

Safer Nicotine Delivery Products



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Disclosures

Pharmaceutical industry: consultancy (2014; 2017)

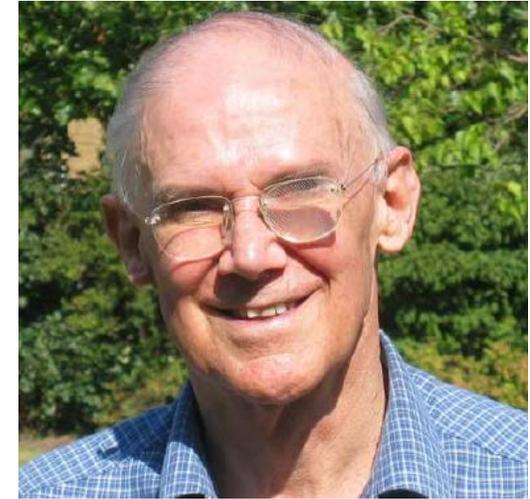
Law/Litigation: expert witness/consultant (2014)

E-cigarette companies: research grants, honorarium (2010-2013)

Tobacco Industry: no funding

Smoking kills

- Smoking kills ~ 8m people a year worldwide; one person every six seconds
- WHO: 1 billion lives lost to smoking by the end of the century
- Almost all the harms come from combustion
- Nicotine, whilst addictive, is relatively safe



**Prof Michael Russell:
“People smoke for
nicotine but they die from
the tar” (1976)**

Russell MJ. (1976). Low-tar medium nicotine cigarettes: a new approach to safer smoking. *BMJ* 1:1430–3

Quitting is difficult



Over time, smoking becomes a deeply entrenched habit. Smoking is repeatedly rewarded and nicotine abstinence is punished.

Over two-thirds of smokers want to stop. Around a third make a quit attempt each year. Around 95% will fail.

What more can be done?

Tobacco Harm Reduction: Providing safer ways of delivering nicotine *without the harmful effects of burning tobacco*

Reduced-risk consumer nicotine market

Pure nicotine based

Tobacco based

Heated aerosol



Unheated



Slide courtesy of Clive Bates

Items are not shown to scale



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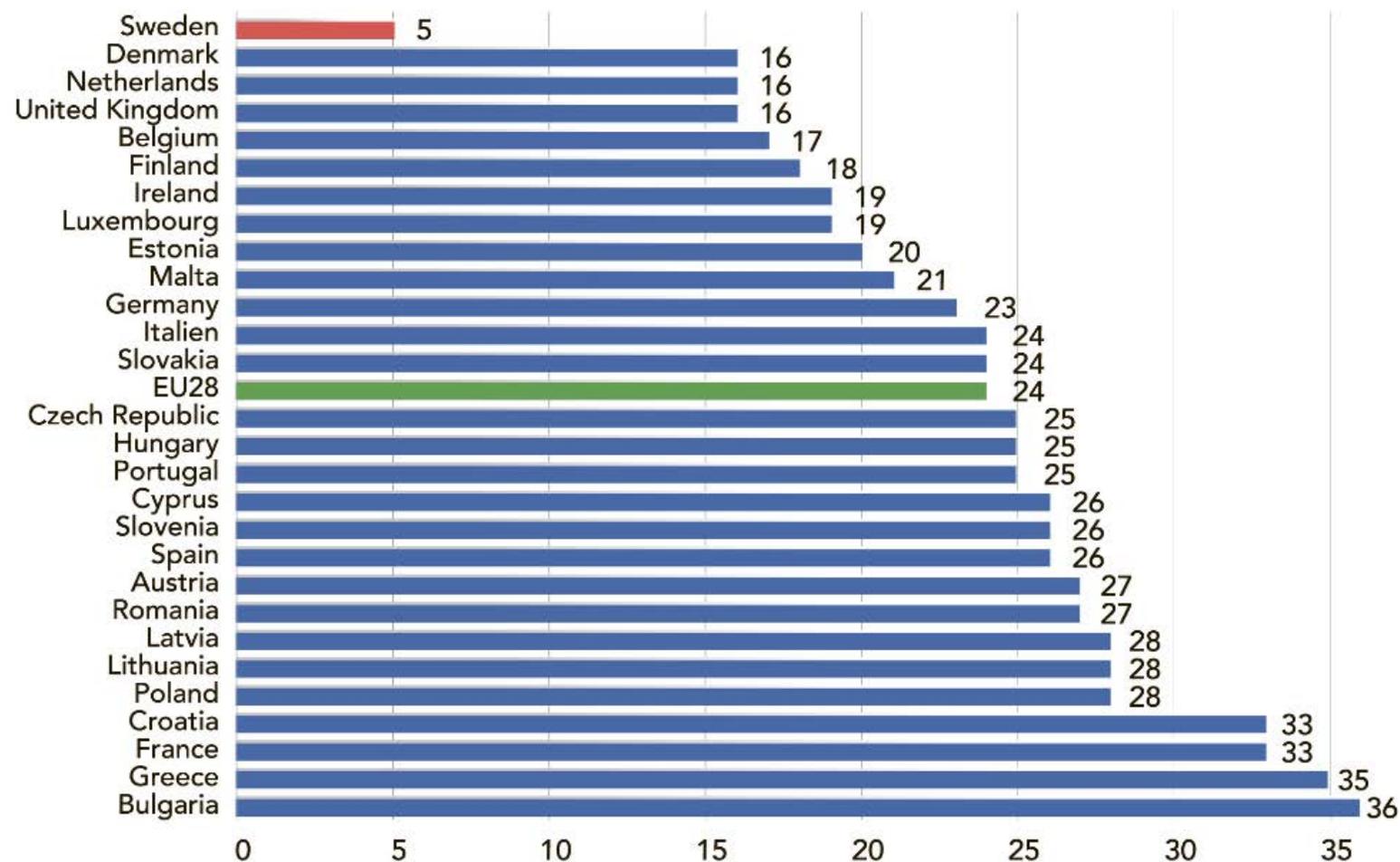
Clear links between the rise in reduced risk nicotine products and decline in smoking



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Prevalence of daily smoking in the EU



Data source: Eurobarometer 458, May 2017 (TableQB4aT2)

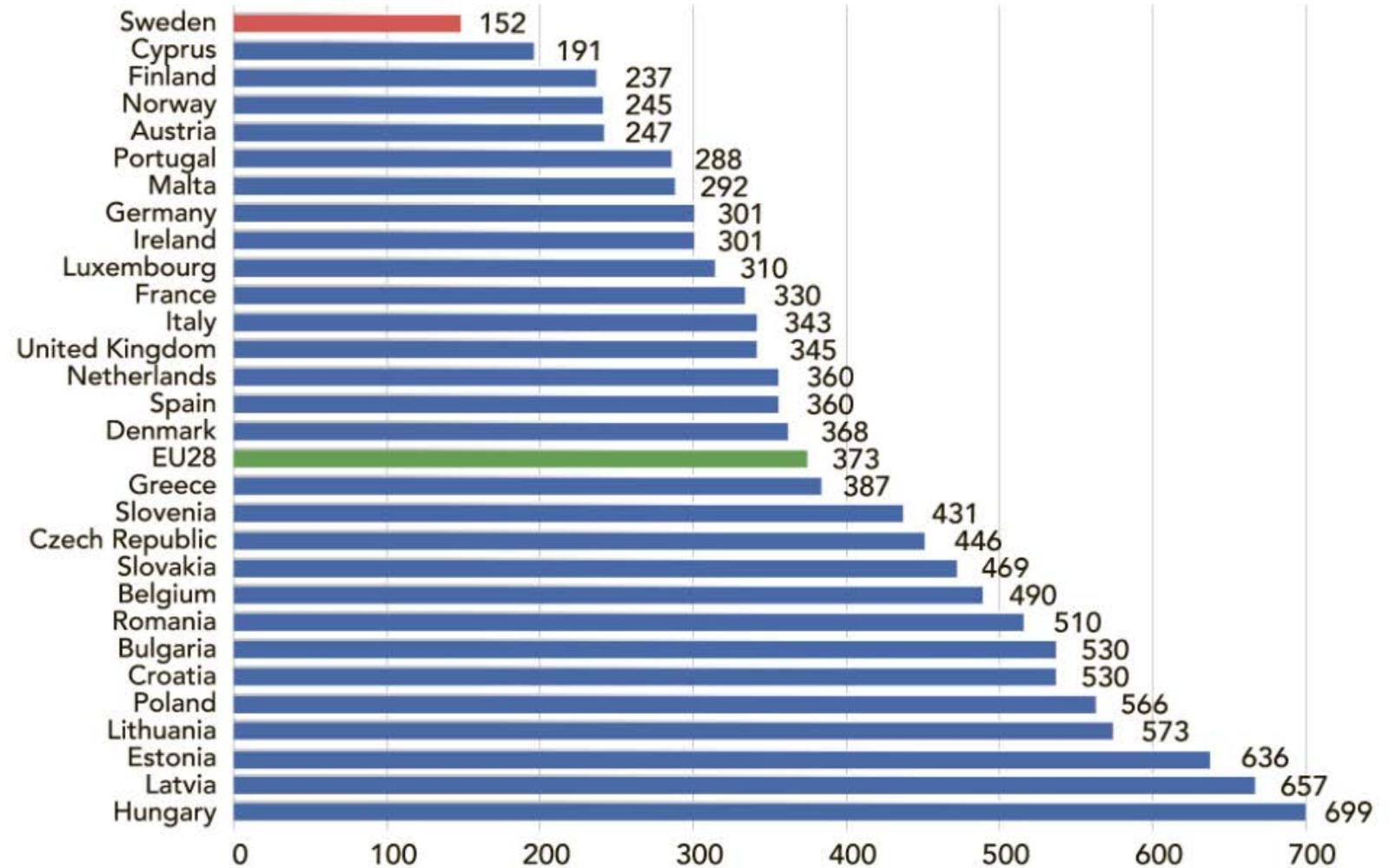
Chart reproduced from: Lars Ramström, poster, Global Forum on Nicotine 2017

Graph taken from:

<https://gsthr.org/graphics>

Smoking related death rates

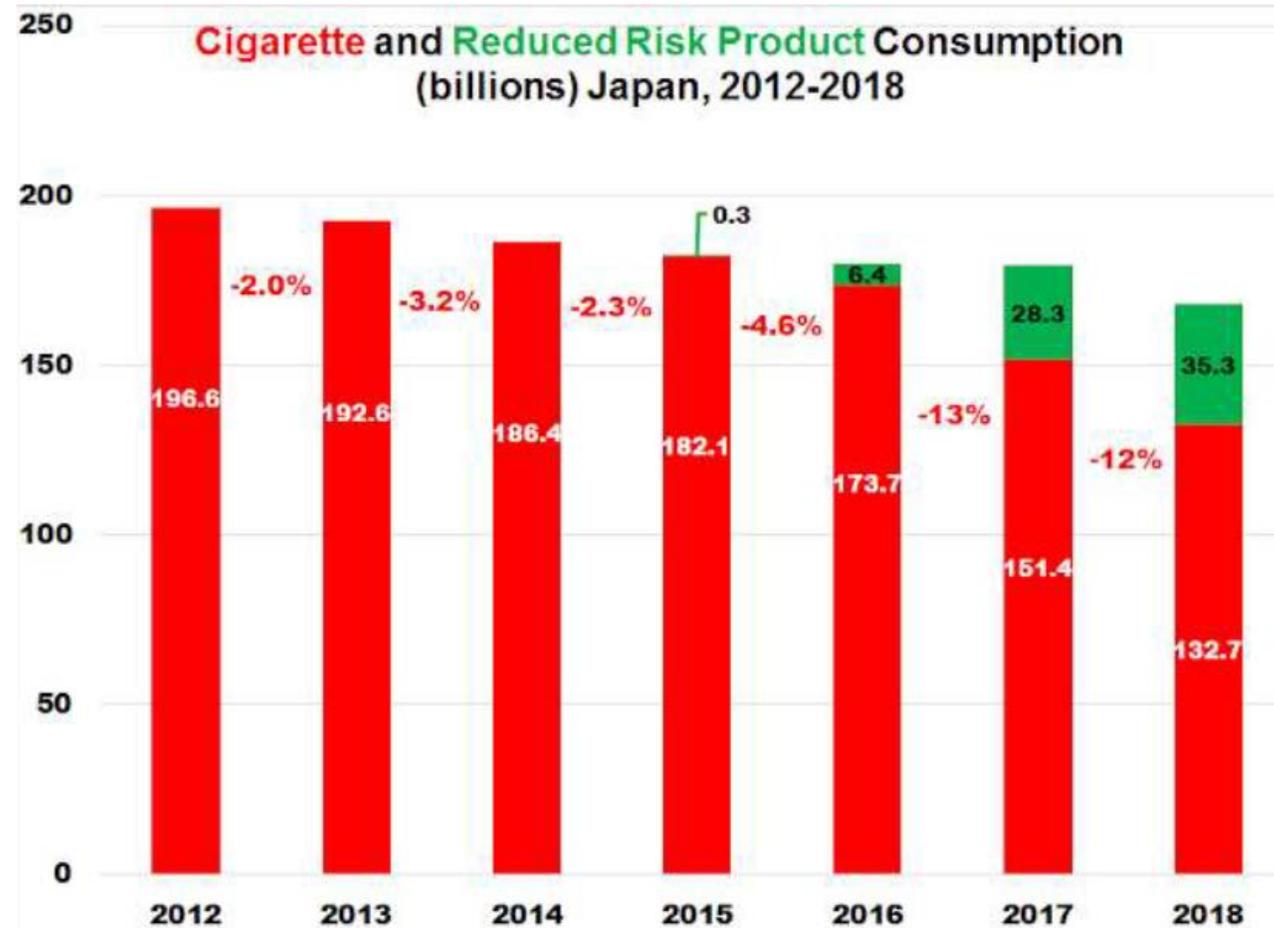
Death rate per 100,000 attributable to tobacco, all causes of death, men 30 years and older



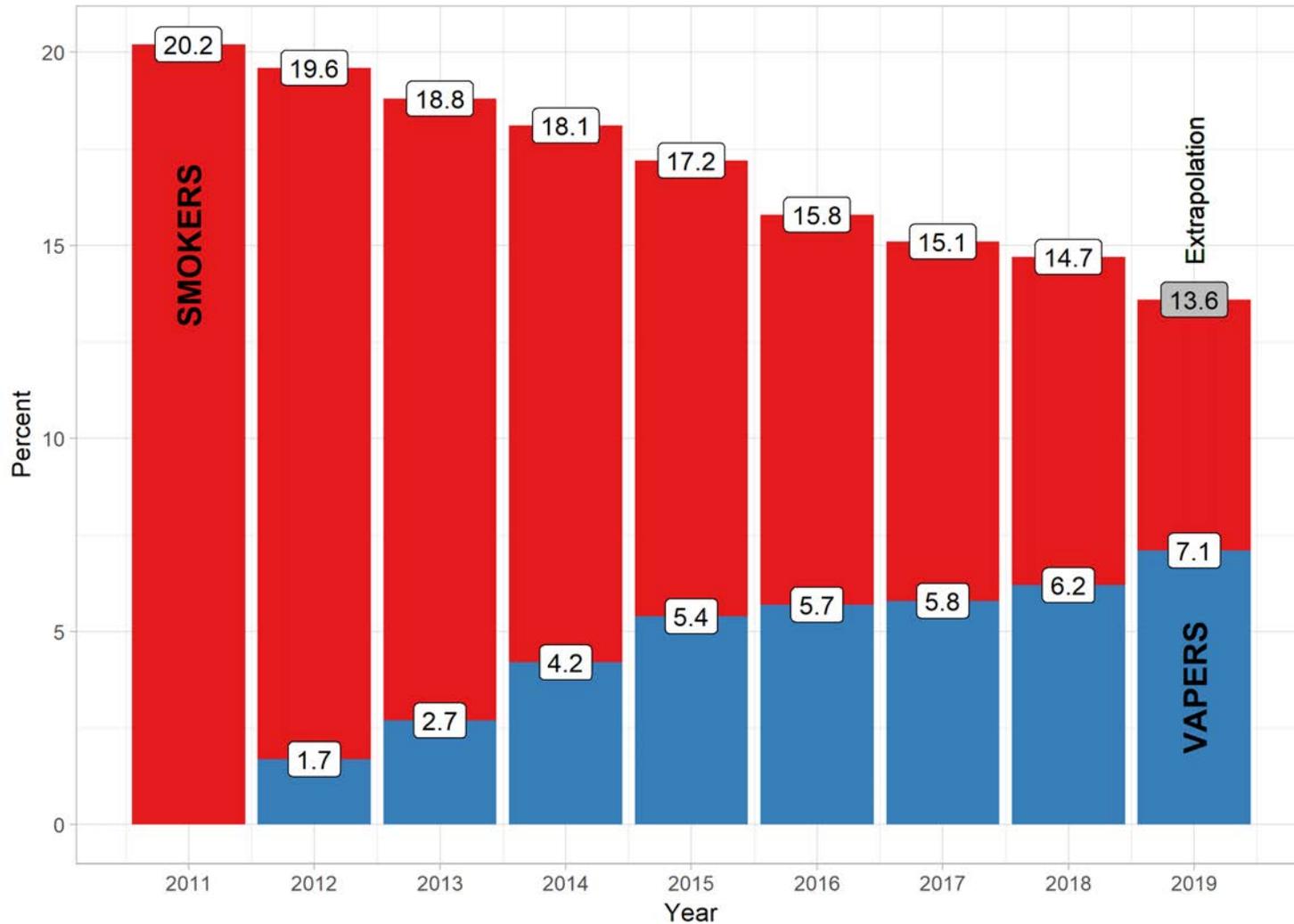
Graph taken from:
<https://gsthr.org/graphics>

Data source: Lars Ramström, poster, Global Forum on Nicotine 2017. Data source World Health Organization. WHO Global Report: Mortality Attributable to Tobacco; WHO: Geneva, Switzerland, 2012; ISBN 978-92-4156443-4

Cigarette sales fall by one-third in Japan



Graph taken from Clive Bates, SRNT-E Oslo, Sept. 2019



Trends in smoking (UK) and e-cigarette use (GB) 2012-2019

VAPERS: e-cigarette users
SMOKERS: cigarette users

Data sources:

Office for National Statistics. (2019). Adult smoking habits in the UK: 2018. *ONS Statistical Bulletin*, 1–16.

Action on Smoking and Health (ASH). (2019). Use of e-cigarettes among young people in Great Britain. *Action on Smoking and Health Website*, (September), 1–14.

Slide courtesy of Prof Gerry Stimson



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E-cigarettes for smoking cessation

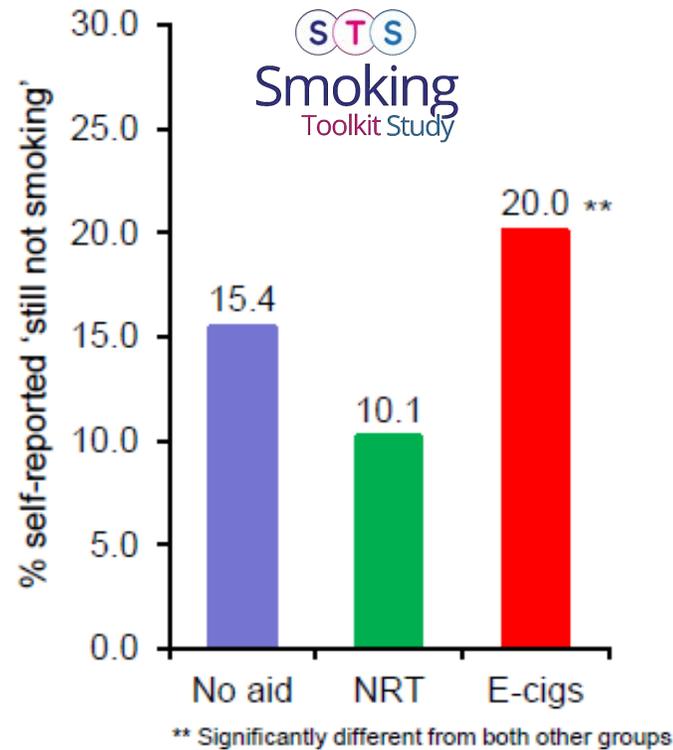


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The substantial increase in e-cigarette use among US adult smokers was associated with a statistically significant **increase in the smoking cessation rate** at the population level.

Zhu et al. (2017). E-cigarette use and associated changes in population smoking cessation: evidence from US current population surveys. *BMJ*: 358, j3262.



Brown et al. (2014). Real world effectiveness of e-cigarettes when used to aid smoking cessation: a cross-sectional population study. *Addiction*, 109(9):1531-40

E-cigarette users were more likely not to be smoking than those using NRT or those using nothing

Evidence from the TEC RCT in England

886 smokers seeking help to quit, randomised to:

- EC starter pack with 18mg tobacco e-liquid (2nd generation EC); or
- NRT (single or combination, of their choice)

Both groups provided with weekly behavioural support within the SSS

	EC (N=438)	NRT (N=446)	RR (95% CI)
% abstinent for 52 weeks	18.1%	9.9%	1.83 (1.30 to 2.58)

Hajek et al. (2019). A randomized trial of e-cigarettes versus nicotine-replacement therapy. *New England Journal of Medicine*, 380(7), 629-637.

Science

Science

E-cigarettes are no safer than smoking tobacco, scientists warn



Vaping may raise cancer and heart disease risk, study suggests

Nicotine in e-cigarettes may convert into DNA-damaging chemicals, mouse trial indicates, but critics say results are irrelevant to humans



E-cigarettes: Effects on health



M News UK News Smoking

Vaping could be worse for your health than cigarette smoking research claims

Flavourings in e-cigarettes harm the lungs by triggering inflammation, scientists have warned



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E-cigarette vapour has NO toxic effect and is as safe as AIR, shock study claims

Toxicants/carcinogens in the aerosol

Table 4 Comparison of toxins levels between conventional and electronic cigarettes

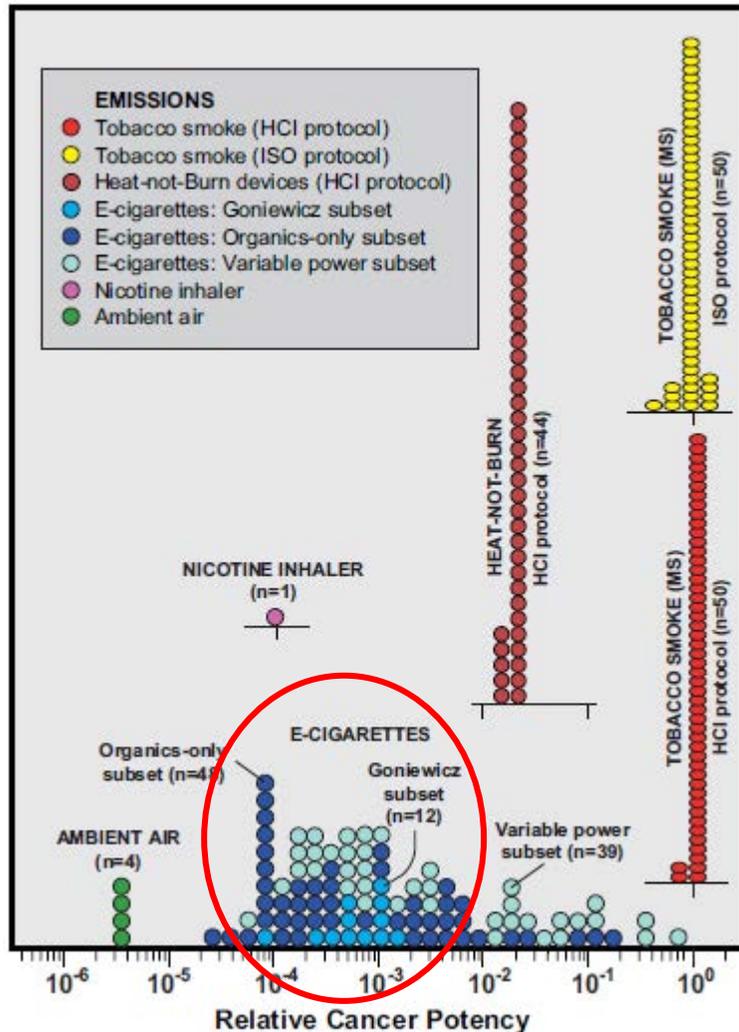
Toxic compound	Conventional cigarette (μg in mainstream smoke) ³⁵	Electronic cigarette (μg per 15 puffs)	Average ratio (conventional vs electronic cigarette)
Formaldehyde	1.6–52	0.20–5.61	9
Acetaldehyde	52–140	0.11–1.36	450
Acrolein	2.4–62	0.07–4.19	15
Toluene	8.3–70	0.02–0.63	120
NNN	0.005–0.19	0.00008–0.00043	380
NNK	0.012–0.11	0.00011–0.00283	40

NNK, N'-nitrosonorcotine (NNN) and 4-(methylnitrosoamino)-1-(3-pyridyl)-1-butanone; NNN, N'-nitrosonorcotine.

We found that the e-cigarette vapours contained some toxic substances. The levels of the toxicants were 9–450 times lower than in cigarette smoke and were, in many cases, comparable with trace amounts found in the reference product.

Goniewicz, M. et al. Levels of selected carcinogens and toxicants in vapour from electronic cigarettes. Tob Control. 2014 Mar;23(2):133–9.

Toxicants/carcinogens in the aerosol

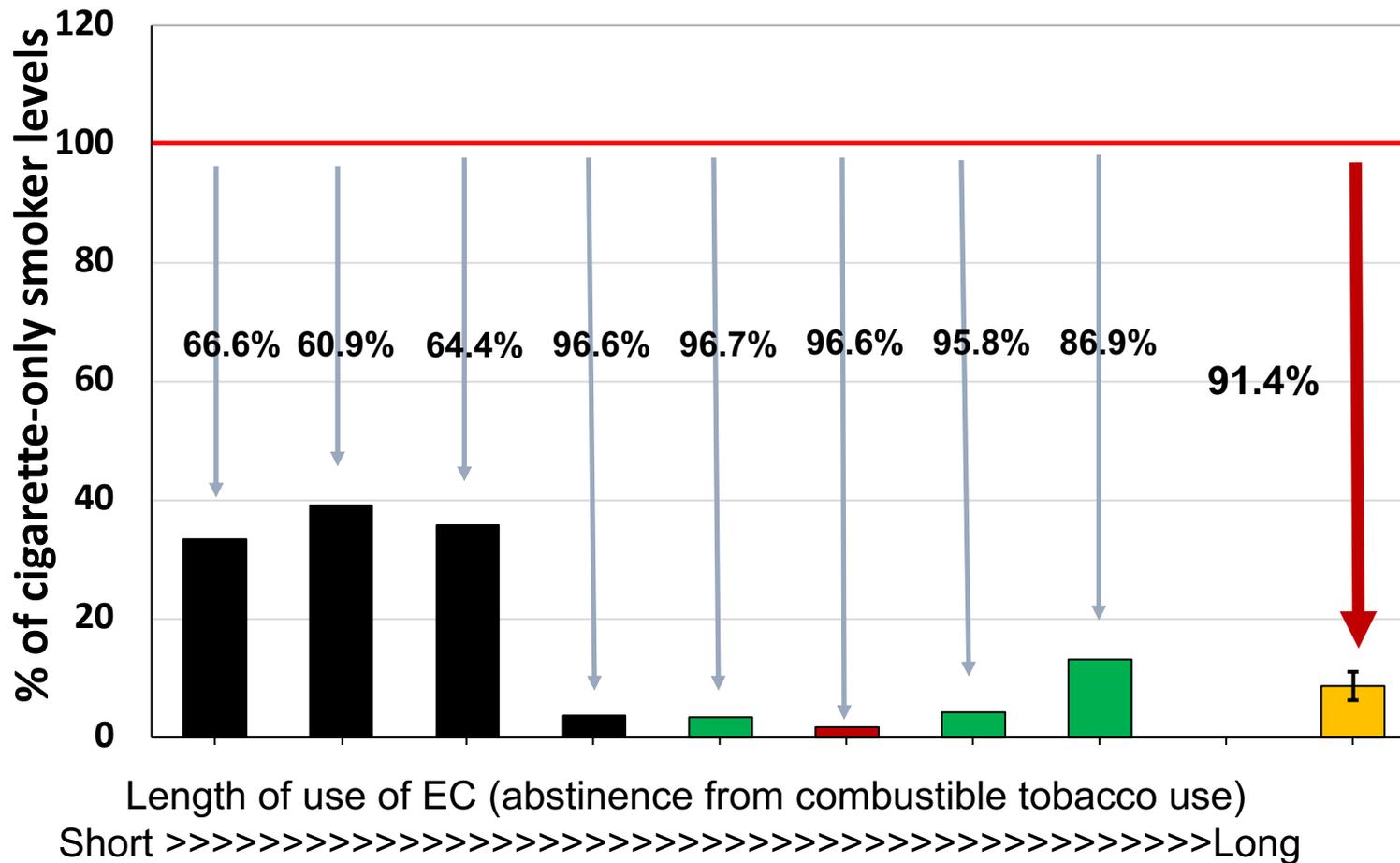


The aerosols form a spectrum of cancer potencies spanning five orders of magnitude from uncontaminated air to tobacco smoke. E-cigarette emissions span most of this range with the **preponderance of products having potencies <1% of tobacco smoke**

Stephens, TC. Comparing the cancer potencies of emissions from vapourised nicotine products including e-cigarettes with those of tobacco smoke. *Tob Control*. 2018; 27: 10-17.

Effects of E-cigarette use on NNAL

- 10 published papers (8 studies) (2015-2017) with 658 participants

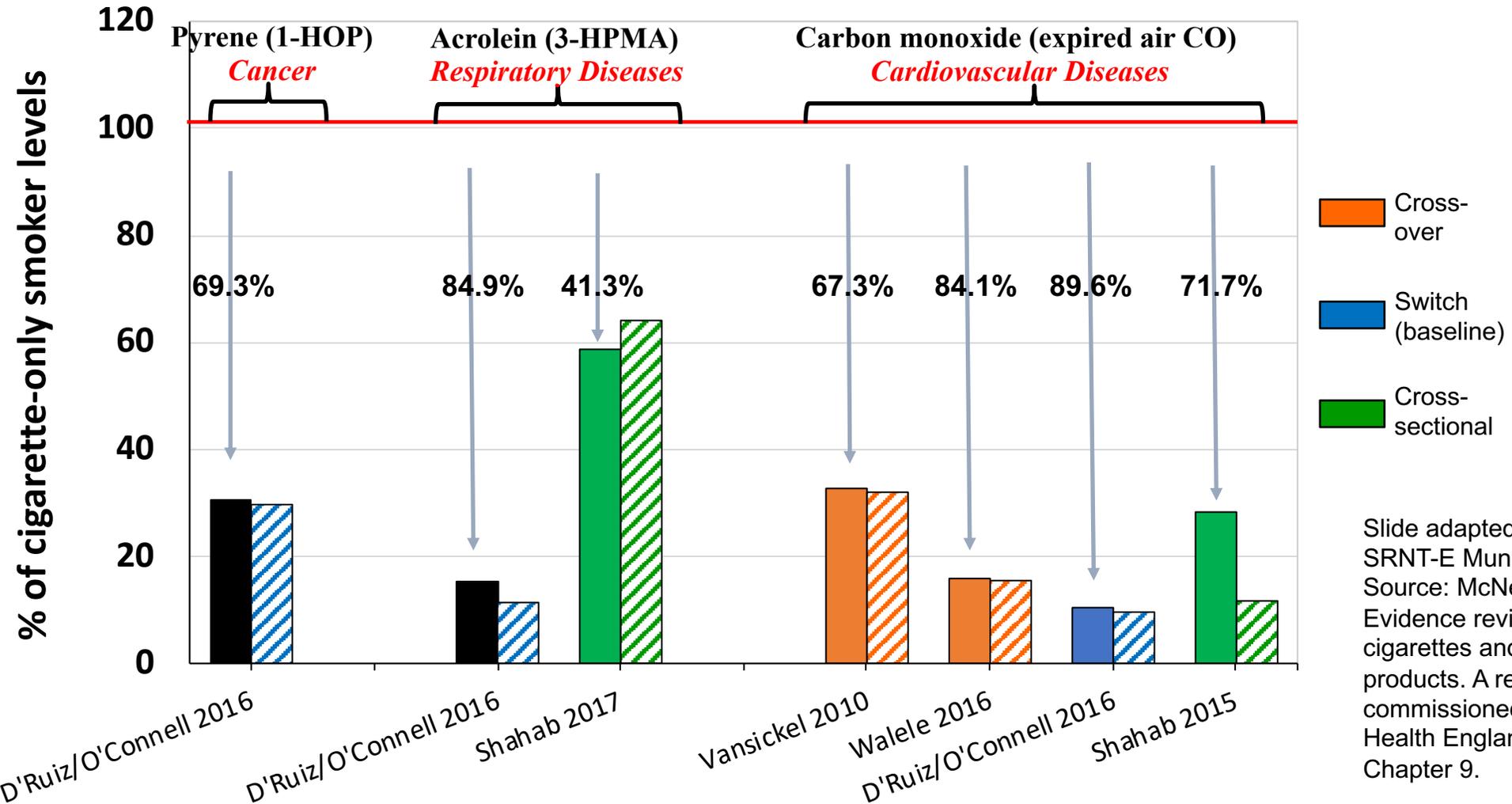


- Randomised Controlled Trial
- Switch (baseline)
- Cross-sectional
- Historic Comparison

Slide adapted from Shahab, SRNT-E Munich (2018). Source: McNeill et al. (2018). Evidence review of e-cigarettes and heated tobacco products. A report commissioned by Public Health England (PHE) Chapter 9.

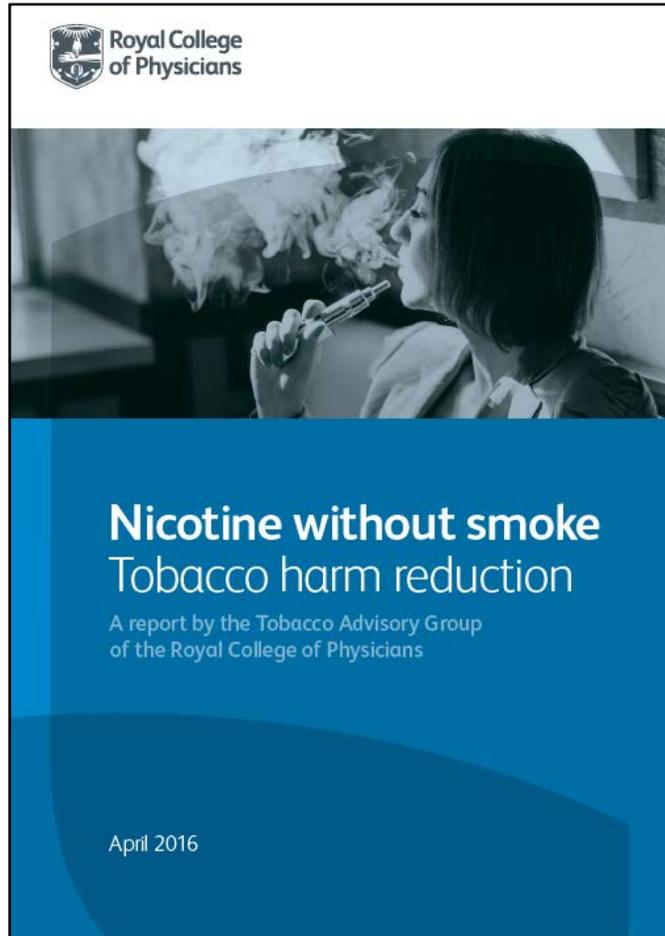
Effect of E-cigarette use on other biomarkers

Generally see similar levels to non-smokers



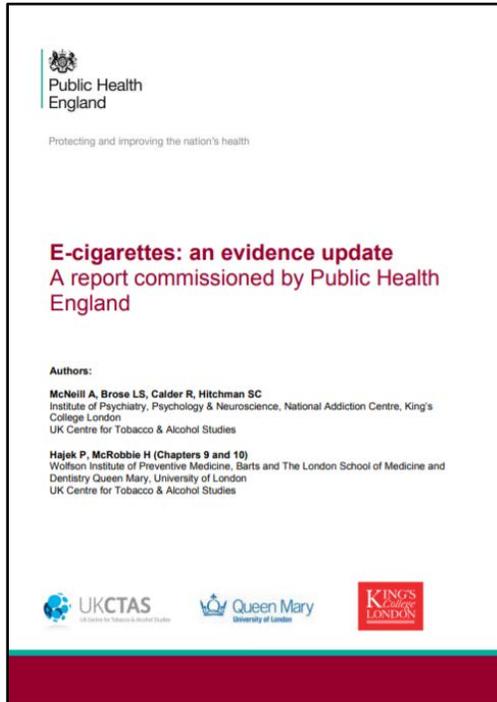
Slide adapted from Shahab, SRNT-E Munich (2018).
 Source: McNeill et al. (2018).
 Evidence review of e-cigarettes and heated tobacco products. A report commissioned by Public Health England (PHE) Chapter 9.

Royal College of Physicians



"Although it is not possible to precisely quantify the long-term health risks associated with e-cigarettes, the available data suggest that they are **unlikely to exceed 5% of those associated with smoked tobacco products,** and may well **be substantially lower** than this figure".

Public Health England



PHE, 2019

“Our new review reinforces the finding that vaping is a fraction of the risk of smoking, at least 95% less harmful, and of negligible risk to bystanders.”

“We should be encouraging smokers to switch.”

Public Health England: Vaping in England: an evidence update February 2019

<https://www.gov.uk/government/publications/vaping-in-england-an-evidence-update-february-2019/vaping-in-england-evidence-update-summary-february-2019>

<https://publichealthmatters.blog.gov.uk/2019/02/27/e-cigarette-evidence-update-patterns-and-use-in-adults-and-young-people/>



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E-cigarettes around 95% less harmful than tobacco estimates landmark review

19th August 2015

Safer cannabis delivery methods?

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Cite This: *ACS Omega* 2019, 4, 16111–16120 <http://pubs.acs.org/journal/acsofd>

Aerosol Gas-Phase Components from Cannabis E-Cigarettes and Dabbing: Mechanistic Insight and Quantitative Risk Analysis

Jiries Meehan-Atrash,[†] Wentai Luo,^{†,‡} Kevin J. McWhirter,[‡] and Robert M. Strongin^{*,†} 

[†]Department of Chemistry and [‡]Department of Civil and Environmental Engineering, Portland State University, Portland, Oregon 97207-0751, United States

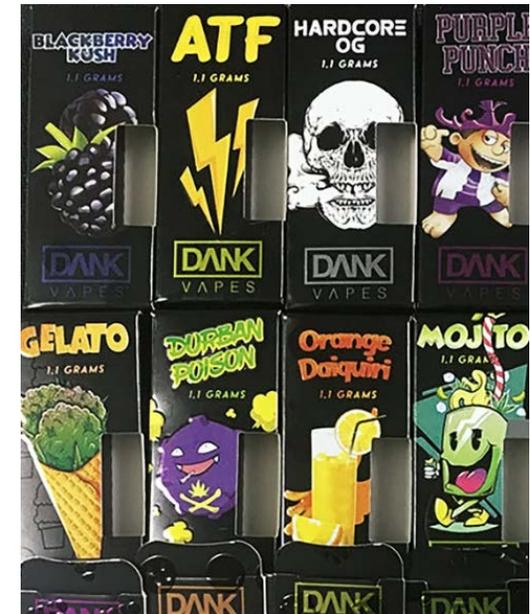
“Overall, gas-phase aerosol products had significantly lower values [of hazardous compounds] in dabbing and vaporizing compared to cannabis smoking...”



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Black market THC oil vaping cartridges



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AUGUST 28, 2019 4:25PM ET

Counterfeit Weed Vape Cartridges Are Everywhere — and They're Making People Sick



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Teen Has Lungs of 'a 70-year-old'
from Vaping for Over a Year
'Every Parent's Worst Nightmare'

SMOKE SCREEN Vaping death toll hits eight as mysterious
lung disease outbreak surges to 530 cases



"CDC and @US...
the cause...
assoc...
pro...
all ca...
cigare...
vaping, products." 10.10.19

Inaccurate reporting = unintended consequences
Not warning people to avoid the risky products = more lung poisonings
Advice to avoid nicotine vaping products = more smoking related disease

TIME TO QUIT? Vaping death toll hits 11
- as Californians told to quit e-
cigarettes over lung disease fears





KEEP CALM
COMMUNICATE
ACCURATELY
USE REDUCED RISK,
LICENCED NICOTINE
PRODUCTS
AND
DON'T SMOKE



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Thank you!



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