

# THE SCIENCE BEHIND HARM REDUCTION & VAPING



WORLD  
VAPERS'  
ALLIANCE

Smoking remains one of the world's biggest preventable killers.

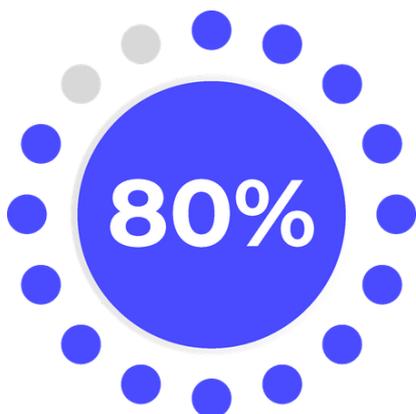
**1.2 billion**  
adults still smoke



roughly **1 in 5** worldwide

Smoking causes  
**over 8 million**  
deaths every year

More than **1 in 5**  
deaths globally in  
2020



of smoking-related  
deaths occur in low and  
middle income countries

# WHAT IS HARM REDUCTION?

Harm reduction minimises activity risks through practical solutions, like seatbelts for driving. Tobacco harm reduction (THR) allows smokers to consume nicotine without cigarette smoke's toxins via vapes, nicotine pouches, and heated tobacco products. Not risk-free, but dramatically safer than smoking, these products offer a way to decouple nicotine consumption from the most harmful aspects of smoking.



# TABLE OF CONTENTS

<b>1. Nicotine</b>	<b>4</b>
<b>2. Vaping</b>	<b>5</b>
• Vaping and Smoking Cessation	5
• Switching to Vaping: Health Effects	5
• Studies linking Vaping to Diseases	6
• Second-hand Vaping	6
• Youth Vaping	6
• Vaping and the "Gateway Theory"	7
<b>3. Nicotine pouches</b>	<b>8</b>
<b>4. Heat-not-burn</b>	<b>9</b>
<b>5. Flavours</b>	<b>10</b>
<b>6. Taxation</b>	<b>12</b>
<b>7. Success Stories in Harm Reduction</b>	<b>13</b>
• Sweden: the smoke-free leader	14
• United Kingdom: Vaping Endorsement	16
• Japan: Heat-Not-Burn Surge	17
• Greece and the Czech Republic: Emerging Leaders	18
<b>8. Conclusion: a clear path forward</b>	<b>19</b>

# NICOTINE

Nicotine is often blamed for the harms of smoking, but evidence shows it is not the main cause of smoking-related disease. The real danger comes from cigarette smoke, which produces tar, carbon monoxide, and thousands of other toxic chemicals that damage the lungs, heart, and blood vessels.

- The British National Health Service stated that: "While nicotine is the addictive substance in cigarettes, it's relatively harmless. Almost all of the harm from smoking comes from the thousands of other chemicals in tobacco smoke, many of which are toxic."
- Shirley Cramer, Chief Executive of Royal Society For Public Health, said: "Getting people onto nicotine rather than using tobacco would make a big difference to the public's health."
- Studies of biomarkers show vapers have much lower levels of harmful smoke-related chemicals than smokers, and while nicotine can briefly raise heart rate and blood pressure, without smoke's toxins it is not driving the major long-term diseases.
- People who switch from smoking to vaping improve their cardiovascular health, regardless of whether they continue using nicotine.
- Because cigarettes deliver nicotine to the brain in 7–10 seconds, they create a strong "hit" and high addiction potential, whereas slower delivery from vapes and heat-not-burn products is associated with lower dependence over time.
- Controlled quitting studies find heavy smokers often need higher nicotine strengths at the start to fully replace cigarettes and avoid dual use, then reduce levels once they are stable as exclusive vapers—suggesting very low nicotine caps would leave many smokers unsatisfied and less likely to switch completely.

# VAPING

Vaping products deliver nicotine using a battery-powered device that heats a coil to vaporise a liquid, avoiding combustion and the thousands of toxic chemicals produced by burning tobacco.

The liquid (e-liquid) usually contains four ingredients: propylene glycol, vegetable glycerin, nicotine and flavourings, all widely used in food, medicines and pharmaceuticals with a long history of safe use.

## Vaping and Smoking Cessation

Cochrane Reviews conclude with high certainty that nicotine vaping increases quit rates compared with traditional nicotine replacement therapies and behavioural support, with no evidence of serious harm from nicotine vaping.

## Switching to Vaping: Health Effects

- The UK Office for Health Improvement and Disparities' independent reports, based on over 100 studies by King's College London, find that vaping carries only a small fraction of the risks of smoking and is the most commonly used and most successful quitting aid in England.
- Public Health England has stated that vaping is around 95% less harmful than smoking, a conclusion that has been repeatedly upheld by subsequent independent reviews.
- Studies of smokers who switch completely to vaping show rapid and substantial improvements in health biomarkers: exclusive vapers have much lower exposure to harmful chemicals, with levels similar to never-smokers even if they previously smoked.
- The reductions in exposure happen within days of switching, approaching complete abstinence levels. A subsequent meta-analysis has confirmed these results, while another study suggests that switching is also linked to adopting healthier routines and exercising.

## Studies linking Vaping to Diseases

- Recent research shows many lab studies that claim harms use extreme temperatures, concentrations or puffing patterns that do not reflect real-world vaping.
- Even in these conditions, vapes still emit dramatically lower levels of harmful toxicants than cigarette smoke and expose users to metals far below recommended exposure limits.

## Second-hand Vaping

Passive vapers absorb only a small fraction of the nicotine compared to passive smokers (around a 6th), and present much lower levels of biomarkers of exposure.

## In the US, youth e-cigarette use has fallen **21,5%** in 5 years



## Youth Vaping

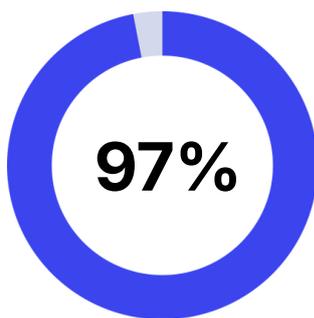
Concerns often focus on a supposed “youth vaping epidemic” and fears of a gateway into smoking, but current data point in the opposite direction.

- In the US, youth e-cigarette use has fallen from 27.5% in 2019 to 5.9% in 2024 (past-30-day use), the lowest level in a decade.
- In the UK, youth smoking is at record lows, with 11–17 ever-smoking at 9.3% (2023) and daily smoking extremely rare, while youth vaping has stabilised at around 18–20% ever tried.
- In Sweden and New Zealand, two countries with the most progressive nicotine policies, youth smoking has dropped to historic lows despite easy access to alternatives: Sweden reports only 4% of 16–29 year-olds smoking daily, and New Zealand reports under-25 smoking at about 3%, effectively creating a “smoke-free generation”.

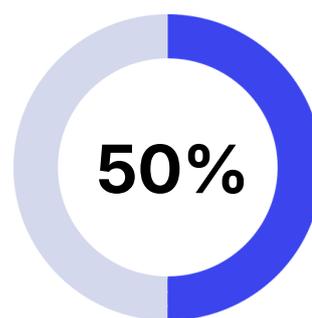
## Vaping and the “Gateway Theory”

- Systematic reviews find no demonstrated causal link from vaping to smoking initiation, concluding that “a true gateway effect in youths has not yet been demonstrated”.
- Instead, personal and social factors—such as dissatisfaction, anxiety, parental smoking, household income and personality traits—appear to drive both smoking and vaping.
- Most youth who vape have either tried smoking first or are merely experimenting without progressing to regular cigarette use.
- The vast majority of vapers are adult smokers trying to switch or former smokers who have successfully quit, with EU data showing that 97% of vapers are former smokers, and 50% of them stating that vapes helped them quit or reduce smoking. Similarly, UK data shows 95% of current vapers are former smokers or dual users. US data confirms that around 70% of adult vapers were smokers before starting vaping.

## EU data



**of vapers are former smokers**



**of them stating that vapes helped them quit or reduce smoking**

# NICOTINE POUCHES

Nicotine pouches are small, discreet sachets containing nicotine but no tobacco, typically made with pharmaceutical-grade nicotine, plant fibres, and food-grade flavourings and sweeteners. Users place them between lip and gum for 5–30 minutes, where they release nicotine slowly through the oral mucosa without combustion, smoke, vapour, or spitting.

- Pouches have been shown to sit at the very bottom of the toxicant and risk spectrum among oral nicotine products, with levels of harmful and potentially harmful constituents far lower than cigarettes and comparable to NRTs.
- They can deliver enough nicotine to satisfy smokers, supporting their use as a smoking-cessation aid.
- They release nicotine more slowly than cigarettes and similarly to other smokeless products, which reduces their addictive potential compared with smoking.
- Biomarker studies find exclusive pouch users have much lower exposure to cigarette-related alkaloids and metals than smokers.
- Oral health research shows improvements in gum health when people switch from cigarettes to pouches.

Population modelling suggests that widespread switching from smoking to nicotine pouches in the US could prevent up to 600,000 deaths by 2050.

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# HEAT-NOT-BURN

Heat-not-burn (HnB) products use a battery-powered device to heat specially designed tobacco sticks at much lower temperatures than cigarettes, creating a nicotine-containing aerosol without burning the tobacco. Cigarettes burn at roughly 900 °C, while HnB devices operate around 350 °C, avoiding combustion and therefore greatly reducing tar, carbon monoxide, and many other toxic by-products of smoke.

- HnB products cut harmful and potentially harmful constituents by at least about two-thirds and particulate matter by around three-quarters compared with cigarettes.
- Although HnB emissions still contain some harmful chemicals, their levels are substantially lower than in cigarette smoke.
- Smokers who switch from cigarettes to HnB products see improvements in health biomarkers and other health outcomes.

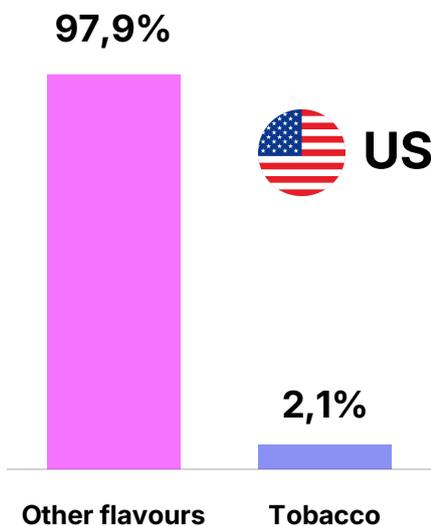
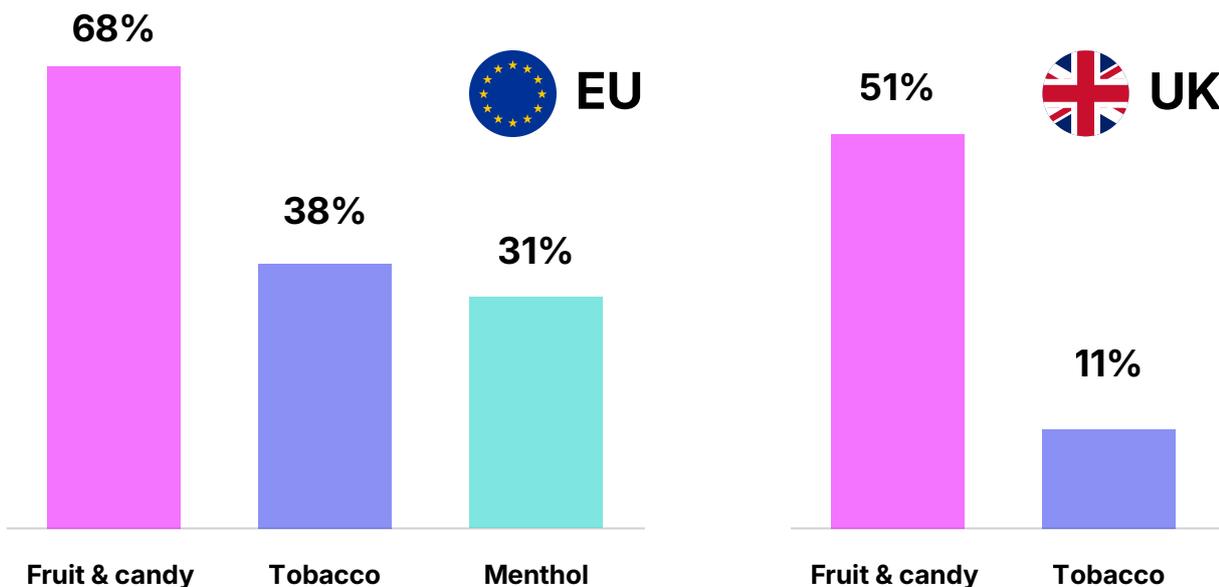
Switching completely from cigarettes to HnB products significantly reduces both the formation of and exposure to harmful chemicals



# FLAVOURS

Survey data shows that adult vapers overwhelmingly prefer non-tobacco flavours, especially fruit and sweet options, rather than tobacco-flavoured e-liquids.

- In the EU, adult vapers primarily use non-tobacco flavours: fruit and candy flavours are the most popular among vapers (68%), followed by tobacco (38%), and menthol (31%).
- In the UK, fruit is the leading choice at 51%, while tobacco is rarely the main choice (11%).
- In the US, only 2.1% of vapers report tobacco as their exclusive flavour, while the rest consume different flavours.



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*Adult vapers strongly prefer **non-tobacco flavours** because they break the sensory link with cigarette smoke*

Adult vapers strongly prefer non-tobacco flavours because they break the sensory link with cigarette smoke, reduce cravings for the taste of tobacco, and make vaping more enjoyable and sustainable.

- Adults using flavoured e-cigarettes have 230% higher odds of quitting than those using non-flavoured or tobacco flavours.
- Smokers switching to non-tobacco flavours (especially fruit/dessert) show greater reductions in cigarette use and higher rates of complete cessation.
- Flavour users are substantially more likely to report vaping as helpful for quitting than tobacco flavour users.
- According to the EU's SCHEER report: "To date, there is no specific data that specific flavourings used in the EU pose health risks for electronic cigarette users following repeated exposure."

When flavours are restricted or banned, a large share of users either go back to smoking or turn to unregulated sources to keep using the flavours that helped them quit in the first place.

- Almost 5 in 10 vapers would either return to cigarettes or seek flavoured products on the black market if they get banned.
- Where flavour bans have been tried, many vapers kept using flavours through workarounds: in Estonia, around 60% of vapers continued using flavours by mixing their own liquids or buying them illicitly; in Denmark, over 90% of vapers say banned flavours are easy to obtain. Flavour bans in US jurisdictions such as San Francisco and Massachusetts were followed by increases in youth or overall cigarette smoking and higher cigarette sales.

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*Adults using flavoured e-cigarettes have **230% higher** odds of quitting than those using non-flavoured or tobacco flavours*



# TAXATION

Risk-proportionate taxation aligns prices with relative health risks, making safer alternatives cheaper than cigarettes to incentivise switching. Equalising taxes across products instead sustains cigarette use, as smokers won't switch to equivalently priced alternatives as rapidly.

- Vaping products have a high price elasticity, meaning that when prices increase, their use often decreases, yet this happens at the expense of increasing smoking.
- This effect is particularly powerful among young users, with research indicating that the unintended consequences of taxing vaping products may outweigh any public health benefits.

A Yale analysis of US state taxes found a \$1/ml e-cigarette tax increase reduced daily vaping by 2.5 percentage points but increased recent smoking by 3.7 points among young adults. China's 2022 30% vaping tax cut vaping short-term, but most of the users who quit switched to smoking.



# SUCCESS STORIES IN HARM REDUCTION

Harm reduction policies embracing vaping and alternatives have driven unprecedented smoking declines in select nations. These cases demonstrate practical, evidence-based strategies that are already effective in accelerating progress toward smoke-free goals.



# SWEDEN: The smoke-free leader

Sweden stands as the global pioneer in tobacco harm reduction, achieving official "smoke-free" status ahead of schedule through widespread adoption of nicotine pouches and other nicotine alternatives.

By 2024, daily smoking among Swedish-born adults dropped to just 4.5%, below the WHO's 5% smoke-free benchmark, while overall adult rates reached 5.3%, making Sweden the first nation to hit this milestone 16 years earlier than the EU objective.

This triumph traces back decades to Sweden's unique policy allowing snus: a moist, oral tobacco pouch. Snus later developed into the innovative, tobacco-free nicotine pouches that have gained massive popularity today. Their use now exceeds smoking, decoupling nicotine satisfaction from deadly smoke: while nicotine consumption mirrors Europe's, Sweden boasts 41% fewer cancers and 44% lower tobacco mortality than EU averages.

Recent data reinforces the model. Sweden's Public Health Agency reports nicotine pouches and e-cigarettes surging, correlating with sustained declines in smoking, with even immigrants' rates falling post-relocation.

Smoke Free Sweden's November 2024 report, "Missing the Target," credits accessible, affordable alternatives for outpacing the 2025 goal, positioning Sweden as a blueprint: high cigarette taxes paired with proportional rules for safer options.



# NEW ZEALAND: Informed Access

New Zealand exemplifies pragmatic harm reduction through the provision of information and promotion of safer alternatives, slashing its smoking rates faster than most countries. Daily smoking rates plateaued at 6.8% in the 2024/25 New Zealand Health Survey, down from 16.4% in 2011/12, but remain on track to be under 5%, with under-25s already smoke-free at ~3%.

Pivotal to this triumph was early endorsement of vaping as a cessation tool via the Ministry of Health's Vaping Facts site, offering facts, helplines, and support. This evidence-based messaging positioned vaping as "far less harmful than smoking," integrating it into quit programs with free starter kits distributed to over 3,400 smokers by 2025.

Youth trends bolster the story: Youth vaping fell from 2022 peaks, while smoking stays negligible, per ASH's 30,000-student survey. Māori and Pacific rates dropped significantly over five years through targeted efforts.

New Zealand proves that transparent communication and regulated alternatives drive equitable progress.



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# UNITED KINGDOM: Vaping Endorsement

The United Kingdom is the clearest example of a major country embedding vaping at the heart of its national tobacco control strategy, with smoking now at record lows and vapers outnumbering smokers for the first time.

In 2023, the UK government launched the world-first national "Swap to Stop" scheme, pledging up to one million free vape starter kits for adult smokers in England. Local roll-outs show the impact: in Dorset, for example, nearly 14,800 free kits had been distributed by early 2025, with over 3,500 smokers recorded as having switched to vaping after just four weeks of support. These initiatives are embedded in a wider ambition to reduce smoking prevalence to 5% or less by 2030, using vaping as the main tool rather than relying solely on prohibition or taxation.

As a result, in 2024, only 10.6% of adults in the UK were current smokers, down from 20.2% in 2011, while about 10% of adults used e-cigarettes daily or occasionally, according to official data. This long-term decline has been repeatedly linked by official reviews to the availability and uptake of vaping products as a quitting aid.

Together, the UK's evidence-based communication, institutional endorsement, and large-scale access programmes make it a flagship harm reduction success story that other countries can adapt to their own contexts.



# JAPAN:

## Heat-Not-Burn Surge

Japan showcases the transformative power of heat-not-burn (HnBs) in accelerating smoking decline, with cigarette sales plummeting over 50% since their introduction despite a stable total nicotine market. By 2023 exclusive cigarette smoking hit a record low of ~10% among adults. Smoking prevalence fell from 21% to 16% in under a decade, placing Japan among harm reduction leaders.

The story began with the launch of HnBs in the country in 2014. Cigarette sales, previously declining ~1.8% annually, accelerated to 9.5% yearly drops post-launch. Independent analyses confirm HTPs displaced cigarettes: a 2025 Tobacco Control study found cigarette-only use dropped sharply as HTPs rose, with dual users often cutting cigarette consumption by two-thirds.

Health and economic projections amplify the impact. A 2024 Healthcare study estimates half of smokers switching to HTPs could avert 12 million tobacco-related illnesses by 2060, saving Japan's healthcare system ¥454 billion (~\$3 billion) annually.

Despite vaping bans, Japan's permissive HnB regulations fueled adoption, proving industry innovation and pragmatic policy can shift millions from combustion without overall nicotine growth. This model offers lessons for scaling non-combustible alternatives globally.

# GREECE AND THE CZECH REPUBLIC: Emerging Leaders

Czechia and Greece earned 2025 World Vapers Alliance "Champions of Change" awards for slashing smoking rates - 23% and 14% respectively over three years - via pragmatic policies favouring vaping and alternatives over prohibition.

Czechia emerged as a prominent harm reduction advocate and led EU reductions in smoking, falling from ~24% to 18.5% (2021-2024), per the Eurobarometer, as vaping grew proportionally. It all started in 2019, when the Czech government explicitly incorporated harm reduction as a strategic pillar in its national strategy. Later on, Czechia adopted a sensible regulation of vaping, ensuring accessibility and availability of different types of flavoured devices and deciding not to tax them, while taxing HnBs at a substantially lower rate than cigarettes. These regulations enabled alternatives to displace cigarettes.

From Europe's highest rates (~42% in 2021), Greece dropped to 36% by 2024 via its National Action Plan integrating harm reduction as the fourth pillar. Heat-not-burn use doubled alongside declines in smoking, backed by risk communication laws empowering smokers with science on safer options. These progress examples within the EU underscore balanced strategies' power.



# CONCLUSION:

## A clear path forward

Vaping, nicotine pouches, and heat-not-burn products represent proven, science-backed tools that can accelerate the global journey toward smoke-free societies. Countries like Sweden, the UK, New Zealand, Japan, Czechia, and Greece demonstrate that pragmatic harm reduction policies, risk-proportionate regulation, clear communication of relative risks, and sustained adult access drive faster smoking declines than prohibition alone.

When smokers have affordable, appealing alternatives backed by transparent health messaging, they switch in large numbers, reducing disease and death while youth uptake remains minimal.

The path is clear. Nations embracing tobacco harm reduction achieve results that traditional approaches cannot match. With 1.2 billion smokers worldwide and global targets slipping, the time for evidence-based policy is now.



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