tobacco sticks for a heated tobacco device would be subject to an excise levy of $0.96 in Ontario (calculated as $19.13 ÷ 20) and $1.62 in British Columbia (calculated as $42.40 ÷ 20). The market leader in HTPs is IQOS, which is sold in Canada in a minimum-content package of 54 sticks. Hence, the excise per stick for such a pack is $0.35 and $0.79 in Ontario and British Columbia, respectively. In this situation, the British Columbia levy exceeds the levy on combustible cigarettes, even though the risk associated with the latter is at least an order of magnitude greater.

The effective excise tax can be reduced by increasing the number of sticks sold in each package. A pack containing 160 heated tobacco sticks, each weighing 0.3 of a gram, fully exhausts the scale benefits in facing excise taxes. The excise components then fall to $0.12 and $0.27 per stick in Ontario and British Columbia – much lower than on combustible products.

This extreme non-linearity in the schedule could be rectified by imposing a per gram or per stick levy, as with cigarettes, and simultaneously mandating a minimum-content pack to discourage youth purchase.

At the start of 2025, most provinces have responded "positively" to the federal taxation initiative, which involves doubling the federal rate and administering the collection of the second tranche of revenue on behalf of the provinces. Thus, the combined excise levy is twice the federal rate. The imposition of such a double excise levy plus a sales tax frequently results in a percentage tax rate above 100 percent of the value accruing to suppliers.

Heated tobacco: Heated tobacco products are subject to the same excise structure as loose-leaf tobacco, and this, in turn, is intended to approximate the corresponding levies on combustible cigarettes.

A critical threshold for such excises results in a declining effective rate as volume increases: the federal rate is set for an amount of 50 grams or any fraction thereof. This structure is intended to deter the purchase of small amounts of tobacco by teens. In 2023, it amounted to just under $9.90 per 50 grams, or 19.8 cents per gram. A cigarette weighs approximately 0.7 grams, so the excise levy amounts to approximately 14 cents per cigarette-equivalent weight of loose-leaf tobacco.

Taxation and Regulation – Is There an Equivalence?

In addition to formal excise levies, governments in Canada have levied de facto or equivalent taxes. Nicotine concentration limits, maximum capacity limits, and flavour bans are all examples.

In 2022, the federal government imposed a 20 mg/mL limit on e-liquid sales. Prior to this, some domestic products contained up to 55 mg/mL of nicotine. Both Juul and Vuse sold prefilled pods with concentrations above 50 mg/mL. The high-concentration liquids are known as salt nicotine and possess different chemical properties from "freebase" nicotine, which rarely has concentrations

above 12 mg/mL. The nicotine limit required consumers to incur an increased outlay to obtain a given nicotine intake. This form of regulation, while intended to reduce the harms of potentially overconsuming more concentrated products, may generate an increase in government revenue indirectly if individuals expend more on the reduced-concentration product. The regulation may also generate more revenue for suppliers for the same reason.

The consumer-side welfare losses are not easy to measure because data on concentration in liquid and pre-regulation are not publicly available. But for a large segment of users, the losses would have been substantial: an individual consuming 2 mL of a 50 mg concentration pre-regulation would have to expend more than twice as much to obtain the same amount of nicotine.[4]

A limit on the capacity of e-juice bottles constitutes a similar de facto imposition, given the non-linear excise structure. For example, British Columbia permits a maximum of 30 mL per container of e-juice. Under 2024 tax rates, a 30 mL container is subject to an excise charge of $15.68 ($7.84 at both the provincial and federal levels), or 52 cents per mL. In contrast, a 120 mL container would carry a charge of 30 cents per mL if permitted. Once again, this limit gives rise to secondary government revenue effects. If the container limit increases expenditure, then government revenue increases. In the absence of revenue and expenditure data, we cannot ascertain the amount by which potential additional government excise revenue might offset the loss of surplus on the consumer side. To the extent that these regulations result in a flight to the illegal sector, then government revenues may decline, alongside legal revenue to the suppliers.

Relatedly, volume limits on pods also serve as an implicit tax. British Columbia, again, limits prefilled pod capacity to 2 mL and also limits disposables to contain no more than 2 mL. Where such a limit is not in place, the market has evolved to an ever-larger capacity. In a private communication, the Canadian Vaping Association indicated that disposables with 16 mL or even 20 mL of liquid are now standard. These larger capacities are not only less expensive for the consumer on account of the nonlinearity of the excise tax structure, but they are also more environmentally friendly: using 10 2 mL capacity disposables necessitates discarding far more material (including housing, electrical components, and batteries) than a single 20 mL capacity product, not least since the 20 mL products use smaller rechargeable lithium-ion batteries.[5] Again, the excise revenue consequence of this regulation cannot be stated with any certainty.

A further revenue-free tax, surprisingly, comes from a flavour ban. Quebec implemented such a ban in the fall of 2023, combined with a maximum container capacity of 30 mL. Suppliers have circumnavigated this rule by selling a "short-fill" bottle that contains nicotine but no flavour in conjunction with a container of flavour. Typically, the short-fill container houses 20 to 24 millilitres, and the flavour container is sufficient to fill the short-fill e-juice container. However, when mixed, the resultant product contains a reduced concentration of nicotine, perhaps 15 mg/mL, resulting in the user having to spend more to obtain the same amount of nicotine. Once again, this is an implicit tax. In Quebec, a user who purchases in a legal environment now buys an e-liquid with perhaps one-third of the nicotine strength (15 mg/mL rather than 55 mg/mL) at twice the price pre-excise. This is roughly a "severalfold" increase in the current nicotine price over the price in the early 2000s.

4 In addition, coils need to be replaced more frequently when the use of refillable pods increases.

5 For disposables up to about a 6 mL capacity, a single 18650 battery is frequently used. This resembles a double-A battery, though several times larger. Such a battery could not service a 10 mL capacity (for example), so such bigger disposables require a charging system which in turn permits a "smaller" battery.

To conclude, regulations of the type introduced at the federal and provincial levels are costly to consumers, as they increase the de facto price of nicotine. They may also increase government revenue because of increased expenditures by users. This effect is mitigated by the degree to which users may resort to an illegal market.

IV International Experience – Importing Success or Replicating Failures?

Policymakers are often tempted to implement policy by replicating the regulations adopted in other jurisdictions. However, the fact that a policy has been tried before is no guarantee that it is either the best policy or even that it would work in another context. An unfortunate feature of nicotine policy the world over is that it seems to be implemented with only a limited understanding of the preferences of the end consumer and an equally limited understanding of attendant risks. Strictures are also too frequently presumed to deliver their desired outcomes.

But legislation provides a set of incentives to both the supply and demand sides of the marketplace and such incentives may deliver unintended consequences more readily than the envisaged and intended outcomes. Australia and Mexico are notable examples, with each having a vibrant illicit supply sector (Mendelsohn 2024).[6] That said, several economies have succeeded in constructing regulatory and fiscal environments that are conducive to smokers switching to reduced-harm products. So, while other countries' experiences are not a blueprint for optimal regulation, they nonetheless provide clues about which policy levers may be brought to bear in balancing the apparent trade-offs between different policy goals, and avoiding incentives for the growth of the illegal sector.

Like Canada, much NGP regulation in the US occurs at the state and municipal levels, creating a similar patchwork of taxes and product restrictions in both countries. However, experiment-based evidence (Buckell et al. 2019) and econometric analyses of sales data indicate that well-intended restrictions on safer nicotine products may backfire: age limits (Dave et al. 2019), flavour bans (Friedman et al. 2024), and excises and sales taxes (Pesko et al. 2020; Friedman & Pesko 2022; Abouk et al. 2023) have prompted demand shifts towards more dangerous alternatives. Those observations challenge the logic of "blunt" restrictions and suggest that targeted age-gating coupled with the creation of policy incentives for adult nicotine consumers to select safer products might be a more optimal strategy (Hampsher-Monk et al. 2024).

Drawing heavily on US concerns about the condition known as E-cigarette or Vaping Associated Lung Injury (EVALI) and the perceived "youth epidemic" in vaping, South Korea's ministry of health issued a statement in 2015 rejecting any distinction between cigarettes and e-cigarettes (MOHW 2015). In the months after, the consumption data show a marked uptick in smoking (Prieger and Choi, 2024). That unintended consequence highlights the power of health communication. In Australia, too, the health authorities are deeply opposed to the notion of tobacco harm reduction. Nicotine e-cigarettes have been available only on a prescription basis. Predictably, however, Australia's restrictions have led to a large market for illicit products (Mendlesohn 2024), and the prescription-basis has not prevented large numbers of Australian youth from using e-cigarettes.

6 See: Madry, Kylie. 2024. "Mexico's Lower House Passes Constitutional Ban on E-Cigarettes, Vapes." *Reuters*. December 3. https://www.reuters.com/world/americas/mexicos-lower-house-passes-constitutional-ban-e-cigarettes-vapes-2024-12-03/.

Across the Tasman, the New Zealand/Aotearoa (NZ/A) ministry of health and other public health agencies have endorsed the nuanced message that nicotine e-cigarettes are "not for children… young people [or] people who do not smoke. [But] vaping can help some people quit smoking [and] is less harmful [albeit] not harmless" (NZ/A Ministry of Health 2022). According to Ben Youdan, Director of Action on Smoking and Health NZ/A, the country's acceptance of vaping as an important tool to accelerate the decline in smoking rates has allowed NZ/A to achieve more rapid smoking cessation than neighbouring Australia. The 2023 New Zealand Health Survey reported that adult smoking rates declined by almost half in the last five years, from 15.1 percent in 2018 to 8.3 percent in 2023.[7] The declines among both Māori and Pacific Peoples have been even greater (Quakrim et al. 2024). In contrast, smoking among Australian adults has declined only marginally from 12.3 to 11.8 percent in the same period (Youdan 2024).

Sometimes, NGPs do not require governmental endorsement to have powerful and positive consequences for public health. Sweden serves as a good example. There, snus has largely replaced smoking, most significantly among males. While Swedes continue to use tobacco/nicotine-based products at levels comparable with European Union (EU) averages, Sweden now has "the lowest rate of tobacco-related mortality and the lowest incidence of male lung cancer" in the EU (Clarke et al. 2019). The change is primarily attributable to the market providing a much safer source of nicotine in products that were satisfactory to people who smoked. Swedish policymakers did not endorse snus, but the tax treatment distinguishes between products on the basis of risk. When Sweden joined the EU in 2003, Sweden negotiated an exemption from European law banning the sale of snus. If snus were available throughout the EU, it has been modelled that 210,000 lives might be saved each year (Sundén 2022). At the time of writing (Summer 2025), Spain has proposed to reduce the legal nicotine concentration of pouches across the EU to 1 mg. Sweden is contesting the proposal.

Japan has experienced an acceleration in its rate of decline in cigarette sales following the introduction of HTPs (Stocklosa et al. 2020; Cummings et al. 2020; Bates 2024), and emerging evidence suggests that this consumer demand shift is also accompanied by reductions in smoking-related diseases (van der Plas 2022). Regulation in Japan is highly unfavourable to vaping, and this may explain why HTP sales, rather than sales of other NGPs, have grown so quickly. Plausibly, an even greater opportunity for tobacco harm reduction would be realized if e-cigarettes were permitted alongside HTPs. Additionally, public health could be further improved if the policy environment further differentiated between HTPs and cigarettes. Currently, for example, heated tobacco is taxed almost on parity with roll-your-own tobacco, forgoing an opportunity to incentivize health-positive substitutions via the price mechanism. Interestingly, despite aggregated reductions in demand for combustible cigarettes, the dual-use rate of HTPs and combustibles remains high, and Japanese who use HTPs report being as likely to indicate an interest in smoking cessation as not (Hampsher-Monk, Prieger and Patwardhan 2024). The most significant risk reductions resulting from substitutions to NGPs are experienced by those who stop using cigarettes entirely. The Japanese experience demonstrates that the availability of NGPs is not sufficient; without corresponding regulations further incentivizing health-positive substitutions, opportunities for harm reduction opportunities may be "left on the table."

7 New Zealand Ministry of Health – Manatū Hauora. 2024. *Trends in Smoking and Vaping: New Zealand Health Survey*. Wellington: New Zealand Government. https://www.health.govt.nz/statistics-research/surveys/new-zealand-health-survey/publications/202324-survey-publications/trends-in-smoking-and-vaping.

The UK has adopted, arguably, the most positive stance towards tobacco harm reduction of any nation. There, e-cigarettes are sold in several hospital lobbies and are handed out, free of charge, to support smoking cessation among members of vulnerable communities under the Swap to Stop campaign.[8] E-cigarettes have not been subject to flavour restrictions and, until 2024, were exempt from the taxes – some of the highest in the world – applied to conventional cigarettes. This treatment created incentives for smokers to switch. These unusual policies were balanced with nicotine content restrictions, volume limits, and minimum legal sale age restrictions. In England, as in other countries, e-cigarette use has been positively associated with both quit rates and successes (Beard et al. 2020). National Institute for Care and Health Excellence (NICE) guidelines (2023) now encourage practitioners of stop-smoking services to make e-cigarettes available, and National Health Service (NHS) guidance (2022) supports their use for smoking cessation by adults.

In 2024, the Starmer administration introduced an e-cigarette tax to "reduce the number of non-smokers and young people that vape… [and] to raise revenue to fund vital public services such as the NHS and smoking initiatives…." The adopted tax structure ensures that e-cigarette prices remain lower compared to combustible cigarettes. First, the adopted tax was relatively small: £2.20 per 10 mL (C$3.96 at present exchange rates) – smaller than the C$11.20 combined federal and provincial excise applied in Canada. Second, the adopted tax basis represents a small fraction of the rate applied to a similar amount of nicotine in combustible cigarette form – proportional to the government's relative risk assessment. And third, the government planned a sympathetic "increase in tobacco duty to maintain the financial incentive to choose vaping over smoking." This, again, is in line with the goal of ensuring that "the introduction of the duty does not make smoking more attractive." We caution, however, that an increase in an excise levy or sales tax on any tobacco or nicotine products will likely veer the market towards the illegal sector, regardless of relative retail prices of NGPs and cigarettes, with the magnitude of the shift depending upon the "local vitality" of the illegal sector.

Such considered approaches are not yet the norm. Around the world, most economies are far less supportive of tobacco harm reduction. Following the guidance of the World Health Organization's Framework Convention on Tobacco Control (FCTC), which calls for parties to consider prohibitions as a default (World Health Organization 2015), many nations, including Mexico, India, Brazil, Vietnam, and Argentina, ban NGPs outright. Meanwhile, more dangerous combustible cigarettes remain legally ubiquitous in those same markets.

The evidence from other countries demonstrates the potential for NGPs to reduce smoking-related harms and is instructive regarding the role of regulation in delivering an optimal balance of benefits and risks. Prohibitions do not eliminate demand for NGPs nor prevent youth from accessing them. But the availability of regulated NGPs is also insufficient. Since consumers respond to the way NGPs are discussed by their health authorities and regulated by their governments, availability must be coupled with health communications and regulatory conditions that promote their use for the purposes of smoking cessation. Such policies are consistent with simultaneous measures to discourage youth access.

8 UK Government, Department of Health and Social Care. 2023. "Smokers Urged to Swap Cigarettes for Vapes in World First Scheme." Press release. April 11. https://www.gov.uk/government/news/smokers-urged-to-swap-cigarettes-for-vapes-in-world-first-scheme.

V YOUTH AND ADULTS

Concerns for youth take center stage in the debate about NGPs. "Public health professionals and the general public understandably abhor adolescent nicotine use in any form" (Warner 2024). Nicotine is dependence forming (Benowitz 2008), and those who initiate nicotine use in adolescence are more likely to face difficulties quitting later (Breslau & Peterson 1996). While there are also concerns that nicotine may harm adolescent brain development, impairing cognition and impulse control (Leslie 2020), such claims are unsubstantiated and based largely on animal studies. "Given species differences and questions about the relevance of experimental animal nicotine dosing paradigms to human use patterns, the validity of extrapolation to humans is speculative. ... Still, concerns about brain function effects of nicotine exposure through vaping deserve serious examination" (Balfour et al. 2021).

Some research on the brain development of individuals who smoked since youth (either early or late starters) indicates a correlation between use and brain function (Musso et al. 2006; Mashoon et al. 2018). However, such studies face a host of methodological hurdles, particularly in attributing causation. Further, even assuming that correlation does imply causation of some magnitude, corresponding studies have not yet been carried out on individuals who never smoked but who vaped into adulthood. Thus, it remains open as to whether any effects found for smokers, whatever the magnitude, might similarly be found in e-cigarette users. It would be premature to assume they would be identical given, as indicated earlier, that smoke represents perhaps 20 times the toxicity of nicotine-based vapour.

To conclude, we do not dismiss the possibility of adverse consequences from vaping. We advocate that youth not initiate nicotine use and that barriers to access by youth be maintained. In particular, this means strict age verification in brick-and-mortar stores or the use of electronic software that requires official proof of age each time an order is made online. Some innovators are experimenting with fitting e-cigarette devices with age-gating technologies capable of verifying consumer age not only at the point of sale but also at the point of use. Such innovations are only conceivable in the regulated market, though even there, it remains to be seen whether and under what regulatory conditions they will be viable in terms of consumer demand.

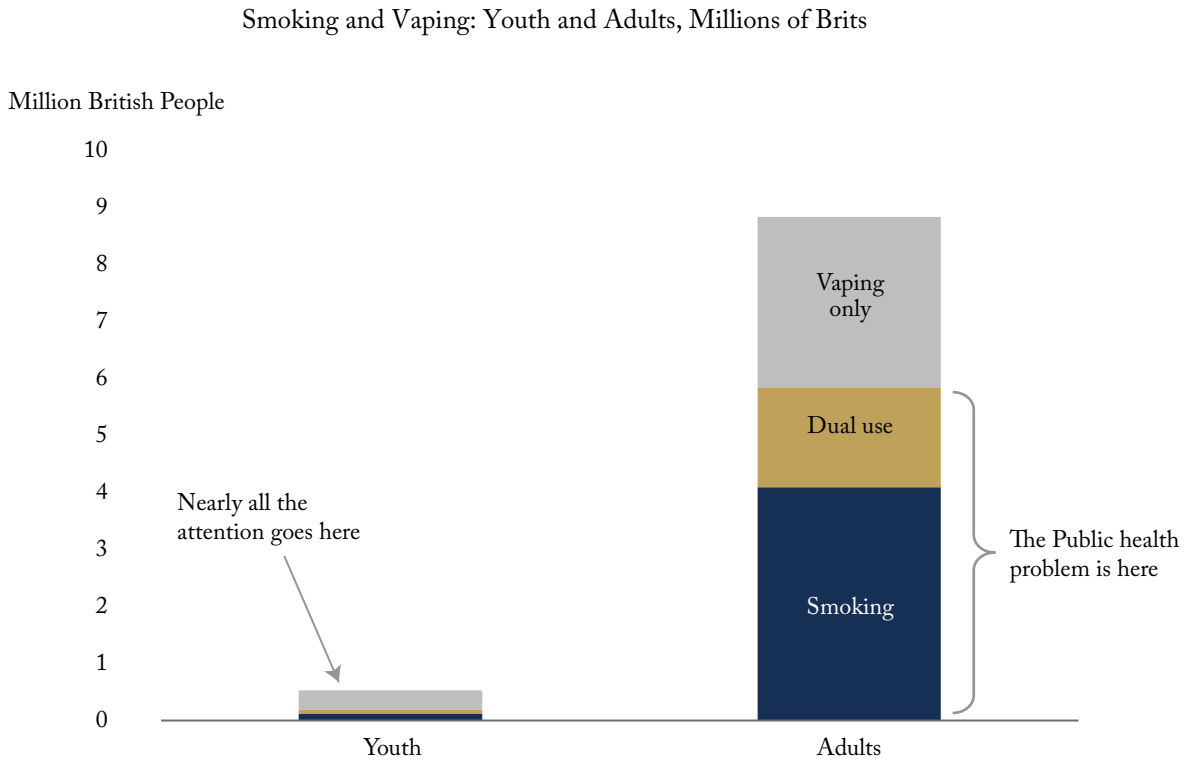
Inspection is also critical. In interviews that we have carried out with numerous vendors, a universal complaint is that government inspections are too infrequent and that health authorities fail to take action when legal operators report illegal activity.

One of the most widely repeated concerns regarding reduced-risk products is that vaping (for example) could serve as a gateway to smoking (Chapman et al. 2019). But as Balfour et al. (2021) point out, "if vaping causes some young people to try cigarettes, the aggregate impact must be small." In countries such as the UK, youth smoking rates have reached historic lows even as e-cigarette use has increased (Williams et al., 2023). In Canada, just 1 percent of 15-19-year-olds now smoke on a daily basis (Statistics Canada 2023). In the US, "youth smoking has nearly ceased to exist" (Warner 2024) and youth vaping rates have declined dramatically since 2019, too (FDA 2024).

In fact, the decline in smoking has accelerated following the introduction of vaping products to Canada (Levy et al. 2023) and the US (Foxon et al. 2024). In Canada, the country's two major surveys (CTNS and CTADS) indicate that young adults now have the lowest smoking rate among all adult age groups, whereas a decade ago, they had the highest. The fact that such young adults also have the highest vaping rate among all adults cannot be dismissed as mere coincidence but suggests instead that the "gateway effect," if it exists at all, is overwhelmed by a replacement effect at the population level.

Today, in Canada (and elsewhere), it is older adults who exhibit the highest rates of smoking. In terms of life years gained, middle-aged adults stand to gain the most from smoking cessation. Unfortunately,

Figure 3: The Stock and Flow Problem



Note: The age ranges overlap for age 16 & 17.

Sources: Youth: ASH and YouGov (ASH) 2022 data age 11-17. Adult: Office for National Statistics (NHIS) 2022 data, age 16 or over.

compared with young adults, older adults are much slower to take up NGPs. Greater uptake of NGPs among older Canadians would increase smoking cessation rates in this group. The existing trends, if not the counterfactuals too, challenge the logic and timing of additional untargeted restrictions on NGPs because such restrictions keep people using more dangerous cigarettes.

A particular concern of authorities worldwide is the possibility that it is flavours rather than nicotine that may be driving youth's use of e-cigarettes and, also, that flavours may act unpredictably when heated. In Canada, at the time of writing, Ottawa is weighing the benefits and costs of further limiting flavours. In addition to their role as a magnetizing agent for youth, concern has been expressed for some time that, when heated to 200 degrees plus, flavours may become toxic, particularly if diacetyl is present. Diacetyl has been linked to a condition named, in common parlance, "popcorn lung" – it has been observed that workers in popcorn manufacturing plants historically developed a range of lung-related morbidities. The American Lung Association, as early as 2016, warned against the

use of diacetyl in e-cigarettes.[9] Diacetyl is not a permitted ingredient in e-cigarettes in Canada. But again, the benefit of that restriction requires consumers to be sufficiently satisfied with the compliant offerings of the legal market so they are not tempted to purchase and use illicit products.

While youth use should be central to policy making, Bates (2023) has argued that a much more serious problem lies in adult smoking – see Figure 3. Too little attention is directed in policy making towards middle-aged and older adults who desperately need to quit, given their smoking history and their number relative to youth. Policies that inhibit such quitting need to be questioned.

VI Illegal Markets

History confirms the economic theory that efforts to suppress demand for popular "sin goods" steer demand to illicit markets. The US prohibition on alcohol and the failed "war on drugs" provide examples. However, formal prohibitions such as these are not a necessary pre-requisite for illicit markets. In the case of tobacco, for example, excise levies and sales taxes "create an incentive for tobacco users, manufacturers … [and] criminal networks, to … avoid or evade tobacco taxes" (Guindon et al. 2017). Seizure data confirm the existence of a sizable illicit trade in Canada (Canadian Border Services Agency 2024). Empty discarded pack studies may also provide evidence for illegal products. However, neither method provides definitive evidence for the scale of the problem.

As an alternative, "gap analysis" compares the tracked legal sales to the total demand estimated with reference to prevalence and frequency data reported in tobacco-use surveys. Recent studies using this method suggest that in many Canadian provinces, illicit cigarettes may account for as much as one-third of all cigarettes consumed (O'Riordan 2023, 2024). Criminal organizations smuggling unprocessed tobacco into Canada often utilize First Nations reserves for production because federal and provincial tobacco controls are more difficult to enforce on those lands, and they are frequently on the US-Canada border, facilitating the importing of tobacco leaf. E-commerce provides additional opportunities for consumers to take advantage of these products, which are often purchased nationwide in violation of the law. A huge variety of combustible and non-combustible products are advertised online at prices frequently just one-third of legal tax-inclusive prices.[10]

The losers from illicit markets are not just legal producers; provincial and federal governments lose tax revenues. If the figures reported in O'Riordan are correct, the missing tax revenue is more than $2 billion. By undercutting tax-inclusive prices, illicit tobacco reduces the price incentive that would otherwise encourage people who smoke to quit or reduce cigarette consumption.

Gravely et al. (2022) report that more than one in five Canadian smokers (22.3 percent) would "find a way" to get a banned flavour of e-cigarettes. The proliferation of illicit trade in NGPs raises several of the same concerns as illicit trade in tobacco products. Illicit e-vapour products evade the product standards afforded by regulation, eliminate an opportunity for age-gating, pose a challenge for law enforcement, and require additional expenditures to detect, prosecute, and sanction violations.

9 American Lung Association. 2016. "Popcorn Lung: A Dangerous Risk of Flavored E-Cigarettes." Each Breath Blog, July 6. https://www.lung.org/blog/popcorn-lung-risk-ecigs.

10 See, for example, retailers Native Cigarettes and Select Smokes.

VII Policy – Guidelines and Recommendations

Guidelines

The rapid growth of the Canadian market for NGPs has left both provincial and federal governments struggling to enact regulations that benefit our public health without stepping on the rights of individuals to consume low-risk products while at the same time protecting youth.

The evidence we have explored in this review leads us to suggest a set of useful guidelines for sculpting policy measures. They are as follows:

1 ***Adopt the principle of horizontal equity***. Taxation and regulatory measures applied to tobacco and nicotine products should be consistent with policies applied to alcohol, cannabis, and other risky products.

2 ***Adopt the goal of harm reduction***. Harm reduction is widely accepted, with applications ranging from drug policy (safe-injection sites) to automotive regulation (seat belts). While less consumption may be better for health, too-strict regulations risk undermining the legal market.

3 ***Adopt evidence-based policies***. There is now a vast impartial literature recognizing that NGPs present a small fraction of the health risk associated with combustible cigarettes and that they are effective aids to smoking cessation.

4 ***Avoid excessive applications of the precautionary principle***. Complete safety is illusionary. Erecting excessive barriers on product characteristics until we have sufficient evidence of very low rather than just low health impacts (by observing a lifecycle of impacts) risks disqualifying interventions that negate more severe risks.

5 ***Social equity***. Tobacco use is concentrated among the disadvantaged: lower-income Canadians, Indigenous communities, those with mental health disorders, members of the LGBTQ+ community, and the incarcerated. Low-risk products are beneficial here, too, promoting both public health and health equity.[11]

6 ***Consider nicotine in a low-risk format to be a consumer good for adults***. Our society tolerates, without necessarily approving, adult access to a range of tempting goods that expose the consumer to some degree of risk; alcohol, cannabis, and lottery tickets serve as examples. We should consider nicotine through the same lens.

7 ***Learn from the experiences of other countries***. There is strong evidence that societies where NGPs are available and regulated appropriately are more successful in reducing smoking than societies where they are not available.

8 ***Balance the interests of all age groups***. The interests of youth and adults can both be served by the judicious combination of free choice, the provision of information and barriers to youth use.

9 ***Don't forget the illegal sector***. There is a massive illegal cigarette sector in Canada that is well poised to step into the NGP market should the regulations fail to provide the "right" incentives.

10 ***Align interests***. Many tobacco companies have a stated goal to transition their customers to low-risk products. While skepticism is justifiable, it challenges the tobacco sector to follow its profession.

Moving Forward

Recommendations hinge on policy goals. An objective to reduce nicotine consumption to zero will inevitably fail, just like the US alcohol prohibition movement in the 1920s (or the former prohibition on cannabis in Canada). The demand for nicotine is ubiquitous as, for some, it offers a degree of satisfaction or utility. Most societies recognize the futility of prohibiting nicotine, and thus, a zero-smoking target is operationally one that tolerates a 5 percent smoking rate. But the reality is that zero smoking, which is defined as a target

11 See Indigenous Peoples Survey (2022) for evidence for Canada and Spasova et al. (2022). Statistics Canada. 2024. *Indigenous Peoples Survey (IPS)*, 2022. August 13. https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3250.

much closer to zero, may ultimately be realizable with an appropriate degree of tolerance of non-combustible nicotine product use.

At the time of writing, only about 1 percent of Canadian teens smoke on a daily basis, despite a daily vaping rate in the neighbourhood of 6 percent. When the current adult generation ages and passes, in particular the part that is middle-aged or older today, and the current teen generation supplants them, it is possible that the 1 percent smoking rate may be carried through the whole population. Undoubtedly, if that happens, it will be accompanied by substantial use rates of other nicotine products. Sweden has about a 5 percent smoking rate among men, and that rate continues to fall, but the rate of snus use in the population is in the high teens. Such patterns may be a necessary part of having near-zero smoking rates. Such a pattern is likely to happen if vaping, pouches, and HTPs elbow combustible use aside. The US market is experiencing robust growth in oral nicotine use, and Canada may ultimately display the same pattern.

While most medical organizations that lobby against nicotine and tobacco do not view NGPs in this light, a small number have adopted a utilitarian/harm reduction approach. The Royal College of Physicians in the UK is one, and Public Health England – a government body – is another.

While it is straightforward to recognize the anomalies that need correction in the current system of NGP taxation in Canada, it is less easy to define an optimal set of tax and excise rates. But corrections to major inadequacies of the status quo will produce substantial improvements to public health.

Concurrently, good excise and sales tax policy can be vastly more effective if the environment in which it operates is characterized by complementary policies. A consideration of the "risk continuum" and the desire to regulate products differentially with respect to their different risk profiles is critical. Lower taxes on NGPs will be more effective in inducing switching from combustibles if smokers are also aware of the true relative risks. Concurrently, public understanding of the relative risks may be communicated effectively by strongly differential levies and other policies. The pervasive misunderstandings require urgent attention: only 4 percent of the Canadian population is aware that e-cigarettes present "very much less risk" than cigarettes. This is a massive barrier to change and needs recognition by Health Canada.

The taxation of smokeless tobacco and heated tobacco sticks is also inappropriately structured and too high, given the relative risks the products pose. Historically, loose-leaf tobacco has been taxed at a rate comparable to cigarettes, and this was appropriate given that loose-leaf was also smoked.

However, in the modern era, smokeless tobacco products eliminate the thousands of harmful chemicals typically released when tobacco is burned.

An Improved Excise Structure

- **Reduce the double excise tax on vaping**. Ideally, the federal government should be the sole tax authority and impose a rate equal to at most half of the current combined rate. Reporting to a single agency reduces administration both for the producer and governments. Ideally, again, the federal government could enter a revenue-sharing agreement with all provinces. This was the original philosophy that supported cannabis levies in Canada – a single low rate with most of the revenue remitted to the provinces. But this philosophy and state became difficult to maintain as some provinces decided to occupy the revenue space themselves. There is no doubt that this ideal would be difficult to achieve operationally (witness the excessive regulation of Nova Scotia, Quebec, and British Columbia, in particular in the vaping space). For decades, the elimination of cross-provincial-boundary differences in trade policy has been discussed at meetings of provincial first ministers, but when it comes to surrendering autonomy, provinces balk. The scale of illegal activity and revenue loss may ultimately spur provinces to scale back in their revenue-seeking, but it may not. If the relative risk of e-cigarettes is 5 percent of the risk of cigarettes, then the taxing authorities need to make a well-supported case for elevated excise levies and sales taxes.

- In the same light, the **standardization of rules and regulations across provinces** would improve the efficiency of the sector.
- **Policy must focus on substitution possibilities when the regulatory environment becomes too constricted**. Proponents of high taxes on vaping products may argue that, even in the presence of the current double-excise regime, vaping is still much less expensive than smoking. This claim is correct. This observation, however, in addition to avoiding the principle of relative risk taxation, ignores the vitality of the illegal market for vapes. It also ignores that higher concentration can be purchased illegally, thus reducing the effective purchase price even further relative to the legal sector. The introduction of a double excise levy, combined with the concentration limit, has effectively quadrupled the price of nicotine from vaping since 2022. E-liquid is not a complex product to produce for illegal suppliers. Ultimately, the effect of current levies and regulations on use is uncertain, but it is very clear what effect they will have on the legal sector.
- **Recognize nicotine/tobacco pouches and heated tobacco sticks as inherently different products from loose-leaf tobacco**. The current interest in nicotine-based herbal products (i.e., modern oral pouches) springs from the inappropriately punitive level of taxation levied on smokeless products that contain tobacco leaf. But the risks associated with the herbal product (synthetic nicotine and vegetable matter) and snus (containing some pasteurized tobacco leaf) are similar. Loose-leaf tobacco was destined to be smoked, and hence, a high tax rate was appropriate because of the tar and carcinogens created at combustion. But pouches, snus and HTPs are not combusted. Current regulations and tax schedules do not respect this fundamental difference.
- **Implement new excise schedules**. The toxicity literature emphasizes that the three NGPs are each at least one order of magnitude less toxic than cigarettes. Relative risk differences persist between sub-groups of NGPs. For example, modern oral pouches may contain one percent of the risk of cigarettes, vaping products slightly more and heated products slightly more again on account of being vaporized at a slightly higher temperature than e-cigarettes. But all are at least an order of magnitude less toxic than combustibles. Hence, policy should focus on getting the big picture right: NGPs collectively are a distinct group and should all be taxed at a substantially lower rate than cigarettes, and one that will not incentivize a virulent illegal market.
- **A need for immediacy**. We recognize that we are not recommending exact numerical rates for excise taxes, nor do we engage in a discussion of, for example, whether excise levies should fall on nicotine volume as opposed to liquid volume or whether the excise schedule should be linear or non-linear, or whether the excise imposition on e-cigarettes should be, following the advice of the Public Health England and the Royal College of Physicians, just 5 percent of combustibles or somewhat more. Current NGP excise levies are such that substantial reductions would result in a welfare-improving scenario that would simultaneously keep a high percentage of the market legal. But time is of the essence: each month that passes under the existing punitive charges will witness a further expansion of illegal markets, and the marketplace could experience a ratchet effect in which an ultimate lowering of rates might not redirect users once having learned to use the illegal supply route, back to the legal market.

Information Policies

Information is critical. An information-based policy agenda complementing fiscal reform has the potential to improve health substantially. As part of such a program, information on relative risks could be made available at supply points. At present, the *Tobacco and Vaping Products Act* forbids this information transmission. Health Canada is failing to educate the population at large.

Pack inserts that message relative risks are a potential tool. Exterior graphic health warnings on packs could be complemented with positive messaging on quitting via NGP use. Current surveys report a very dense fog hanging over risk information. The public in general, and smokers in particular, along with the medical professionals who treat them and their friends and family who might

otherwise encourage health-positive substitutions, are all misinformed about nicotine and the potential of reduced-risk nicotine products. Canadians deserve better.

VIII Conclusion

Canada's structure of nicotine and tobacco excise and sales taxation reflects a bygone era, one that predates the development of technologies that separate nicotine from combustion. The time has come to review how the spectrum of nicotine-containing products is taxed and regulated. The past decade has seen piecemeal changes implemented by provincial and federal governments independently that have not been guided by a coherent philosophy.

Coordination between finance, health, and revenue departments is essential both at the provincial and federal levels if we are to succeed in establishing a tax structure that respects the rights of adult consumers and that does not incentivize illegal supply.

Youth can and must be protected within a consistent policy framework from initiating nicotine and tobacco use without infringing on the rights of adults. Given that hundreds of millions of dollars can be generated from NGPs, it behooves governments to fund inspections of vendors and all supply sources. Meaningful barriers to youth use can only be put in place if resources are furnished for the purpose. Otherwise, youth will find ways to obtain a product that would do better not to use.

Physicians may believe that they "should do no harm" in their practice and hence advise against smoking and other forms of nicotine and tobacco use. At the same time, a world where doctors and dentists learn more fully about the possibilities of reduced-harm products and grasp the relief afforded by them would likely be a healthier one than where the use of any form of nicotine is discouraged (Bover Manderski et al. 2021). Rather than promoting the unrealistic ideal that individuals should "do no harm" – a goal that is often unattainable – we, the authors, advocate that adults aim to "do very little harm" in their approach to nicotine use. Embracing this principle within a regulatory environment that respects and supports it would contribute to improved public health.

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