

PERSPECTIVES ON DEVELOPING A NICOTINE STANDARD FOR TOBACCO PRODUCTS IN CANADA

REPORT ON A DISCUSSION AMONG CANADIAN TOBACCO CONTROL EXPERTS,
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EXECUTIVE SUMMARY

Almost three decades have passed since researchers proposed regulating nicotine content in tobacco products could reduce their addictiveness. Since then, the proposal has gained the support of some expert committees and health authorities and is slated for implementation in one country. Research suggests that it is possible to reduce the nicotine content of combusted tobacco to sub-addictive levels and that doing so would be effective at reducing the products' addictiveness, would facilitate smokers' quitting and could prevent the onset of addiction by young people who experiment with smoking.

In 2018, Health Canada stated its intention to explore options to reduce the addictiveness of tobacco, including the regulation of nicotine content. There are indications that Canadian smokers and the general public see this as an effective policy option, and that they rank it higher than other new policies.

Despite these developments, there has been little formal discussions within the Canadian public health community about the benefits or drawbacks of pursuing this option in Canada. In June 2021, Physicians for a Smoke-Free Canada convened a virtual meeting among 26 Canadians who worked in tobacco control as researchers, clinicians, or within governmental or non-governmental organizations. The purpose of the meeting was to gather and exchange perspectives on a nicotine standard for tobacco and to identify considerations for policy makers who wished to further explore this policy option.

Comments made during the meeting and in subsequent interviews revealed there was no current consensus among participants on whether or how Canadians should explore reduced-nicotine product. For most participants in this discussion, such a measure was seen as a good candidate for inclusion in an ENDGAME strategy, either to help drive smoking rates below 5% or to implement once Canada had reached that target. Among those who generally supported the idea, there remained specific areas where the need for further research or policy development was identified. Most participants were supportive of continued and expanded discussions about the appropriateness of such a regulation in Canada. For a small number of participants, the perceived risks of shifting smokers to an illicit, untaxed and unregulated tobacco market exceeded any perceived benefits. Some also associated a large opportunity cost to any further exploration of the proposal, and a distraction from the implement of proven tobacco reduction strategies.

These comments suggest that on balance the Canadian tobacco control community sees value in further exploration of the potential of a reduced nicotine standard but does not think that the proposal is sufficiently developed to be implemented at this time. A consensus within the public health community on how or even on whether to adopt a nicotine standard in Canada is unlikely to be achieved without greater clarity about the strategic context in which it would be implemented. Many participants recommended more discussion and knowledge-sharing among this community and other affected Canadians.

A. INTRODUCTION AND BACKGROUND:

In the 1990s, American tobacco researchers Neil Benowitz and Jack Henningfield proposed that reducing the nicotine content in tobacco would be an effective way of weaning smokers off cigarettes. They considered that a maximum level of 0.4 mg of nicotine per cigarette would limit the development of addiction to smoking and would wean current smokers off cigarettes.^{1 2} Subsequent study by these and other researchers has shown nicotine reduction to be a “powerful tool to reduce smoking” in controlled trials, although questions remain about the impact in real world conditions.^{3 4}

POLICY DEVELOPMENTS

A number of health authorities and governments have reviewed the policy option of a reduced nicotine standard:

1. Policy recommendations by the COP to the FCTC and the World Health Organization

The World Health Organization Framework Convention on Tobacco Control (FCTC), which came into force in 2005, mandates parties to adopt guidelines for testing and measuring the contents and emissions of tobacco products and for regulating these. Parties to the convention are required to “adopt and implement effective legislative executive and administrative or other measures for testing and measuring, and for such regulation”⁵ The Conference of Parties to the FCTC established a Working Group to develop guidelines to assist Parties in implementing this section of the treaty. In 2010, this Working Group identified that measures to reduce the addictiveness of tobacco products would be an appropriate objective of tobacco product regulation, although it deferred any specific recommendations on how such measures should be structured.⁶

In 2012 and 2014, the WHO’s scientific advisory body on tobacco regulation (the Study Group on Tobacco Regulation, or TobReg) convened to consider the issue of reducing the addictiveness of tobacco products by regulating nicotine content. In 2015 it recommended that:

Reducing the maximum allowable nicotine content in cigarettes to minimally addicting levels be considered a suitable strategy for reducing the demand for these products, which account for the vast majority of tobacco-attributable morbidity and mortality in most countries and regions.

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- 1 Benowitz NL, Henningfield JE. Establishing a nicotine threshold for addiction: the implications for tobacco regulation. *N Engl J Med* 1994;331:123-125. doi: 10.1056/NEJM199407143310212.
 - 2 Henningfield JE, Benowitz NL, Slade J, Houston TP, Davis RM, Deitchman SD. Reducing the addictiveness of cigarettes. *Tob Control* 1998;7:281-293. doi: 10.1136/tc.7.3.281
 - 3 Berman, ML and Glasser, AM. Nicotine Reduction in Cigarettes: Literature Review and Gap Analysis. *Nicotine & Tobacco Research*, 2019, S133–S144. doi: 10.1093/ntr/ntz162.
 - 4 Donny, EC and White, CM. A review of the evidence on cigarettes with reduced addictiveness potential. *International Journal of Drug Policy*. 2021. <https://doi.org/10.1016/j.drugpo.2021.103436>
 - 5 World Health Organization. WHO Framework Convention on Tobacco Control. 2003 <http://apps.who.int/iris/bitstream/handle/10665/42811/9241591013.pdf;jsessionid=771465002DC98181009DF123F7C48CEF?sequence=1>
 - 6 WHO. Framework Convention on Tobacco Control. Partial Guidelines for Implementation of Articles 9 and 10 of the WHO Framework Convention on Tobacco Control, as adopted at COP 4 (2010) and revised at COP5 (2012). https://www.who.int/fctc/guidelines/Guidelines_Articles_9_10_rev_240613.pdf

The study group continued this work and in 2018, held an expanded meeting that considered this and other regulatory issues.⁷ The study group recommended that governments should:

Consider a regulatory strategy for reducing exposure to toxicants in combusted tobacco product smoke that includes a nicotine level in tobacco that does not exceed 0.4 mg/g of tobacco (0.04 mg nicotine per combusted product in mainstream smoke under HCl smoking conditions). This should be accompanied by a reliable system for monitoring regulated constituents in tobacco and smoke, comprehensive tobacco control and concerted national and international efforts to prevent black markets.

2. Policy proposals by the United States Food and Drug Administration

In 2009 the U.S. Food and Drug Administration was authorized to adopt “tobacco product standards... appropriate for the protection of public health”. Subsequently, the FDA has advanced the concept of a product standard that limits nicotine levels in various fora, including scientific publications⁸ and official government policy publications.⁹ In doing so, the agency’s spokespeople have linked the regulatory rationale to other regulatory and market developments, and the potential contribution of e-cigarettes to a harm reduction approach.¹⁰

[O]ur plan demonstrates a greater awareness that nicotine, while highly addictive, is delivered through products on a continuum of risk, and that in order to successfully address cigarette addiction, we must make it possible for current adult smokers who still seek nicotine to get it from alternative and less harmful sources. To that end, the agency’s regulation of both novel nicotine delivery products such as e-cigarettes and traditional tobacco products will encourage the innovation of less harmful products while still ensuring that all tobacco products are put through an appropriate series of regulatory gates to maximize any public health benefits and minimize their harms.

It is currently uncertain whether the FDA will implement a nicotine standard for tobacco, or how the incoming FDA Commissioner will approach this and other tobacco issues.¹¹

3. Policy decisions by the New Zealand government

In spring 2021, the New Zealand Ministry of Health proposed a range of measures to reduce smoking prevalence in New Zealand to under 5% by 2025. Among these were proposals to “reduce nicotine in smoked tobacco products to very low levels.”¹² The Ministry received more than 5,000 contributions to the consultation on their set of proposals, with more than 70% of personal, community or professional

7 World Health Organization. (2019). WHO study group on tobacco product regulation. *Report on the Scientific Basis of Tobacco Product Regulation: Seventh Report of a WHO Study Group*. <https://apps.who.int/iris/handle/10665/329445>

8 Gottlieb, S and Zeller, M. *A Nicotine-Focused Framework for Public Health*. *New England Journal of Medicine*. <https://www.nejm.org/doi/10.1056/NEJMp1707409>

9 U.S. Food and Drug Administration. (2018). *Advance notice of proposed rulemaking: Tobacco product standard for nicotine level of combusted cigarettes*. (p. Document number: 2018–05345. *Federal Register* 2018:1–99.)

10 U.S. Food and Drug Administration. *Statement from FDA Commissioner Scott Gottlieb, M.D., on pivotal public health step to dramatically reduce smoking rates by lowering nicotine in combustible cigarettes to minimally or non-addictive levels*. March 14, 2018. <https://www.fda.gov/news-events/press-announcements/statement-fda-commissioner-scott-gottlieb-md-pivotal-public-health-step-dramatically-reduce-smoking>

11 Foiley, KE. *The overlooked public health issue that could make or break Biden’s new drug regulator*. *Politico*. November 27, 2021. <https://www.politico.com/news/2021/11/27/fda-tobacco-califf-523390>

12 New Zealand & Ministry of Health. (2021). *Proposals for a smokefree Aotearoa 2025 action plan: Discussion document*. <https://www.health.govt.nz/publication/proposals-smokefree-aotearoa-2025-action-plan>

organization submissions supporting proposals to reduce nicotine. Ninety percent of submissions from tobacco and/or vape-affiliated individuals or businesses were opposed.¹³

In December 2021, the New Zealand government concluded its consultation on its Smokefree Aotearoa 2025 Action Plan. Among its focus areas is the objective of “making it easier to quit and harder to become addicted by only having low-level nicotine smoked tobacco products for sale”.¹⁴ The government has indicated its intention to establish a technical advisory group by February 2022 to support this regulatory development and to introduce legislation in 2022.¹⁵ This measure is part of a broader strategy that includes additional measures to prevent addiction to tobacco (including reducing retail and a tobacco-free-generation measure) and to facilitate switching to less harmful sources of nicotine.¹⁶

4. Consideration of reduced nicotine in Canada

1) Federal government

The federal *Tobacco and Vaping Products Act*¹⁷ requires all tobacco manufacturers to comply with the product standards set by the federal government and authorizes government to establish product regulations. To date no such regulations are in place,¹⁸ and existing tobacco product standards (e.g. additive restrictions) are specified in the TVPA.

Health Canada has considered regulating the nicotine content in tobacco products. In its 2017 consultation document, *Seizing the Opportunity: The future of tobacco control in Canada*¹⁹ it identified the option of “tobacco addictiveness reduction — Develop regulatory options for reducing the addictiveness of tobacco products in order to prevent people from becoming users.” In 2018, the department adopted a revised tobacco strategy (“Canada’s Tobacco Strategy”) in which it said that it would “explore potential options that could further reduce the appeal and addictiveness of tobacco, including taxation, price interventions, and the regulation of nicotine content.”²⁰ To assist consideration of this option, the department commissioned research to estimate the effectiveness of a reduced nicotine standard.²¹ Other activities that may have been undertaken with respect to this initiative have not been proactively disclosed.

13 New Zealand Ministry of Health. *Consultation on Proposals for a Smokefree Aotearoa 2025 Action Plan Analysis of submissions*
https://www.health.govt.nz/system/files/documents/publications/consultation_on_proposals_for_a_smokefree_aotearoa_2025_action_plan_analysis_of_submissions.pdf

14 New Zealand. Ministry of Health. *Smokefree Aotearoa 2025 Action Plan*. <https://www.health.govt.nz/our-work/preventative-health-wellness/tobacco-control/smokefree-aotearoa-2025-action-plan>

15 New Zealand. Ministry of Health. *Smokefree Aotearoa 2025 Action Plan. Focus Area 4*
<https://www.health.govt.nz/system/files/documents/pages/smokefree-aotearoa-2025-action-plan-focus-area-4-factsheet-web.pdf>

16 New Zealand Associate Minister of Health. *Supporting smokers to switch to significantly less harmful alternatives*.
<https://www.health.govt.nz/system/files/documents/pages/supporting-smokers-switch-to-significantly-less-harmful-alternatives-21nov2018-redacted.pdf>

17 Canada. *Tobacco and Vaping Products Act*.
<https://laws-lois.justice.gc.ca/eng/acts/t-11.5/page-1.html#h-449223>

18 Between 2005 and 2016 regulations were in place to address ignition propensity. See Cigarette Ignition Propensity Regulations, SOR 2005-178.

19 Health Canada. *Seizing the Opportunity. The Future of Tobacco Control in Canada*. 2017
<https://www.canada.ca/content/dam/hc-sc/documents/programs/future-tobacco-control/future-tobacco-control-consultation-eng.pdf>

20 Health Canada. *Overview of Canada’s Tobacco Strategy*.
<https://www.canada.ca/en/health-canada/services/publications/healthy-living/canada-tobacco-strategy/overview-canada-tobacco-strategy.html>

21 Industrial Economics Incorporated. *Modeling the Potential Health Benefits of a Nicotine Standard*.

In this study, five experts were recruited to provide estimates of the effectiveness of a reduced nicotine standard, which were then used as the basis of a modelling standard. This analysis estimated a range of premature deaths averted (from 150,000 to 500,000) over 30 years.

2) Provincial governments

One province, Quebec, has clear legislative authority to require product standards for tobacco products, including reduced nicotine.²² Neither Quebec nor any other Canadian province or territory has identified reducing nicotine in tobacco products as a policy option or objective. Any consultations among Health Canada and the provinces on this issue have not been proactively disclosed.

3) Canadian public

There is limited information on the views of Canadians and Canadian smokers about reduced nicotine.

Although the federal government included the concept of reduced addictiveness in its 2017 consultation it did not quantify the responses it received and has not made the submissions available for independent analysis. The department noted “there was no consensus” among the diverse stakeholders and that concerns had been expressed about compensatory smoking and contraband.²³

Other public surveys conducted on the topic suggest that Canadians are receptive to the idea of reducing nicotine levels in tobacco.

- In 2016, as part of the International Tobacco Control project, a panel of approximately 3,000 adult Canadians who smoked cigarettes, who had recently quit smoking cigarettes or who used vaping products were asked to rank certain tobacco policies which were not yet implemented, including “reducing the nicotine content of cigarettes to make them less addictive.”^{24 25} In this survey, three-quarters (75%) of non-daily smokers and two-thirds (68%) of daily smokers supported policies to reduce nicotine in cigarettes. Support for this policy overall, at 70%, was as high or higher than for any other proposed measures, including raising the legal age for purchase (70%), increasing access to alternative nicotine products (illegal at the time of survey) (66%), banning marketing (58%), banning all additives and flavourings in cigarettes (42.5%) and a menthol ban (30%) or plain packaging (29%). One-quarter of Canadian smokers responded to the survey by saying they would quit smoking entirely if nicotine were reduced, and half said they would try non-nicotine cigarettes to see how they liked them. Fewer than one in ten said they would switch to an alternative form of nicotine (9%) or find a way to get cigarettes with nicotine (7%).
- In 2021, Leger polled 2,400 Canadians on their views of 5 proposals for tobacco control measure, asking them to identify the two items they thought would be most effective and the two they thought would be least effective. Four in ten (39%) of those polled thought “a law that requires

Based on the expert’s median estimate of behaviour change, the study suggested a nicotine standard could result in smoking falling below 8% within four years and decline to 5% within seven years, mostly as a result of users switching from cigarettes to e-cigarettes.

22 Quebec. *Tobacco Act*. s. 29. .”The Government may make regulations determining standards relating to the composition and characteristics of tobacco products manufactured in Québec for sale in Québec. The standards may require, prohibit or restrict the use of certain substances or certain processes and vary according to the tobacco product concerned. No distributor of tobacco products may sell a tobacco product in Québec that is not consistent with the standards prescribed by a regulation made under the first paragraph.”

23 Health Canada. *Consultation on the Future of Tobacco Control in Canada: What we heard*. 2017. There were 1,749 responses to Health Canada’s 2017 consultation on future tobacco control measures, of which 1,627 were from members of the general public and 122 were from stakeholder organizations from diverse sectors (tobacco industry, Indigenous groups, provincial governments, public health NGOs, researchers, health professions, etc).

<https://www.canada.ca/en/health-canada/services/publications/healthy-living/consultation-future-tobacco-control-what-we-heard.html>

24 Smith, T, Nahhas, G et al. *Which tobacco control policies do smokers support? Findings from the International Tobacco Control Four Country Smoking and Vaping Survey*, Preventive Medicine, Volume 149, 2021, doi.org/10.1016/j.ypmed.2021.106600.

25 Chung-Hall, J., Fong, GT et al. *Craig Smokers’ support for tobacco endgame measures in Canada: findings from the 2016 International Tobacco Control Smoking and Vaping Survey*. CMAJ. September 28, 2018 6 (3) E412-E422; DOI: <https://doi.org/10.9778/cmajo.20180025>

tobacco companies to reduce the amount of nicotine in cigarettes and roll-your-own tobacco in order to make them less addictive” was the most effective of the 5 proposed measures. One in five (22%) thought it was the least effective.²⁶ The poll was conducted on behalf of the Quebec Coalition for Tobacco Control and Physicians for a Smoke-Free Canada.

B. MEETING REPORT

In June 2021, Physicians for a Smoke-Free Canada (in partnership with the Ontario Tobacco Research Unit) convened a meeting among a group of Canadian tobacco control researchers, advocates and policymakers. The objective of the meeting was to exchange views on how Canadians might assess nicotine reduction as an option for consideration in Canada. The meeting was not intended to result in any consensus or conclusions on whether Canadians should adopt this measure, but rather to inform subsequent discussions of this or other proposals to reduce smoking in Canada.

Canadians working in tobacco control from the research, clinical, non-governmental and governmental sectors were invited to participate at a virtual meeting held on June 9, 2021. A list of meeting participants can be found at Appendix 2.

The meeting was in three parts. Dr. Ashley presented an overview of the proposal and relevant developments in the United States. Dr. Ashley, currently a professor of public health, is a former Assistant Surgeon General/Rear Admiral-Lower Half and a former head of research at the Food and Drug Administration’s Center for Tobacco Products. The general discussion which followed included prepared comments from four participants selected to represent competing views and different disciplines.

Following the meeting, interviews were conducted with 8 participants who had agreed to provide additional comments. These interviews were structured around 4 questions:

- Is reducing the addictiveness of tobacco products an objective that should be explored in Canada?
- Were this proposal to be considered in Canada, what are the criteria by which we should we evaluate it?
- Are there circumstances or conditions that would make this proposal more or less important to consider in Canada?
- What else should we keep in mind? / Do you have other thoughts or recommendations?

In the meeting and interviews, Chatham House rules were followed. The report from the meeting therefore does not identify the individual who made the comments nor the sector they in which they work. The comments were edited for readability.

26 Leger. *Endgame Measures and Harm Reduction*. Survey conducted among Canadians. September 2021. Conducted on behalf of the y Coalition québécoise pour le contrôle du tabac (CQCT) and Physicians for a Smoke-Free Canada.
http://www.smoke-free.ca/pdf_1/2021/Leger-A-English.pdf

The other four measures presented, ranked in decreasing order of perceived efficacy, were:

- Banning the sale of tobacco and nicotine products in convenience and general stores, and only allowing them to be sold in specialty shops where young people may not enter (42% most effective, 27% least effective)
- A law that phases out the commercial sale of cigarettes and other smoked tobacco products within 15 years (31% most effective, 26% least effective)
- Government making stop smoking clinics, services and products freely available (28% most effective, 29% least effective)
- Raising the legal age to buy tobacco and other nicotine products to 21 (19% most effective, 51% least effective).

SUMMARY AND ANALYSIS OF DISCUSSION

The main comments made by individuals are noted in the following section, “Views Expressed”.

Although there was no consensus on how or why a nicotine standard should be developed in Canada, there were only very few individuals who expressed opposition to further consideration of this idea. A few individuals expressed strong support for implementation, and most expressed support for further evaluation of the idea or for implementing it if certain conditions were satisfied.

A factor which may contribute to the current lack of consensus about the idea is the lack of clarity about the strategy in which such a measure would be used. For some, a nicotine standard is a component of a harm reduction approach and a way to help shift smokers to non-combusted sources of nicotine, especially vaping. For these individuals, opinions on nicotine reduction seemed aligned with perspectives on the efficacy of a vaping focused harm reduction strategy. Some thought reduced nicotine tobacco would help move smokers completely to vaping and that this switching outcome would most likely reduce the disease burden of nicotine. Others thought the risks of continued dual use and/or health risks of vaping meant that the disease burden would not necessarily be reduced.

Others did not consider nicotine reduction to be inherently connected to efforts to switch smokers to alternative nicotine sources and saw this proposal as a potential contributor to ending addiction to nicotine. Among this group there were also a range of views. Those who saw this as a de-facto ban on cigarettes did not agree on whether this would be an appropriate or inappropriate development. Many identified conditions under which this move would be appropriate in Canada, for example when prevalence fell below 5%, when neighbouring jurisdictions adopted the measure, when illicit supply was under better control, when more was known about the impact on young people or vulnerable populations, etc.

Based on the comments gathered during this meeting and in subsequent interviews, the following could contribute to arriving at a consensus either in favour of adopting or rejecting a nicotine performance standard for tobacco products sold in Canada:

- Knowledge generation on areas of uncertainty and concern
- Knowledge transfer within the public health community and among other affected Canadians.
- Greater clarity about the tobacco control strategy in which this measure would be implemented

VIEWS EXPRESSED

1. Expressions of support for a Canadian nicotine standard for tobacco.

This is a measure that is overdue

My first reaction is one of vital enthusiasm. For the first time we are talking about regulating an industry. Up to this point, much of our time, resources and our efforts have focused on the victims of the industry (on issues like trying to help people quit, etc.

It's been 60 years since the Royal College of Physicians in England released their seminal report: clinicians at that time would have expected that public policy makers and politicians would have moved to quickly regulate this product in such a way.

I have been intrigued by this idea since it was first proposed by Neal Benowitz and Jack Henningfield many years ago. It appears to have great validity on the face of it. It just makes sense. The data shown is very encouraging in terms of helping people stop smoking and removing some of factors that are currently part and parcel of the smoking experience.

This is a measure that will contribute to public health objectives.

It is impossible to reduce the harmful combusted products probably in a meaningful way, but it is entirely possible to reduce the abuse of liability or addictiveness. I'm convinced that nicotine content reductions would largely achieve this. In my opinion, this is the best option for addressing the fundamental problem of pairing addiction with harm.

This is a measure that is technically achievable and intuitive and it bears serious consideration

We should explore this idea because addictiveness drives the high lifetime dose of harmful substances in tobacco smoke. Any burning product is damaging, but it is the frequency and dose of exposure that drive the harm. Campfires illustrate this: for most people the occasional campfire is not contributing to a substantial burden of harm, but indoor cooking fires would.

I think making cigarettes less addictive should be a top priority, particularly given the negative health consequences of smoking.

This is a measure that should be part of a tobacco ENDGAME in Canada

This is a huge measure, and I believe it would be a game changer. If at some point we are talking 'Endgame', then we've got to put a marker down somewhere to actual end tobacco use. This is a measure that is technically achievable and intuitive and it bears serious consideration.

I think that nicotine limits would send a clear signal yet that there will actually be an end game.

This is one of the more promising Endgame strategies, and is valuable because it offers a way of getting rid of the commercial cigarette. It is a more acceptable way to get rid of cigarettes because it addresses different concerns that people have. Some smokers misunderstand, and think it is a way of taking chemicals out of cigarette and making them safer. For others, who understand nicotine as a driver, the availability of nicotine substitutes (like e-cigarettes) makes this idea acceptable. This idea allows smokers to change what they are doing or to not change what they are doing. It is a dramatic transition without seeming to be a dramatic transition.

This is a measure that will contribute to tobacco harm reduction

You can't have the product with the greatest harm being the most addictive, which is where we've been for the past century.

The only reason that we don't ban cigarettes altogether is because people are dependent. But we have alternative options. So what is keeping us from adopting this measure?

Reducing nicotine in cigarettes will help shift smokers to e-cigarettes. Nudging smokers to alternative sources (like vaping) forces them to change the delivery pattern of the drug. The elasticity factor on a cigarette requires you to breathe deeper to get more nicotine, but on a vaping device you have to breathe longer. Changing delivery systems requires smokers to unlearn how they used to get their drug and learn a new pattern. In that it requires a large behaviour change it is not unlike quitting.

Why would a smoker take all the time to learn how to switch to a vaping device? The only answer is because cigarettes are not as appealing, and that it is as if they are not there. But a strategy to nudge people over to vaping products won't work as long as cigarettes are better nicotine delivery systems for those who are already cigarette smokers.

Given that there are already products available that are safer, there is no reason to allow cigarettes to remain on the market.

We know it is nicotine that is a major driver of use and we now have other source of nicotine that are less harmful. No reason why we should let the industry continue to sell cigarettes.

2. Expressions of reservations, hesitancy or conditionality about a nicotine standard for Canada.

This concept needs additional review before it can be adopted

There are some promising results. But there hasn't been a single jurisdiction anywhere who has actually implemented such a strategy population wide. And, and yeah, I think we could put this on the back burner until we have that type of evidence.

I am certainly on board with the idea that cigarettes should be made less addictive. I'm just not 100% sure that this is the best path forward, and a concerned about putting all our eggs in the 'let's reduce nicotine' basket.

The data that has been published in this area for using low nicotine cigarettes is growing, but I just don't think that there's enough of an evidence base there to really say how effective is going to be.

To date there has been only one brand of low nicotine cigarettes that have been used for testing. We need to address whether manufacturers might be able to do things to blunt the effect of reducing nicotine by finding other ways to make cigarettes appealing.

It's important that we get it right before implementing a society wide change. The best way to ensure that is to make sure that different stakeholders and people with different types of expertise are able to come together and brainstorm about what is really the best approach and what unintended consequences could result.

There is certainly a lot we don't know about VLNC – we don't know how things are going to happen until they actually happen. We don't know the impact on youth, for instance. Although I think it would lessen the transition into cigarettes, it is not something we know for sure.

The clinical trials that have been run to date don't really tell us very much about what the impact might be because they don't provide the context in which they would be introduced. Nor do they help us understand whether a strategy that requires this to be done as a gradual reduction in nicotine or an abrupt reduction. Here there is a bit of a chicken-and-egg situation, where we won't be able to evaluate approaches until they are implemented but need to understand them before implementing them.

We may also want to better understand how these might affect smoking relapse. In cessation clinics we get people to quit, but we also get a lot of repeat customers: they quit, they come back. But, you know, cigarettes, tobacco cigarettes, combusted cigarettes aren't the only aren't your only option. If you want to reduce your harm or move towards a smoke free or nicotine free lifestyle, then, you know, there are strategies for you to do that. It doesn't have to be quitter die, or, you know, there are alternatives.

More people will come to table and support the idea if there is more evidence.

This measure may not have the intended or desired effect.

We don't yet know whether people will stop smoking cigarettes once the nicotine is reduced. Just because you've gotten rid of the nicotine does not reduce anyone's harm from smoking.

We can think of coffee as an analogy – decaffeinating coffee would not remove coffee drinking. People might drink coffee and then take a caffeine pill.

I think there would be a certain segment of the population that would continue to use them, and then you're not reducing their harm at all right. And still, all of the components of tobacco that cause death and disease are all still there. For those who continue to smoke cigarettes, even though the nicotine has been reduced, there will be no harm reduction.

There are lots of components of tobacco that are positively reinforcing other than nicotine. For those who continue to smoke.

We should consider the scenario that if smoking tobacco provides addiction-related compounds, smokers might supplement a low nicotine cigarette with nicotine from other sources. And if you do restrict nicotine and combustible tobacco alone, it might end up being that smokers will be using NRT combined with the with the tobacco, and you're basically back to square one.

We should consider that reduced nicotine may lead smokers to compensate through dual use of e-cigarettes and reduced-nicotine cigarettes. This will put users at increased risk for heart attack and stroke compared with those who use either product alone, or neither product.

This measure would not address non-nicotine drivers of tobacco dependency

While nicotine is the most important contributor to cigarette addiction, it interacts with other constituents that are found in tobacco, some of which are added to cigarettes by the tobacco industry.

We should be careful not to solely focus on one constituent, but also think about the relative ratios of nicotine or other contributing constituents to addiction. For example, there's evidence from industry research that it is not the nicotine levels themselves, but the ratio of nicotine to other constituents (e.g. acetaldehyde) that may be the most important factors to addiction.

The conclusion of the U.S. Surgeon General that nicotine was addictive has narrowed attention to this one compound, although there is evidence about the relationship of other products in tobacco products which contribute to addiction.

Nicotine is certainly an important part of the tobacco addiction story, and it might be a necessary component for addiction. But there's certainly a lot more to addiction to tobacco than just the level of nicotine in cigarettes, or the presence of this one solitary constituent.

Those who obtain nicotine from non-tobacco sources (like NRT or vaping) experience fewer withdrawal symptoms like cravings than do smokers who are trying to quit. This suggests differences in the addiction experience, which may be linked to reinforcing elements in tobacco products, including acetaldehyde.

Research underway in Canada is making head-to-head comparisons among dual users for cigarettes or e-cigarettes are finding that smokers consider cigarettes more addictive than e-cigarettes, and that the preference for one product over another depends on the situational context, even when there is comparable nicotine delivery.

There is evidence that there are physiological aspects of smoking - throat hints and inhalation – that people also find reinforcing.

Some experimenters try smoking and give up because the nicotine in the cigarette made them dizzy and nauseous. If you remove the nicotine, but there is still something in the cigarette that makes people feel some good, there might be a risk of recruiting new users.

We need to consider whether they can find another nicotine variant to include (as HEMP producers have tried to overcome the ban on Delta 9 THC by producing Delta 10 THC).

We need to have a better understanding of addiction. How addictive are cigarettes? How much is the addiction related to nicotine? How much is related to the sensations in the mouth? How much is related to the emotional state of the smoker?

This measure would benefit from (or need) support from Indigenous communities

There are complex cultural issues to consider, including the use of tobacco products by indigenous communities.

An important step would be for Canada bring the indigenous groups that produce tobacco to the table, maybe relatively early. Perhaps we would need to engage the Minister of Indigenous Affairs to explore the roadblocks of changing treaties and agreements around producing tobacco on reserve?

We will need to consider how tobacco products are produced on reserves, and whether we can reach an agreement through new or revised treaties so that they can only produce tobacco that is low in nicotine.

Such an initiative will not reduce tobacco dependence in Canada if first nations' communities are not on board with it.

This measure would benefit from (or need) collaboration amongst governments

If the Americans were adopting this measure, it would be nice to move in lock-step with them.

A move like this will require coordination between Canada and the United States. Unless there is the exact same initiative in each country, smuggling will completely undo efforts to have all cigarettes contain very low amounts of nicotine. Canada should think about what we would do if the US does really push this forward and we can't take the initiative without having the U.S. do the same.

Because of Canada's borders with the United States and with Aboriginal reserves, and because of the U.S. border with Mexico, there are four sets of decision makers that would have to agree to reduce nicotine in cigarettes at the same time.

If it works out the way everyone thinks that will then eventually no one will want to use these products. The industry will slowly die off. Given the huge tax revenues these products generate, it may be hard to get the support of governments in the US, Mexico and Canada.

If this measure is adopted elsewhere then it will be more politically feasible in Canada – this will also give us more data on which we can assess the impact.

It has to be done all over the place, or not at all. IT is an all or nothing idea.

I could see New Zealand succeeding. In addition to having the political will to act, they don't have to contend with products from the US.

The effect of this measure on youth is still unknown.

To date the research and discourse is primarily adult-oriented, with a focus on the provision of reduced nicotine cigarettes to adult smokers. While it is unethical to conduct prospective studies on the transition from experimentation to youth, there must be other ways to understand what would happen to novice smokers. Our concepts of "experimentation" and "regular use" may need to be re-examined. We need to know what happens to kids who pick up a nicotine product, and who pick it up for a reason.

Over time the reasons that kids are picking up cigarettes are changing. Overtime, as prevalence of smoking declines, smoking is increasingly concentrated in those young people who have other mental health challenges. They have anxiety. They have depression. They have ADHD. There are a lot of kids who are very challenged and there is a lot of co-use with other drugs going on. We need to understand what will happen to this group, and to be cognizant that the group of kids who are starting to smoke these days are probably more troubled kids.

We should not restrict the discussion on reduced nicotine cigarettes to concerns about adult smokers and cessation. Let's make sure that the up-and-coming generation is included and that we have thought through what's going to happen to them with them.

This is a measure that should be considered at a future time.

There are two scenarios that will make this an important component of an ENDGAME approach:

** If other endgame strategies have succeeded, then the number of remaining smokers will be smaller and the threat of a mass exodus to the illicit tobacco market will be lessened.*

** On the other hand, if we haven't succeeded and still have many consumers, then a more radical intervention like this may be needed to actually reach the end game.*

I can see it as kind of the final stage of a plan to get to five by 2035. If we have timelines and strategies to get as many people as possible to quit through whatever means.

If we were down to 5%, the level of contraband would be manageable, and the benefits would outweigh the risks.

If we can get smoking rates as low as possible in traditional ways – say below 10% - and if uptake continues to be really, really low, then I could see this measure happening here, as long as we're in line with whatever the US is doing.

This measure will require us to do more to help smokers quit.

If we're going to take this product off the market, we must provide greater support and encouragement for consumers to quit in a way that we haven't done to date.

This is a measure that should be phased in gradually.

Any mandated limit should occur over a fairly long timeframe (5 to 10 years) to give all stakeholders an opportunity to adapt.

If it were incremental and did not leave to over-compensation, that might be the way to go.

This measure has a relationship to harm reduction that needs to be re-thought

Using nicotine reduction in combusted tobacco to nudge smokers to e-cigarettes will only reduce harm if smokers if e-cigarettes really are much less harmful and if smokers don't remain dual users. Recently, the evidence about long-term e-cigarette safety and low-dual use is not comforting.

But to me, it's really kind of a stepwise process where you're trying to get the worst products off the market, or the worst product so that people aren't using them, and then move forward with the other products one at a time.

When the idea was first floated, there was the feeling that e-cigarettes would be a viable alternative. But since then there has been a drive to reduce the nicotine levels in e-cigarettes too. Given these two seemingly conflicting approaches, we may have to re-think our position on e-cigarettes.

3. Expressions of opposition to adopting a nicotine standard for cigarettes in Canada.

This measure is an indirect and inappropriate way to ban cigarettes

A regulation which requires very low nicotine in cigarettes is functionally the same as a ban on cigarettes and a ban on cigarettes is not a good measure for Canada at this time. Nicotine is intrinsic in the definition of a cigarette – if you can't have nicotine, then it's the same as banning cigarettes.

This is essentially a backdoor strategy of prohibition - transitioning people away from cigarettes but providing a product so it doesn't look as drastic as a sudden prohibition would be. Nonetheless you're really changing the market.

Our policies should be transparent – and do 'what they say on the box'. If our goal is to end the sale of cigarettes, the policy should be to end the sale of cigarettes. Our words and our actions need to be consistent.

This is not an idea that should be explored in Canada. Our goal should be to eliminate cigarettes – period. Anything that distracts from that will allow the tobacco pandemic to continue.

This measure will not work in Canada because of the availability of contraband.

The biggest argument against this would be that it's a form of prohibition, that it would lead to widespread illicit market activity.

Because tobacco in the illegal market is cheaper and unregulated, the growth of the illicit market that lower nicotine standards will trigger will undermine our goals in the following ways:

- *A ban on cigarettes would reduce the price of tobacco, and remove the ability to use tax and price, which is the most effective tobacco control intervention. In Canada we could predict a drop of 80% or more in the price of cigarettes*
- *The reduction in prices will trigger a relapse among those who have quit smoking because of price and will make inexpensive cigarettes available to price-sensitive young people.*
- *Other tobacco control measures like menthol bans, plain packaging and health warnings will also be less effective, although some contraband has health warnings.*
- *Enforcement activities will be reduced. Finance departments, which currently have an enforcement incentive because of the money collect in taxes, will no longer apply resources to contraband control.*

The impact on prohibition will be different depending on where we are in terms of prevalence. If we are at relatively low number of consumers and the threat of sort of a mass exodus to illicit tobacco market would be more modest.

This measure is a distraction from more proven tobacco control methods

We should work towards the goal of 5% by 2035 using the strategies that have already been proven effective.

Implementing measures to reduce nicotine would be a distraction from us from other evidence-based strategies that are not yet in place in Canada.

Smokers will not buy VLNC cigarettes and will turn to informal distribution channels.

South Africa's experience with banning cigarette sales during COVID demonstrated how quickly informal channels can become entrenched.

Bhutan's ban on cigarettes did not result in a reduction in youth smoking, but rather an increase from 10% in 2004 (the year of the ban) to 22% by 2019.

This measure would require increased enforcement of selling on reserves, which currently isn't well enforced. If it is a really tough option for smokers to get cigarettes with regular nicotine from reserves, then maybe contraband won't be as big of an issue as we currently think.

Canada is struggling with very necessary reconciliation and acknowledged colonialism. This likely makes confrontation and enforcement of controls on illicit tobacco a non-option for governments at this time.

Other countries where contraband sales are a problem, such as those in the European Union, are not considering reducing nicotine.

Countries which are considering this, such as New Zealand, benefit from isolation and easier border control. It would be less difficult for them to change their tobacco supply exclusively to one with very limited content in tobacco.

I'm not convinced that we need reduced nicotine cigarettes to get to our objective. There is much we have yet to do – raise taxes, expand smoke-free, raise the minimum age to 21, expand free smoking cessation products and services, reduce outlets that sell cigarettes, etc.

Canada has not run out of regulatory options with a proven impact--far from it in fact. We can make progress without reducing nicotine.

4. Other comments

We should require reductions in nicotine in other products too

This idea should also be considered for non combustion products. We are learning more about the destruction that is caused to the neurophysiology of the developing adolescent brain by exposure to nicotine. Research by Kandel²⁷ and others suggests that nicotine is the prototypical gateway drug, cementing those mechanisms in place that make it much more likely for people to be addicted to nicotine or to have certain significant mental health challenges later in life. Given our experience with the explosion of adolescent use of noncombustible tobacco products in recent years, it makes sense that we should apply this kind of approach to all nicotine containing products.

We should maintain availability of nicotine in non-tobacco products

If we didn't have alternative nicotine consumer products available, then we would have a problem in adopting measures to reduced nicotine in cigarettes

Allowing non combusted nicotine products to remain on the market is very important in terms of allowing millions of Canadian consumers a place to land if combustible nicotine products are removed.

*If alternative nicotine products are to be allowed to remain on the market, the option of permitting the sale of **traditional** tobacco should be considered. (Tobacco sold without papers, filters, additives, or other high levels of processing). This would provide an alternative for people who are not ready to quit right away, but who need some sort of alternative. Restoring tobacco to these traditional forms may be an opportunity to de-colonize tobacco and to better address the role of indigenous traditions.*

The only way that I can see consumers being on board with it is if there is an alternative way of getting nicotine. The early proposals included the idea of nicotine being available in e-cigarettes, but since then there has been such a backlash and huge anti e-cig movement. I don't see how tobacco consumers are going to be all that happy about having no alternative.

The discussion on e-cigarettes in Canada is not as black and white as it is for many people in the US. Most people that I know, in the tobacco control field in Canada can see clearly see both sides - they're not so blind or so attached to their own viewpoint that they just refuse to see the other. I think there is there is a happy middle ground that can be met in Canada, where harm reduction products and very low nicotine content cigarettes are part of the approach.

We should consider complementary and alternative measures

Addressing the palatability of cigarettes might be an option to consider as well.

Combustion is what is responsible for the lion's share of the negative health consequences, so banning combustible products or modifying combustible products so that they don't have the same level of appeal are also worth exploring.

We have been focused on creating incentives and nudging strategies to encourage people to change behaviour and have allowed those to filter up into a goal. I think that's backwards. If your goal is to end the sale of cigarettes, your policy should be to ended sale cigarettes, and then there should be a mechanism associated with it.

27 Kandel ER, Kandel DB. Shattuck Lecture. A molecular basis for nicotine as a gateway drug. *N Engl J Med.* 2014;371(10):932-943. doi:10.1056/NEJMsa1405092

There are other ways to end cigarette use. One is to let it die out progressively, without any specific regulatory actions to trigger this. A second is to set an end-date goal, and then let the systems figure out the mechanisms to get there. A third is to decolonize tobacco, and let it remain but only as a non-industrial substance. In this approach tobacco would be allowed in its original state, but the things that have transformed it into a cigarette (papers, additives, filters) would not. This is a counterpoint to the very low nicotine cigarette, as it allows the product (tobacco) without the form (cigarette) to be used, instead of allowing the form (cigarette) without the drug (nicotine) to be used. These both are aimed at ending the use of cigarettes as we now know them.

Our nudging approach is focused on individual behaviour changer. But to extrapolate from individual behavior change to population health behaviour change is a flawed way of thinking. We should focus instead on the changes in the context and the political and regulatory environment that affect smoking.

We should call the tobacco companies bluff and end the sale of cigarettes.

5. Suggestions for future discussion

This measure should be examined by other public health stakeholders

We would benefit if the Public Health Agency would be part of this discussion and would help bring experts and other forces to the table to help establish what needs to be in place to make lower nicotine tobacco a viable approach.

This measure should be examined in a policy context

Reduced nicotine products make sense in the context of a strategy more than as a stand-alone regulation. and for that we need to look beyond the research questions and review it as a policy goal.

What we need to understand is the context of use of the substances are - a reduced nicotine cigarette or an e-cigarette. It is the context around the use of these products that will achieve a change in population health, which is why the context is the element that we need to evaluate. And we can't do that by just focusing on the individual pieces. Research focused on only one product will not answer that question – a reduced nicotine cigarette could be really good, it could be really bad, it depends on the context

There are examples of policy discussions that can be drawn on.

Low risk nicotine guidelines are an example of a project aimed at finding a shared statement. We hashed it out over two days. We hired an impartial mediator who kept us on track and on time. It did not end with the meeting but continued over the following months as more evidence came out. This I think is a model that could be used to articulate a Canadian approach to this and other issues.

The Canadian Tobacco Control Research Initiative hosted meetings where stakeholders from across the country would get together for a day or two. We don't need to hold expensive in person meetings in order to bring stakeholders together, but we can overcome scheduling challenges to hold zoom meetings to discuss issues like these.

In the 1960s through 1990s, Health Canada hosted policy-setting meetings with provincial governments and health stakeholders which resulted in a consensus for comprehensive measures implemented as a National Strategy to Reduce Tobacco Use. This type of consensus-building process involving all parties would accelerate decisions on this and other new regulatory options.

APPENDIX 1

NOTES FROM DR. ASHLEY'S PRESENTATION

THE ADDICTIVENESS OF TOBACCO CAN BE LESSENERED BY REDUCING THE AMOUNT OF NICOTINE IN TOBACCO.

The harm from tobacco use is the end of a process which takes a non-user from experimentation to addiction to disease. These steps are influenced by the appeal, the addictiveness, and the toxicity of the products.

Tobacco control measures like plain packaging seek to address the appeal of the products, and those which seek to encourage "less harmful" nicotine use address toxicity. Measures to address the addictiveness of tobacco are relatively less developed.

In 1994, Neal Benowitz and Jack Henningfield proposed²⁸ that the addictiveness of nicotine products could be addressed by requiring that cigarettes not contain enough nicotine to sustain addiction. They suggested that nicotine content in cigarettes should be limited to 0.4-0.5 mg per cigarette, which would not meet the 5 mg per day, which they considered the amount required to establish and maintain addiction. Reducing nicotine in all combusted tobacco products was seen as a way to reduce the number of cigarettes smoked, to increase success in quit attempts, to reduce the likelihood of transition from experimentation to addiction and to disrupt the relationship between the drug effect and smoking.

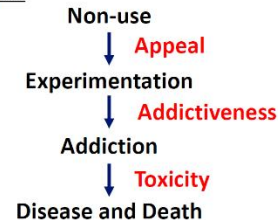
Previous attempts to reduce nicotine (e.g., 'light' cigarettes) had failed because smokers were able to overcome the ventilation used to reduce delivery (compensation) and because the widespread availability of higher nicotine cigarettes maintained the availability of these more addictive designs. To avoid these failures, it was proposed that the nicotine content in the tobacco portion of a cigarette should be reduced to prevent smokers from compensating, and to ensure that all combusted products were required to contain lower nicotine tobacco.

THE U.S. FOOD AND DRUG AUTHORITY CAN REQUIRE NICOTINE REDUCTIONS IF CERTAIN CONDITIONS ARE MET.

Since 2009, the U.S. Food and Drug Authority has had the legislative power to set tobacco product standards,²⁹ including those which reduce nicotine yields, as long as they do not reduce the yields to zero or ban cigarettes and other conventional tobacco products. In 2018, with an advance notice

Tobacco Product Harm

"Use of tobacco products is driven by their appeal or attractiveness to potential consumers and sustained by their pharmacological addiction or dependence potential."



Product Standards – Decision Points

- FDA must have convincing evidence that the product standard is appropriate for the protection of public health
- Once the standard is in place, FDA must be able to answer the question - Does a specific marketed product meet the standard?
- To answer these questions, the standard should be
 - Justifiable – is there adequate evidence?
 - Necessary – is this the least costly alternative to achieve the goal?
 - Appropriate – will it do what it claims to do?
 - Unambiguous – is the requirement clear?
 - Measurable – are there methods to measure?
 - Quantifiable – can the methods distinguish products that meet the standard from products that do not?

28 Benowitz, N.L. and Henningfield, J.E. *Establishing a nicotine threshold for addiction: the implications for tobacco regulation*. New Engl J Med 1995;331(2):123-125.

29 U.S. Government. *Family Smoking Prevention and Tobacco Control Act* <https://www.govinfo.gov/app/details/BILLS-111hr1256enr>

of proposed rulemaking,³⁰ they formally launched consultations on regulating the maximum amount of nicotine permitted in tobacco.

To establish such regulations, the FDA was required to satisfy 6 evidentiary needs.

1. Evidence for an adverse impact on population health
2. Evidence of causality or association of the item proposed to be regulated with the adverse impact
3. Evidence that the proposed (quantitative) requirement would end or reduce the adverse impact
4. Viability of technical means of meeting the requirement
5. Quantitative estimate of the public health benefit
6. Possible unintended/secondary consequences of the requirement, their costs, and benefits

The first two – those related to the harms caused by tobacco and the addictiveness of nicotine – are well established. The subsequent four evidentiary requirements have helped shape the research and thinking on nicotine reduction product standards.

EVIDENCE THAT THE PROPOSED (QUANTITATIVE) REQUIREMENT WOULD END OR REDUCE THE ADVERSE IMPACT

In 2013, Dorothy Hatsukami and colleagues conducted experiments where they switched smokers to very low nicotine or low nicotine cigarettes and found that after a period of a week their biomarkers of exposure showed that they had been exposed to fewer toxins. They also found that certain markers of satisfaction and appeal of the products were reduced: satisfaction dropped, psychological reward dropped, enjoyment of the sensation dropped, craving dropped, and aversion went up.

In 2015, the same research group conducted a randomized clinical trial looking at how different levels of nicotine reduction affected the number of cigarettes smoked per day.³¹ The results showed that over the six weeks of the study those smokers using cigarettes with the least nicotine also smoked the fewest cigarettes. Smokers did not try to compensate to maintain the amount of nicotine they received by smoking more cigarettes, and blood tests confirmed this. Those with lowest nicotine products also tried more often to quit.

Subsequent studies used a longer study period (20 weeks) and compared a gradual or immediate reduction in the amount of nicotine in cigarette tobacco.³² For all smokers who received reduced nicotine cigarettes (both gradual and immediate reduction), the amount of nicotine absorbed generally (but not always) fell. Most of those for whom the nicotine was gradually reduced did compensate in the early weeks, but by the end of the study were no longer compensating. As with the shorter studies, the levels of satisfaction and cravings fell for those smoking reduced nicotine cigarettes.

VIABILITY OF TECHNICAL MEANS OF MEETING THE REQUIREMENT

The question of the technical viability of manufacturing reduced nicotine cigarettes can be addressed through the precedents set by tobacco manufacturers who introduced low nicotine cigarettes in previous

30 United States Federal Register. *Tobacco Product Standard for Nicotine Level of Combusted Cigarettes*. Docket No. FDA-2017-N-6189 <https://www.federalregister.gov/documents/2018/03/16/2018-05345/tobacco-product-standard-for-nicotine-level-of-combusted-cigarettes>

31 Donny EC, Denlinger RL et al. *Randomized Trial of Reduced-Nicotine Standards for Cigarettes*. *N Engl J Med*. 2015 Oct;373(14):1340-9. doi: 10.1056/NEJMsa1502403.

32 Smith TT, Donny EC et al. *The Impact of Gradual and Immediate Nicotine Reduction on Subjective Cigarette Ratings*. *Nicotine TobRes*. 2019 Dec 23;21(Supplement_1):S73-S80. doi: 10.1093/ntr/ntz158.

decades. These included Quest (introduced in the 1980s, but failed to gain market share), Spectrum (a research product) and Moonlight (authorized by the FDA in 2019) brands.

QUANTITATIVE ESTIMATE OF THE PUBLIC HEALTH BENEFIT

Estimates derived from modeling exercises estimate that a policy requiring cigarettes to have very low levels of nicotine would result in 2.8 million fewer tobacco-related deaths in the USA by 2060, 16 million fewer people who initiated smoking, and a smoking prevalence of 1.4%.³³

POSSIBLE UNINTENDED/SECONDARY CONSEQUENCES OF THE REQUIREMENT, THEIR COSTS, AND BENEFITS

To assess unintended secondary consequences, researchers evaluated whether certain sub-populations would respond differently than older adults. Their conclusions were that younger adults responded more quickly (and the benefits would be greater).³⁴ A separate study looked at the impact on individuals with mental health conditions, such as depression.³⁵ Researchers found no indication that reducing nicotine would increase smoking or inhalation of chemicals or exacerbate depressive symptoms. Because smokers with mental health conditions have more difficulty in quitting and because reduced nicotine cigarettes helped reduce the dependence of this group on cigarettes, they concluded that the policy would offer particular benefits to these individuals.

ADDRESSING CONCERNS ABOUT ILLICIT TRADE

Experience with other product standards suggests that illicit trade is not going to be the big deal that the tobacco industry says it was. Concerns about illicit trade can be addressed by:³⁶

- implementing a robust track and trace system,
- prohibiting online payments
- requiring licenses for manufacturing and distribution,
- conducting regular compliance and enforcement activities.
- making smoking cessation treatments and alternative nicotine containing products, for example, e cigarettes readily available.

Ensuring that smokers can use a product that will meet their needs and can acquire it legally will reduce the likelihood that they will choose to use a product that's illegal and is no more effective than an illegal product at meeting their needs. For that reason, having alternative nicotine containing products that will deliver enough nicotine to satisfy smokers it's going to be a real key.

33 Apelberg BJ, Feirman SP et al. *Potential Public Health Effects of Reducing Nicotine Levels in Cigarettes in the United States*. N Engl J Med. 2018 May 3;378(18):1725-1733. doi: 10.1056/NEJMs1714617. Epub2018 Mar 15.

34 Cassidy RN, Tidey JW. *Age moderates smokers' subjective response to very low nicotine content cigarettes: Evidence from a randomized controlled trial*. Nicotine TobRes. 2018 Apr 28. pii: 4989923. doi: 10.1093/ntr/nty079.

35 Tidey JW, Pacek LR et al. *Effects of 6-week use of reduced-nicotine content cigarettes in smokers with and without elevated depressive symptoms*. Nicotine TobRes. 2016 Aug 3. pii: ntw199.

36 Ribisl KM, Hatsukami DK, et al. *Strategies to Reduce Illicit Trade of Regular Nicotine Tobacco Products After Introduction of a Low-Nicotine Tobacco Product Standard*. Am J Public Health. 2019 Jul;109(7):1007-1014. doi: 10.2105/AJPH.2019.305067.

ADDRESSING OTHER POSSIBLE CHALLENGES

- ***Product use noncompliance in studies to date does not give an accurate assessment of impact, especially on quitting***

One challenge to making inferences from research studies is the issue of non-compliance among research subjects. These individuals were at liberty to break the acquire regular cigarettes and although few did so, it is likely that this would have underestimated the benefits of reduced nicotine cigarettes on quitting.

- ***Cannot ethically perform a prospective study on transition from experimentation to regular use***

It is not ethical to perform a prospective preference prospective study on how reduced nicotine cigarettes would affect the transition from experimentation to regular use of cigarettes. Although it would be desirable from a scientific standpoint to compare the smoking trajectory of young people who have never smoked but who are introduced to very low nicotine cigarettes with those who take up regular cigarettes, this is a study that cannot take place. In its place, longitudinal studies like the PATH study (Population Assessment of Tobacco and Health) can provide some insight.

- ***No real-world evaluation of the proposal***

To date, no country or jurisdiction has put this measure in place, although there has been talk of doing so in New Zealand.

- ***Is nicotine intrinsic in the definition of a cigarette?***

One of the questions that come up in the United States is whether nicotine intrinsic is to the definition of a cigarette. There is a likelihood that tobacco companies will make this argument part of a legal challenge to block such a regulation.

- ***Synthetic nicotine as a substitute***

Whether synthetic nicotine could be used to legally circumvent a regulation is an issue that should be resolved in the United States by the requirement that nicotine products receive a new product review.

- ***Extinction of smoking cues will take time***

Although nicotine is the main driver of addiction, the habit of smoking involves other reinforcing behaviours and even without nicotine in a cigarette a smoker will continue to perceive that it is addressing their craving. It will take time before they begin to disconnect those two. As a result, it can be expected that the impact of a nicotine reduction product standard will not be instantaneous, and that time will be required for the extinction of smoking cues.

- ***Communicating to the public***

It will be challenging to communicate to the public that reduced nicotine cigarettes will be less addictive but nonetheless will continue to produce the toxic chemicals that cause disease.

- ***Providing support to the large number of smokers trying to quit***

The challenge of establishing systems to provide support for the large number of smokers trying to quit should be a welcome challenge for public health. Our real hope with such a regulation would be to have so many smokers that quit lines are just overwhelmed with smokers trying to quit.

CONCLUSION

- A reduced nicotine product standard must include all substitutable combusted products
- Cessation success would benefit if effective nicotine replacement and alternative substantially lower risk nicotine products for smokers were available.

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