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E-cigarettes and the impact on insurance

Dr John Schoonbee
Global Chief Medical Officer
Swiss Re

Swiss Re

Agenda

- Landscape
- Concerns
- Quitting
- Beyond vaping
- Where to from here?

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Section

- **Landscape**
- Concerns
- Quitting
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Smoking is bad!

15.1% of adults smoke

- Worldwide, tobacco use causes more than 7 million deaths per year.
- Cigarette smoking is responsible for more than 480,000 deaths per year in the United States, 96,000 deaths in the UK.
- On average, smokers die 10 years earlier than nonsmokers.
- Smoking increases the risk of 14 cancers, CAD, CVD.
- Duration and amount do matter.

- In 2017, $9.36 billion was spent on advertising and promotion of cigarettes and smokeless tobacco combined—more than $25 million every day → >$1 million every hour.

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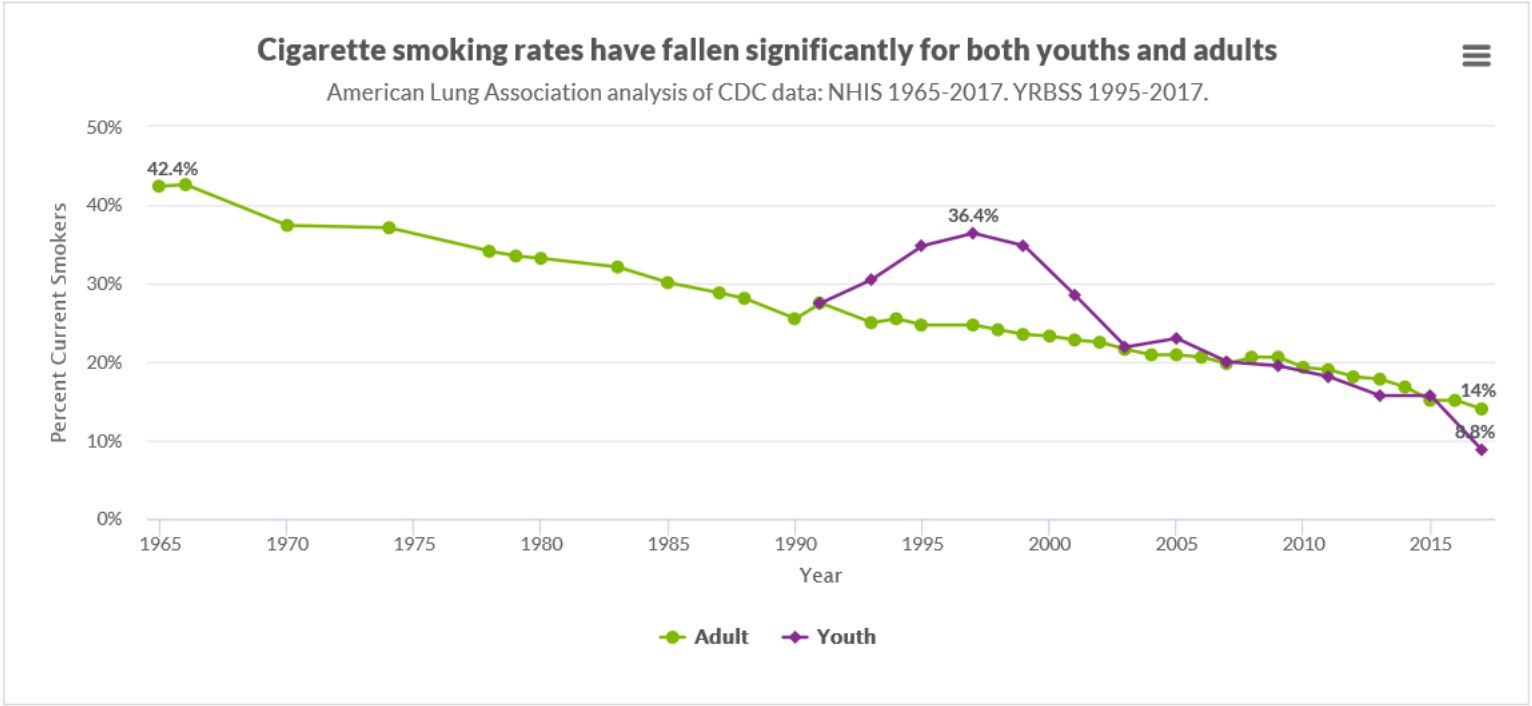
https://www.cdc.gov/tobacco/data_statistics/fact_sheets/fast_facts/index.htm

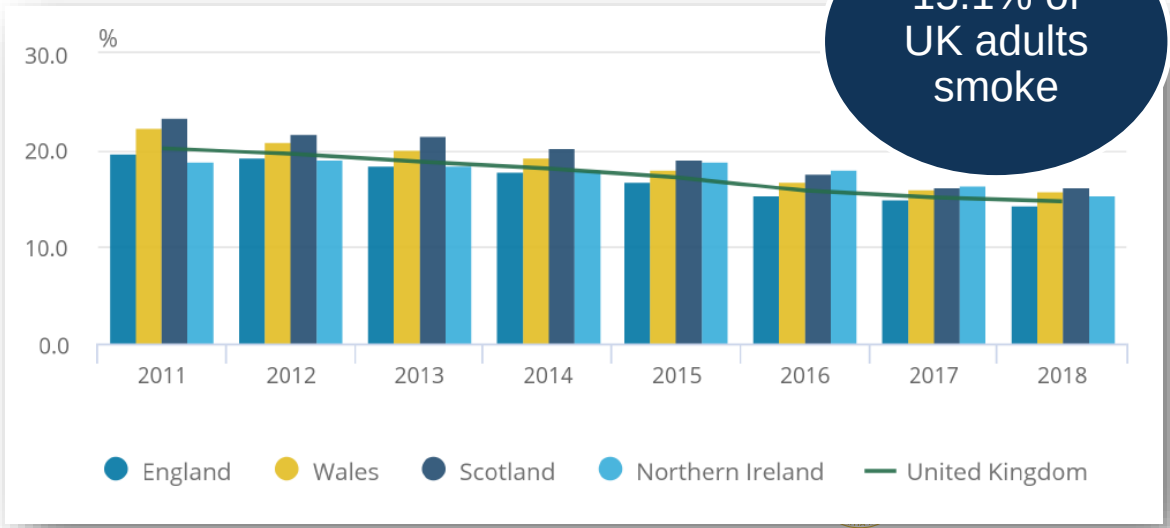
US smoker trend 1965-2017



UK and Ireland

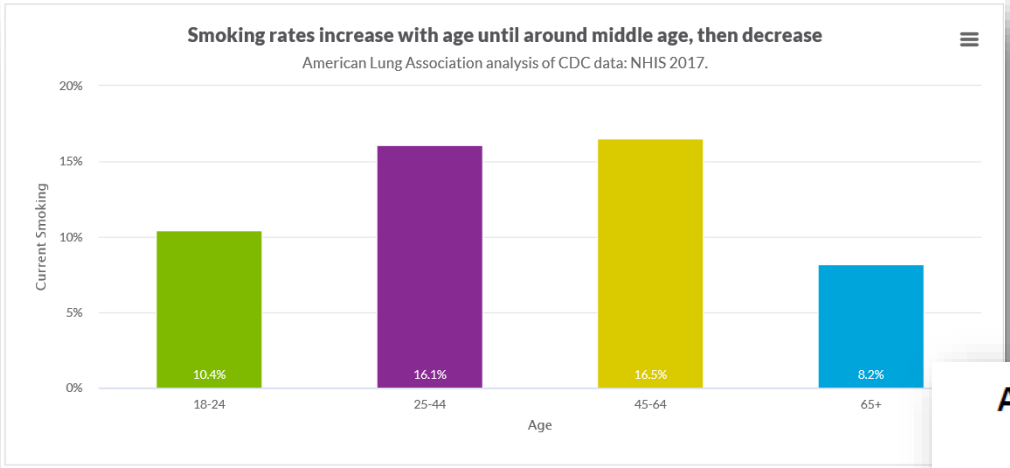
- The Healthy Ireland Survey found that about 22% of Irish adults are smokers, 18% smoke on a daily basis with 4% smoking occasionally.

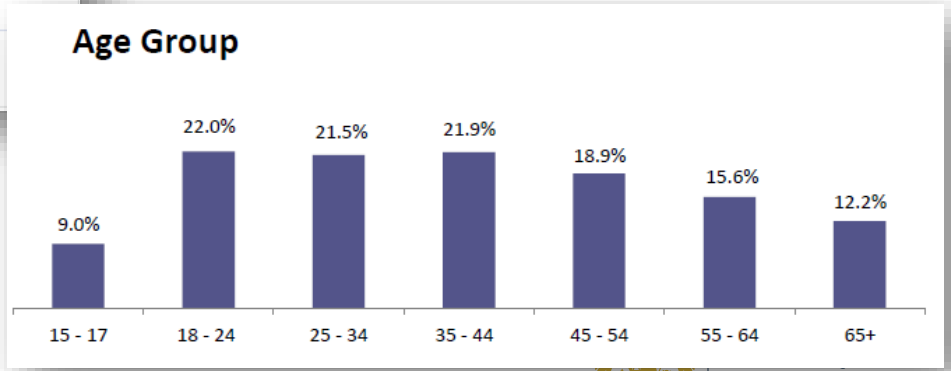
https://www.thejournal.ie/quit-smoking-numbers-3779386-Jan2018/



15.1% of UK adults smoke

Smoking rates vary by age, income, education





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https://www.lung.org/our-initiatives/research/monitoring-trends-in-lung-disease/tobacco-trend-brief/current-smoking-comparisons.html

Landscape

- Traditional cigarettes (combustible)
- **Vaping, e-cigarettes (mass commercialization)**
  - **regulation, types**
- Heated tobacco products
- (others)
- Nicotine
  - most contain, except some e-cigarettes
  - not harmful per se*, but creates addiction

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US e-cigarette trend (adult, ever & current)

Adult Electronic Cigarette Ever and Current Use Trends by Sex, Race, and Age*

	2014	2015	2016	2017	% Change 2014-2017	2014	2015	2016	2017	% Change 2014-2017
	Ever Use					Current Use				
Total	12.6	13.1	15.2	14.4	14.3	3.7	3.2	3.2	2.8	-24.6
Male	14.1	15.2	17.7	16.5	17.3	4.1	4.1	3.8	3.3	-20.6
Female	11.1	11.1	12.9	12.4	11.7	3.4	2.5	2.6	2.4	-30.7
Age										
18-24	21.6	21.3	23.6	25.5	17.8	5.1	4.9	4.7	5.2	1.7
25-44	15.1	17.8	21.0	19.2	27.0	4.7	4.0	4.2	3.6	-22.8
45-64	10.1	10.6	12.6	11.7	16.3	3.5	3.1	2.8	2.4	-32.8
≥65	3.7	3.8	4.4	4.2	12.7	1.4	1.1	1.0	0.7	-51.1

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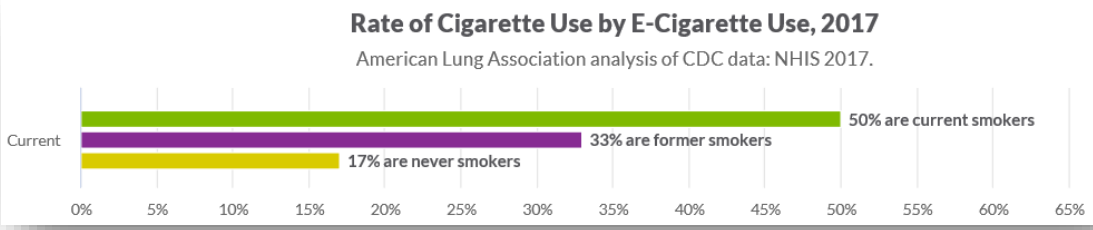
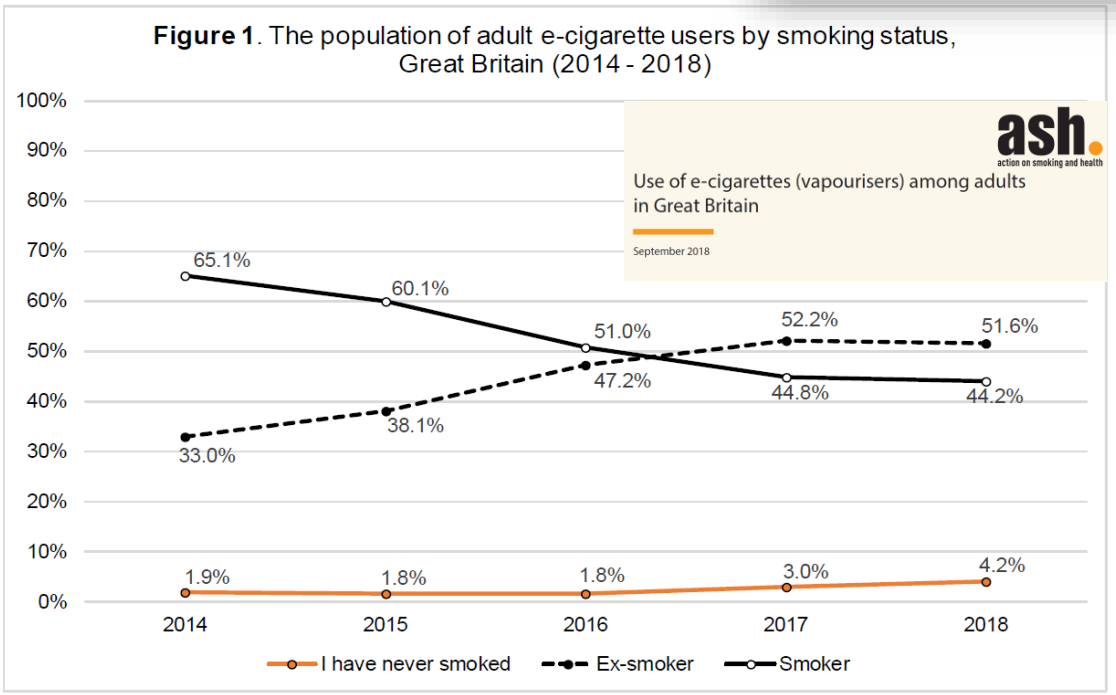
CDC. National Center for Health Statistics. National Health Interview Survey 2014-2017. Analysis by the American Lung Association Research Team

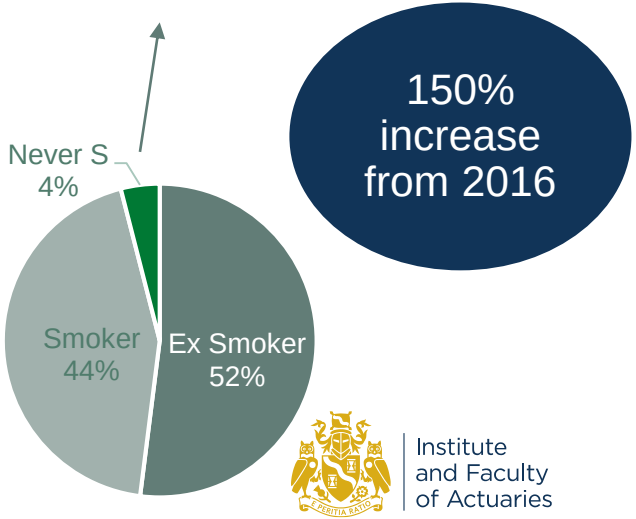
UK e-cigarette use (by smoking status)



https://www.lung.org/



~0.5% of all UK adult "never smokers"



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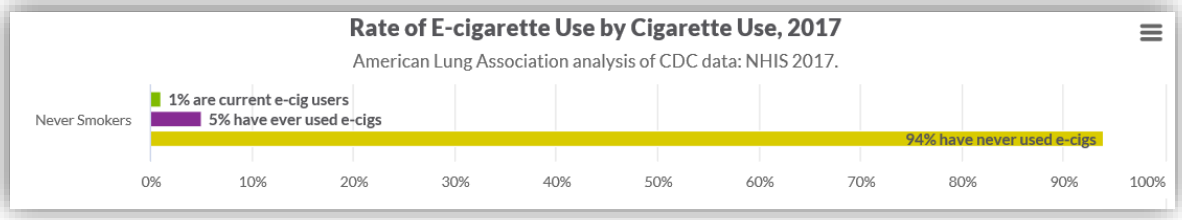
E-cigarette use in ex & never smokers



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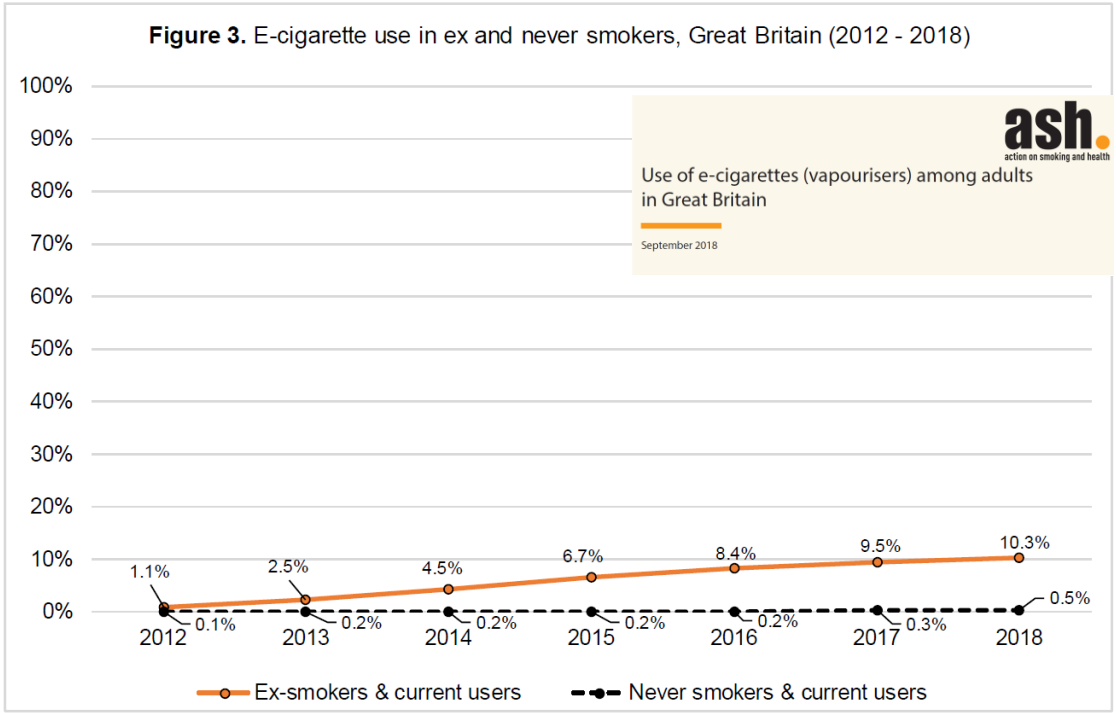

0.5 vs 1% of *never smokers* are current e-cigarette users

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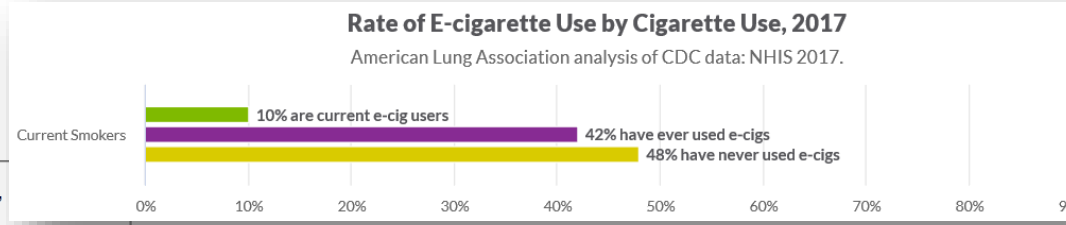
E-cigarette use amongst smokers
Great Britain vs. USA



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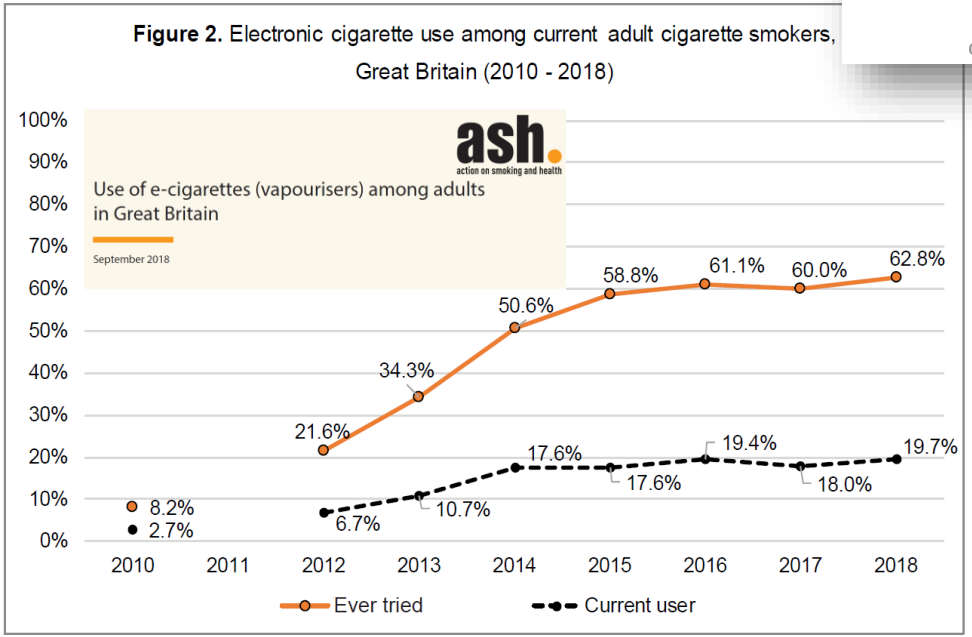

63 vs. 42% of current smokers ever used e cigarettes

20 vs. 10% of current smokers are dual users

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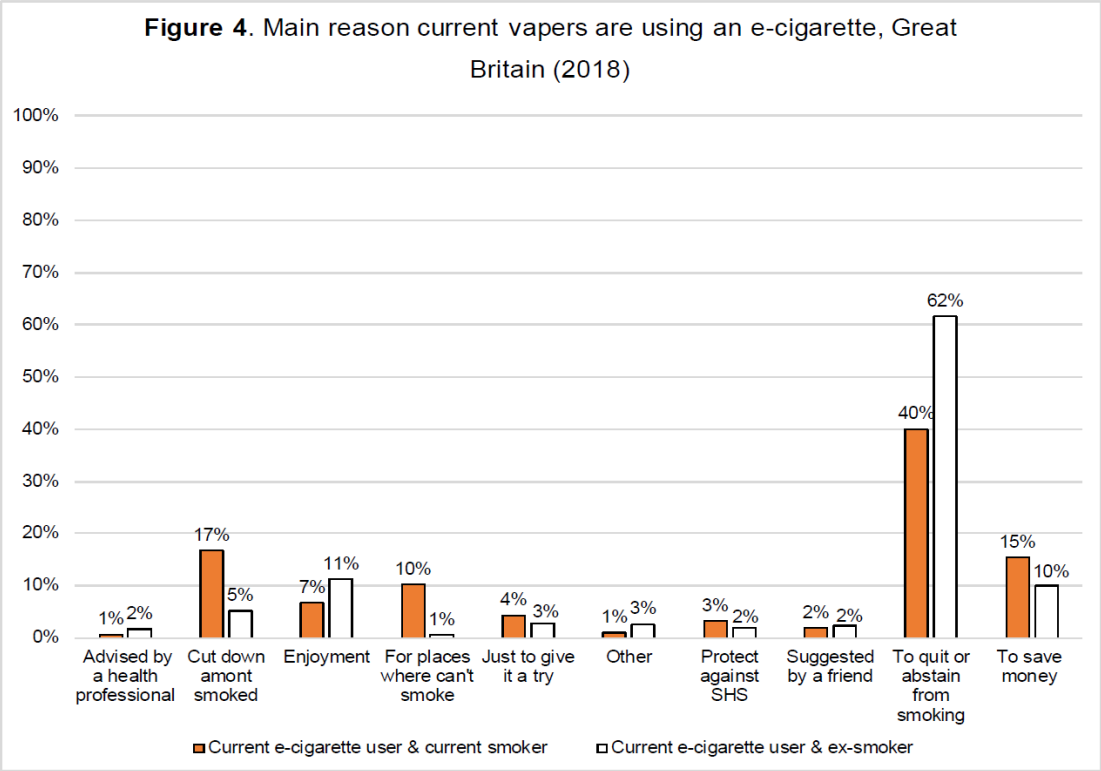
Why do adults vape?



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Section

- Landscape
- **Concerns**
- Quitting
- Beyond vaping
- Where to from here?

Youth

- Youth/nicotine
- Addiction
- Gateway

- Legitimizes smoking

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Youth US

- Nearly 9 out of 10 cigarette smokers first try cigarette smoking by age 18, and 98% first try smoking by age 26.
- Each day in the U.S. about 2,000 youth under 18 years of age smoke their first cigarette, more than 300 become daily cigarette smokers.
- Flavorings in tobacco products can make them more appealing to youth.
  - In 2018, 67% of high school students and 49% of middle school students who used tobacco products in the past 30 days reported using a flavored tobacco product
- Recent increases in the use of e-cigarettes is driving increases in tobacco product use among youth.
  - The number of middle and high school students using e-cigarettes rose from 3.6 million in 2018 to 5.3 million in 2019— an increase of 1.7 million

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https://www.cdc.gov/tobacco/data_statistics/fact_sheets/youth_data/tobacco_use/index.htm

Different flavours of e-cigarettes – adults vs youth

Figure 4: Use of different flavoured e-cigarettes (ASH Smokefree GB data 2015)

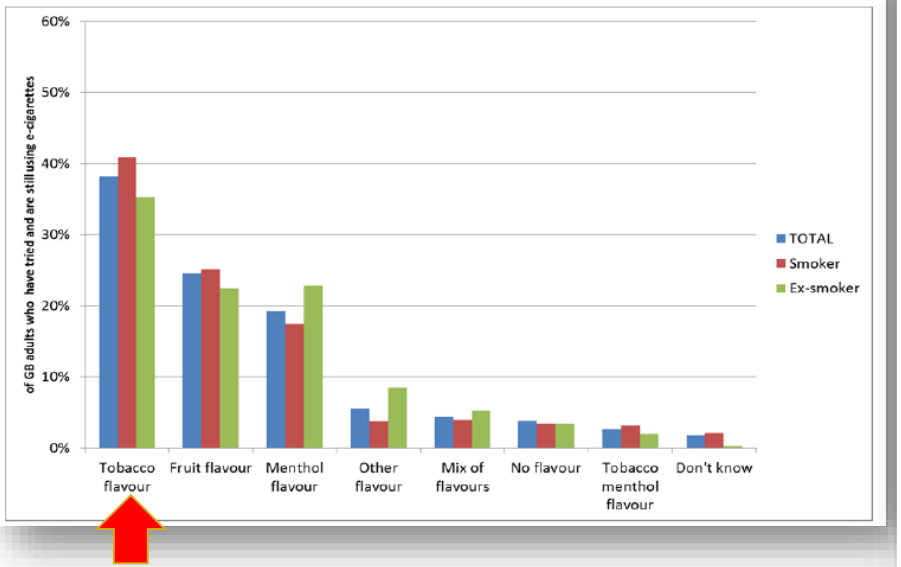
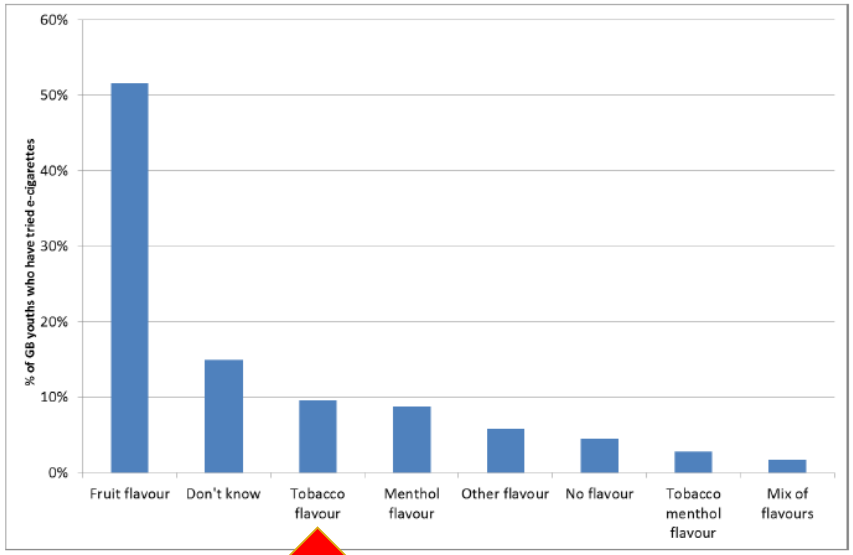


Figure 6: Last flavour tried by youth, ASH Smokefree GB youth survey, 2015



Note: The proportion of youth reporting cu[illegible] use was too small to assess flavours in current users.

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E-cigarettes - Gateway to tobacco?

- CDC findings (2013 vs 2014) indicated that past 30-day use of EC increased among middle and high school students
- High school students use increased from **4.5% to 13.4%** between 2013 and 2014.
- Middle school students, current EC use increased from **1.1% in 2013 to 3.9% in 2014.**
- However, cigarette smoking **had continued to decline** during this period (high school students: 15.8% to 9.2%; middle school students: 4.7 % to 2.5%) such that smoking was at a 22-year low in the US.
- These findings strongly suggest that EC use is **not** encouraging uptake of cigarette smoking.

Arrazola, R.A., et al., *2011-2014.* MMWR Morb Mortal Wkly Rep, 2015. **64**: p. 381-5.
Dutra, L.M. et al, JAMA pediatrics, 2014. **168**(7): p. 610-617.
Centre for Disease Control and Prevention. E cig use….2015

E-cigarettes - Gateway to tobacco?

Electronic Cigarettes

	Middle School								High School							
	2011	2012	2013	2014	2015	2016	2017	2018	2011	2012	2013	2014	2015	2016	2017	2018
Total	0.6	1.1	1.1	3.9	5.3	4.3	3.3	4.9	1.5	2.7	4.5	13.4	16.0	11.3	11.7	20.7
Male	0.7	1.4	1.4	4.5	5.9	5.1	3.7	5.1	2.3	3.6	5.5	15.0	19.0	13.1	13.3	22.6
Female	0.4	0.8	0.9	3.3	4.8	3.4	2.9	4.8	0.7	1.9	3.5	11.9	12.8	9.5	9.9	18.8

2019 – 10.5% (*18.0% frequent*) 27.5% (*34.2%*)

Cigarettes

	Middle School								High School							
	2011	2012	2013	2014	2015	2016	2017	2018	2011	2012	2013	2014	2015	2016	2017	2018
Total	4.3	3.5	12.7	2.5	2.3	2.2	2.1	1.8	15.8	14.0	12.7	9.2	9.3	8.0	7.6	8.1
Male	4.5	3.8	14.1	3.0	2.3	2.5	2.0	2.1	17.7	16.3	14.1	10.6	10.7	9.1	7.6	8.8
Female	4.0	3.2	11.2	2.0	2.2	1.8	2.2	1.5	13.8	11.7	11.2	7.9	7.7	6.9	7.6	7.3

2019 - 2.3% 5.8%


New Online Views 21,055 | Citations 0 | Altmetric 1291

Original Investigation ONLINE FIRST

November 5, 2019

e-Cigarette Use Among Youth in the United States, 2019

Karen A. Cullen, PhD[1]; Andrea S. Gentzke, PhD[2]; Michael D. Sawdey, PhD[1]; et al

> Author Affiliations

JAMA. Published online November 5, 2019. doi:https://doi.org/10.1001/jama.2019.18387

https://doi.org/10.1001/jama.2019.18387

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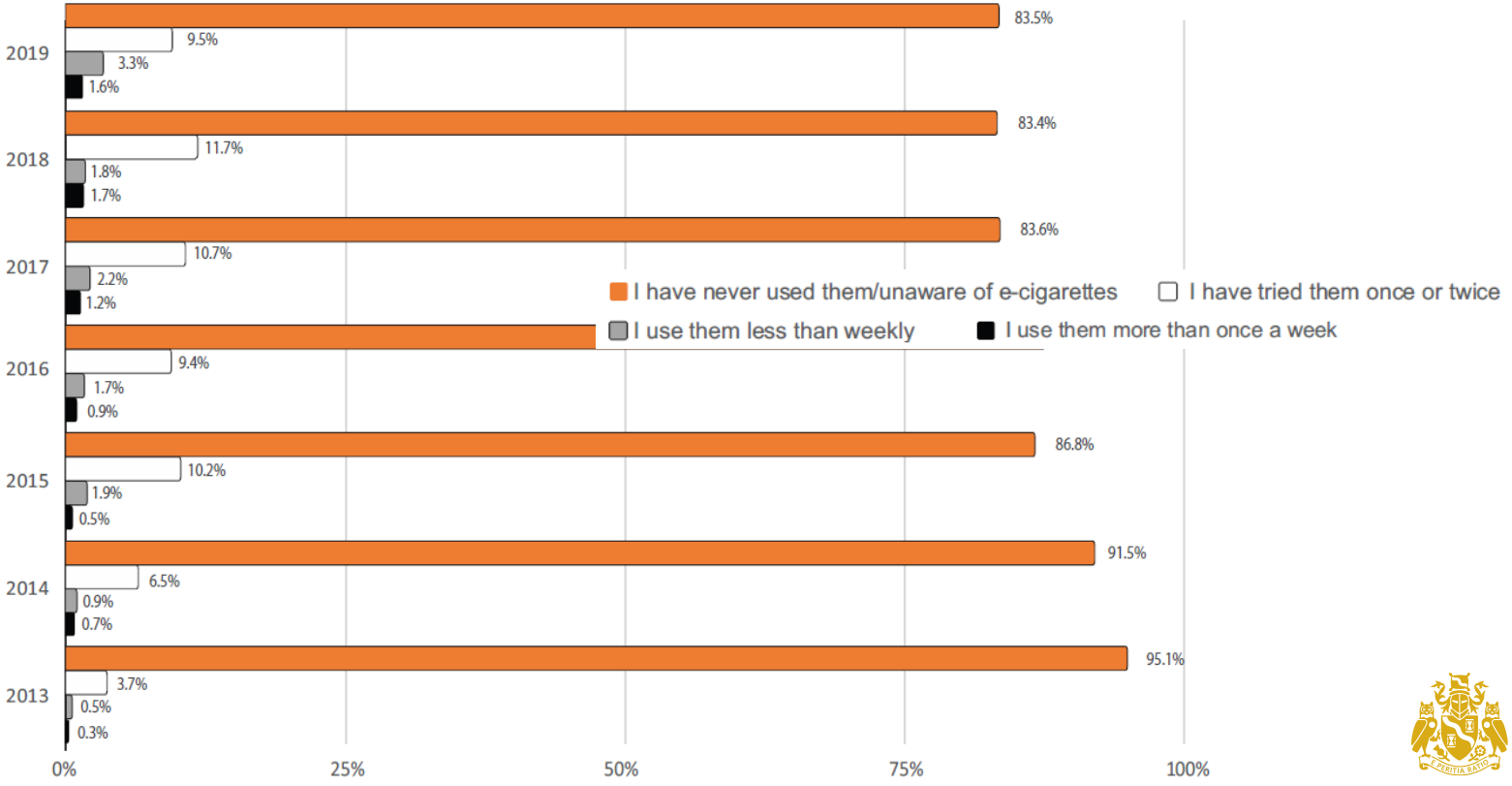
CDC. National Youth Tobacco Survey, 2011-2018. Analysis by the American Lung Association Epidemiology and Statistics Unit

Use of e-cigarettes by GB youth (11-18), 2013-2019



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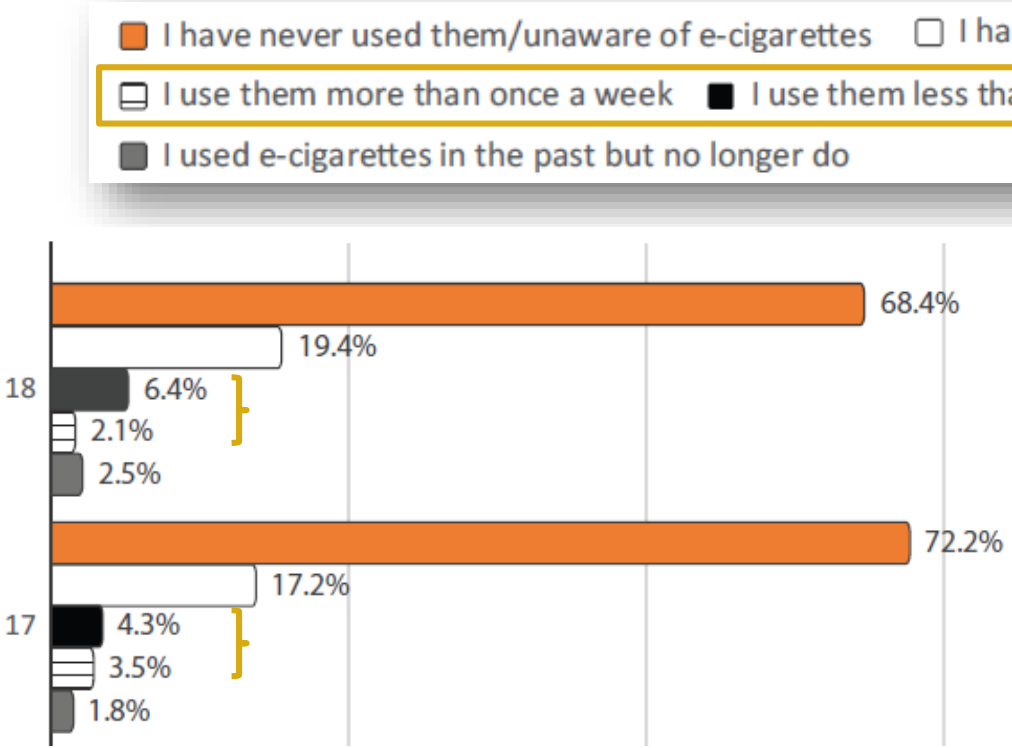
Use of e-cigarettes by age, GB youth, 2019



~8% of 17/18yr olds use e-cigs

2.1 - 3.5% of 17/18yr olds use e-cigs at least weekly

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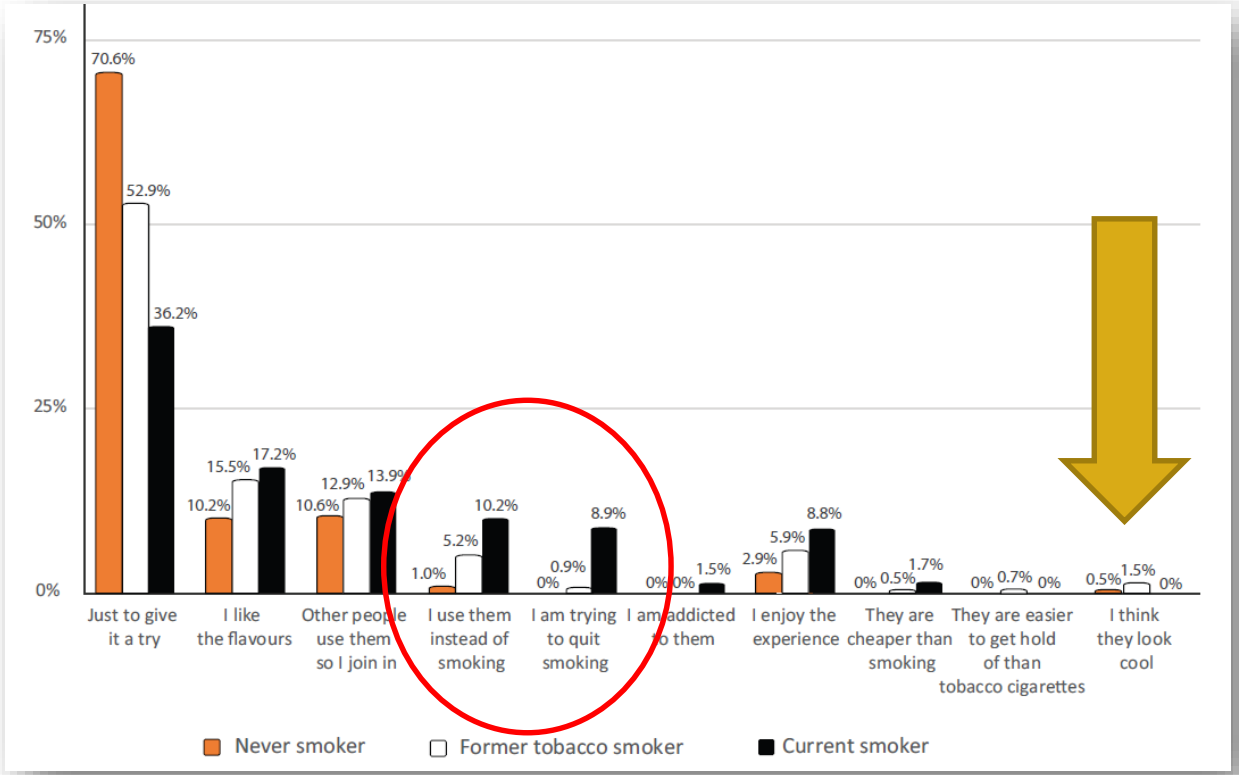
Reasons for e-cigarette use, GB youth (11-18), 2019



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Health dangers

- Intrinsic
- Behavioural/gateway

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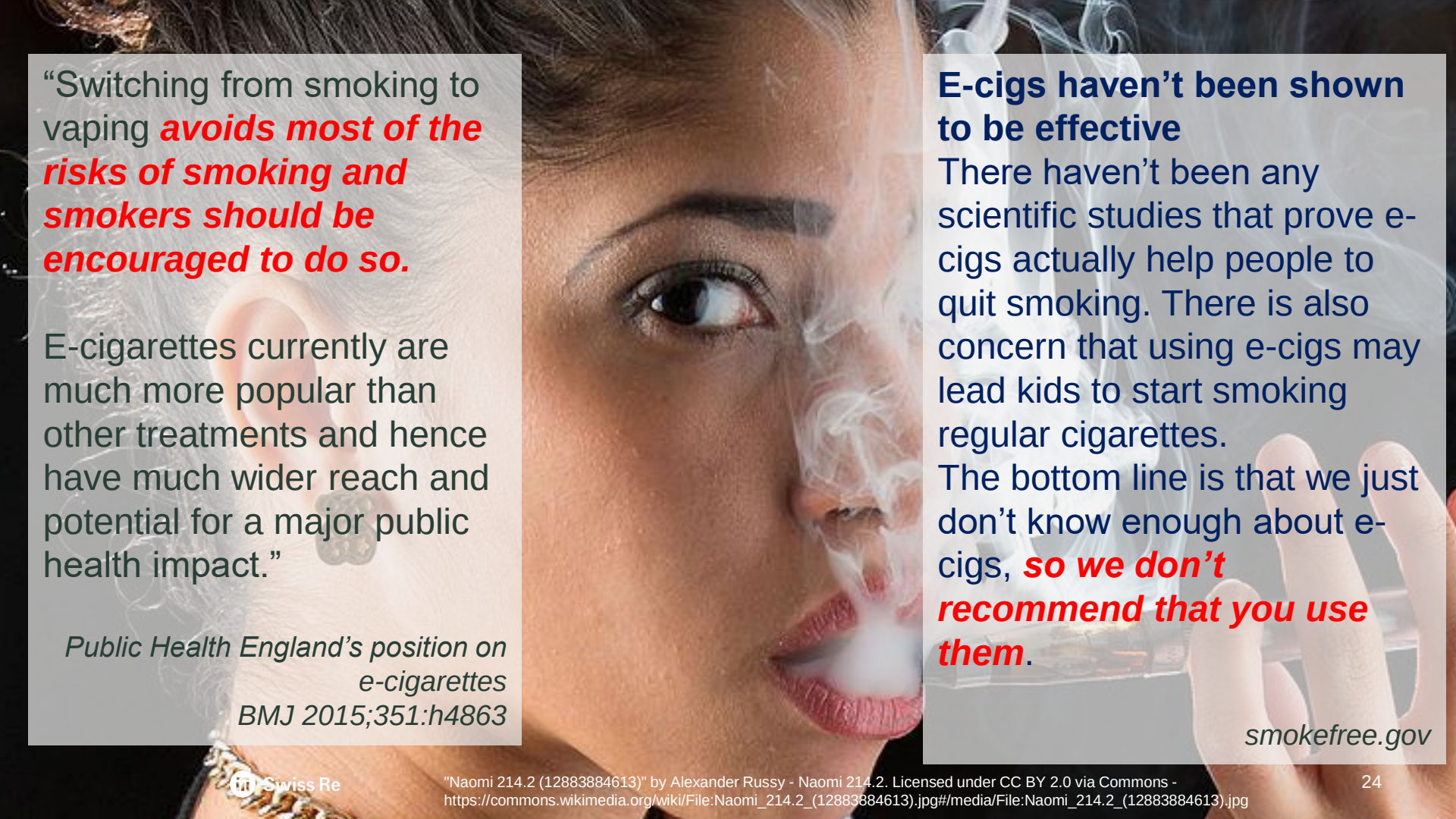

“Switching from smoking to vaping ***avoids most of the risks of smoking and smokers should be encouraged to do so.***

E-cigarettes currently are much more popular than other treatments and hence have much wider reach and potential for a major public health impact.”

Public Health England’s position on e-cigarettes
BMJ 2015;351:h4863

E-cigs haven’t been shown to be effective

There haven’t been any scientific studies that prove e-cigs actually help people to quit smoking. There is also concern that using e-cigs may lead kids to start smoking regular cigarettes.

The bottom line is that we just don’t know enough about e-cigs, ***so we don’t recommend that you use them***.

smokefree.gov

View from Irish Cancer Society

Irish Cancer Society position on e-cigarettes

E-cigarettes are less harmful than combustible cigarettes, but health risks remain.

There is not enough evidence e-cigarettes are an effective quit aid for smokers; while other methods, such as Nicotine Replacement Therapy and prescription drugs have been proven to be effective in helping people to quit.

There is a need for greater evidence on the long-term health consequences of e-cigarette use.

As a result of clever marketing, e-cigarette use is increasing among young people and may act as a gateway to smoking.

Investment is needed in smoking cessation strategies we know will make a difference in supporting people to quit smoking.

Are e-cigarettes safe?

While short term evidence has found that e-cigarettes are less harmful than combustible cigarettes, e-cigarettes are not harm free, and more evidence is required to assess long-term risk.

We cannot categorically say that e-cigarette use increases cancer risk, but e-cigarette use may cause precursor events to cancer, such as lung inflammation and DNA damage in the lungs. These products can also alter vital signs such as heart rate and blood pressure.

Evidence on the safety of e-cigarettes is constantly emerging and although most of the short-term evidence has found that e-cigarette use is safer than smoking cigarettes, there are still risks present, and as we do not know what the long-term health implications are, more evidence is needed to assess long-term risk.

https://www.cancer.ie/reduce-your-risk/smoking/electronic-cigarettes

Harm?

- Intrinsic harm

vs

- Relapse/conversion to traditional cigarettes (and harm we know that causes)

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Is it safe? What about the aldehydes?

- Recent reports raised a possibility that under certain conditions, EC may release high levels of **aldehydes** (released in tobacco smoke and contribute to its toxicity) - aldehydes are also released with thermal degradation of propylene glycol and glycerol in e-liquids.
- Previous studies detected the presence of aldehydes, especially formaldehyde, in the vapour from some EC, but at levels much lower than in cigarette smoke.
- Across brands, ***EC released 1/50th of the level of formaldehyde released by cigarettes. The highest level detected was six times lower than the level in cigarette smoke***.
- + "**what is in the fluid**"/regulations & recent study on airways epithelium, cancer risk mice

Farsalinos, K. *E Cig aerosol contains 6 x LESS formaldehyde than tobacco cigarette smoke.* 2014
Farsalinos, C. E-cigarette aerosols generates high levels of formaldehyde only in 'dry puff' conditions. Addiction
McRobbie, H., et al., Effects of the use of electronic cigarettes with and without concurrent smoking on acrolein delivery. 2014

E-cigarettes - are they harmful?

- e-cigarettes are about 95% safer than combustibles
- The concentration of nicotine in nicotine containing devices is however not standardised and the dose delivered is inconsistent

*"the constituents of cigarette smoke that harm health – including carcinogens – are **either absent** in e-cigarette vapour or, if present, they are mostly at levels much below 5% of smoking doses (mostly below 1% and far below safety limits for occupational exposure)"*

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BMJ 2015;351:h4634

E-cigarette, or vaping, product use associated lung injury (EVALI)

- As of **November 13, 2019**, 2,172* cases of e-cigarette, or vaping, product use associated lung injury (EVALI) have been reported
- 42 deaths have been confirmed.
- vs. 480,000 US deaths annually due to smoking

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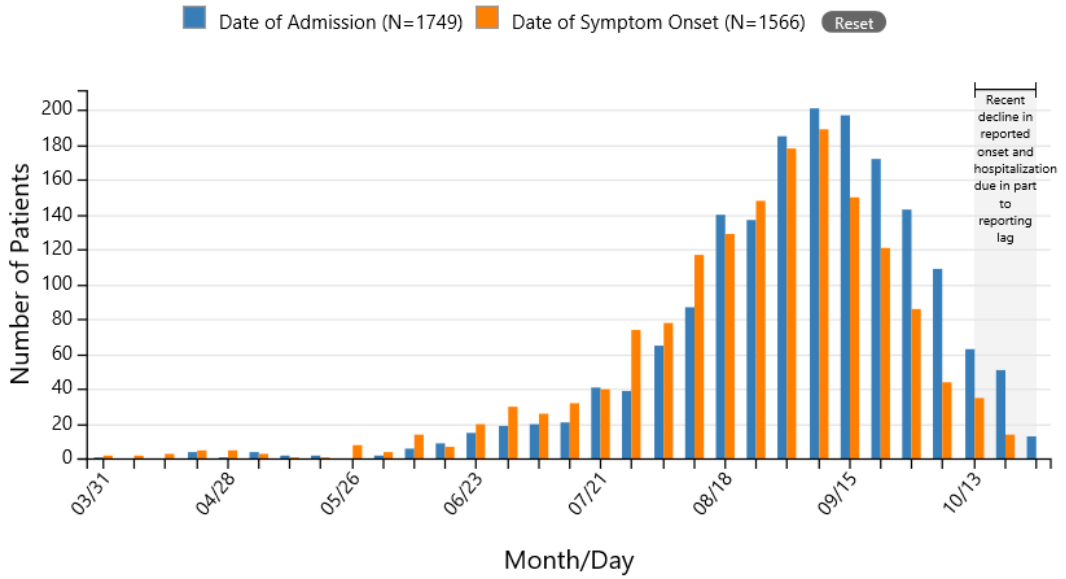
E-cigarette, or vaping, product use associated lung injury (EVALI)

- CDC has identified vitamin E acetate as a chemical of concern among people with (EVALI). Recent testing of bronchoalveolar lavage (BAL) fluid from 29 patients found vitamin E acetate in **all** of the samples.
- Vitamin E acetate might be used as an additive, most notably as a thickening agent in THC-containing e-cigarette, or vaping, products.

Dates of symptom onset and hospital admission for patients with lung injury associated with e-cigarette use, or vaping — United States, March 31-November 2, 2019



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“**Although the currently available results for e-cigarettes are promising**, there is insufficient evidence at present to reliably demonstrate their effectiveness as an aid to smoking cessation.

Health Service Executive
Feidhmeannacht na Seirbhíse Sláinte

E-cigarette use does not show increase in abstinence

- Use of e-cigarettes to aid quitting cigarette smoking was not associated with improved cessation or with reduced consumption, even among heavier smokers
- Smokers who had used e-cigarettes for cessation were less likely to be abstinent for 30+ days at follow-up, compared to never-users who tried to quit (11.1 % vs 21.6 %; OR adj = 0.44, 95 % CI = 0.2–0.8).

TABLE 2—Multivariable Logistic Regression Baseline Predictors of Making a Quit Attempt at 12-Month Follow-Up as a Function of E-Cigarette Use: California Smokers Cohort, 2011–2012

Variable	No. (%)	AOR (95% CI)
E-cigarette use		
Have used	177 (55.7)	1.15 (0.67, 1.97)
Will never use	141 (44.3)	1.00 (Ref)

Am J Public Health. 2015;105: 1213–1219. doi:10.2105/AJPH.2014.302482

E-cigarettes - Intensive e-cigarette users more likely to quit smoking

- Representative samples of adults in 2 US metropolitan areas were surveyed in 2011/2012 about their use of novel tobacco products. In 2014, follow-up interviews were conducted with 695 of the 1,374 baseline cigarette smokers who had agreed to be re-contacted (retention rate: 51%).
- The follow-up interview assessed their smoking status and history of electronic cigarette usage. Respondents were categorized as **intensive users** (used e-cigarettes daily for at least 1 month), **intermittent users** (used regularly, but not daily for more than 1 month), and **non-users**/triers (used e-cigarettes at most once or twice).
- Logistic regression controlling for demographics and tobacco dependence indicated **that intensive users of e-cigarettes were 6 times more likely than non-users/triers to report that they quit smoking** (OR: 6.07, 95% CI = 1.11, 33.2).

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Nicotine Tob Res. 2015 Feb;17(2):127-33

View from Irish Cancer Society

Is the use of e-cigarettes an effective method for quitting smoking?

63% of smokers are thinking about quitting. At present, long-term evidence on the efficacy of e-cigarettes as a quit tool is limited.

While some smokers may be quitting smoking with the use of e-cigarettes, recent evidence has shown that many of these people may become dependent on e-cigarettes and will remain addicted to nicotine.

A greater body of research on the long-term efficacy of e-cigarettes as a quit-tool is needed.

There is not enough evidence at present to suggest that e-cigarettes are more effective than Nicotine Replacement Therapy (NRT), for example, to end nicotine addiction.

https://www.cancer.ie/reduce-your-risk/smoking/electronic-cigarettes

- There are now over 1 million people in the country who've successfully quit smoking.
- This translates to about 830,000 smokers in Ireland, fewer than the number of quitters.
- The survey also looked at people who've quit smoking in the past year and found that about one in eight people (12%) who smoked a year ago have since quit.
- Almost half of those who successfully quit smoking recently did so through willpower alone (45%) while 37% used e-cigarettes.

https://www.thejournal.ie/quit-smoking-numbers-3779386-Jan2018/

E-cigarettes more effective for smoking cessation than NRT

RESULTS A total of 886 participants underwent randomization. The 1-year abstinence rate was 18.0% in the e-cigarette group, as compared with 9.9% in the nicotine-replacement group (relative risk, 1.83; 95% confidence interval [CI], 1.30 to 2.58; P<0.001). Among participants with 1-year abstinence, those in the e-cigarette group were more likely than those in the nicotine-replacement group to use their assigned product at 52 weeks (80% [63 of 79 participants] vs. 9% [4 of 44 participants]). Overall, throat or mouth

3%, vs. 51.2% in the nicotine-

acement group (37.9%, vs. 31.3% in

es in the incidence of cough and

replacement group (relative risk for

0.6 to 0.9). There were no

or shortness of breath.

on than nicotine-replacement

ort. (Funded by the National

trolled Trials number,

ISRCTN60477608.)

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N Engl J Med 2019; 380:629-637
DOI: 10.1056/NEJMoa1808779

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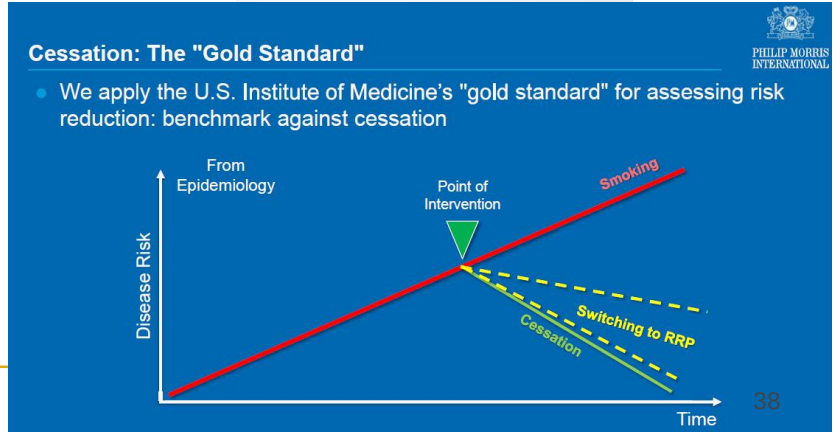
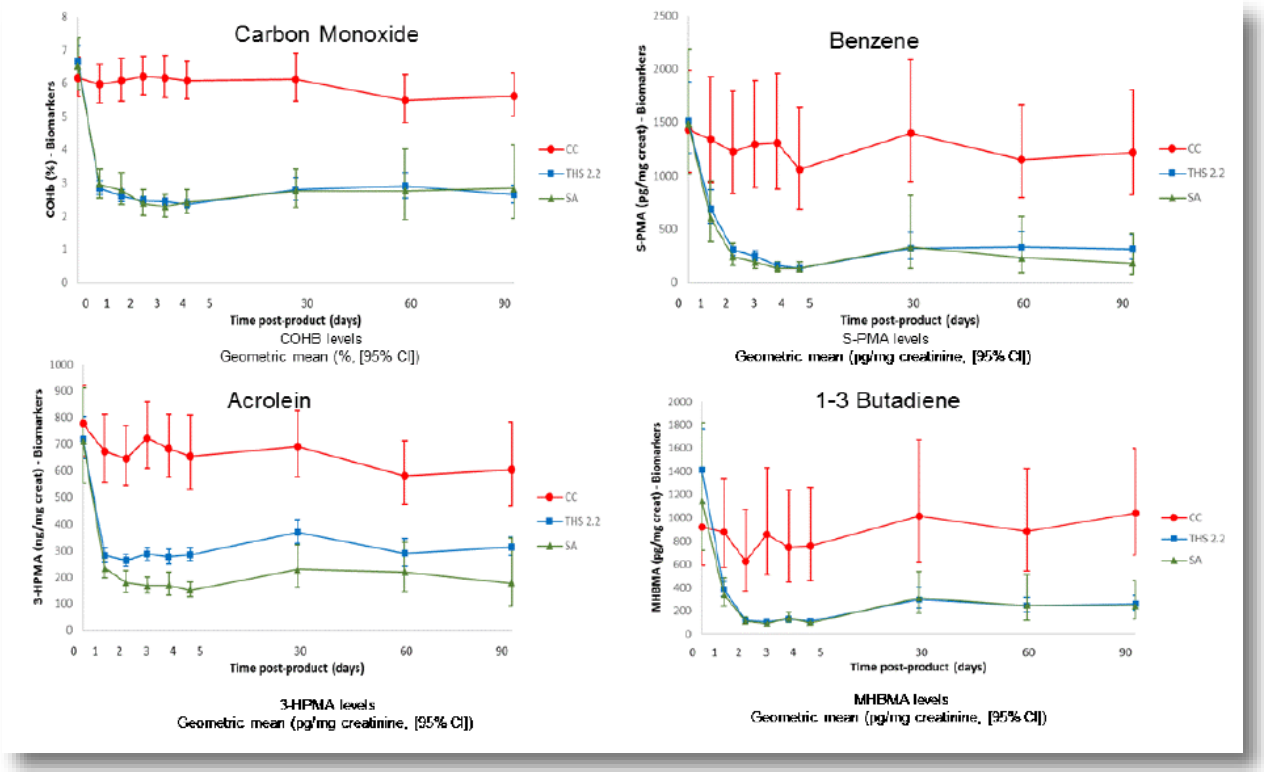
- **Beyond vaping**
- Where to from here?

“Heated” Tobacco Products

- Philip Morris International CEO has stated : “no more combustible cigarettes by 2050”
- PMI has **invested 3bn USD** in developing a new reduced risk product (RRP) – no combustion, only heating of tobacco to 300°C – **“heat not burn”**
- The data shows **risk/<u>EXPOSURE</u> reduction of >90%** (compared to traditional cigarettes)
- They have launched in multiple markets – Japan, Europe, US & UK - in Japan alone they have >10% of the smokers who have converted to IQOS
- Single digit % of smokers manage to give up, PMI have managed *over 70% conversion in Japan (first market)*
- This is the first of 4 different platforms they are developing, all “reduced risk products”. The second is in live city testing.



Reduction in (some) metabolites & carcinogens track levels seen in abstinence when smokers switch to certain reduced *"exposure"* products



CC – combustible cig
THS – RRP
SA - abstinence

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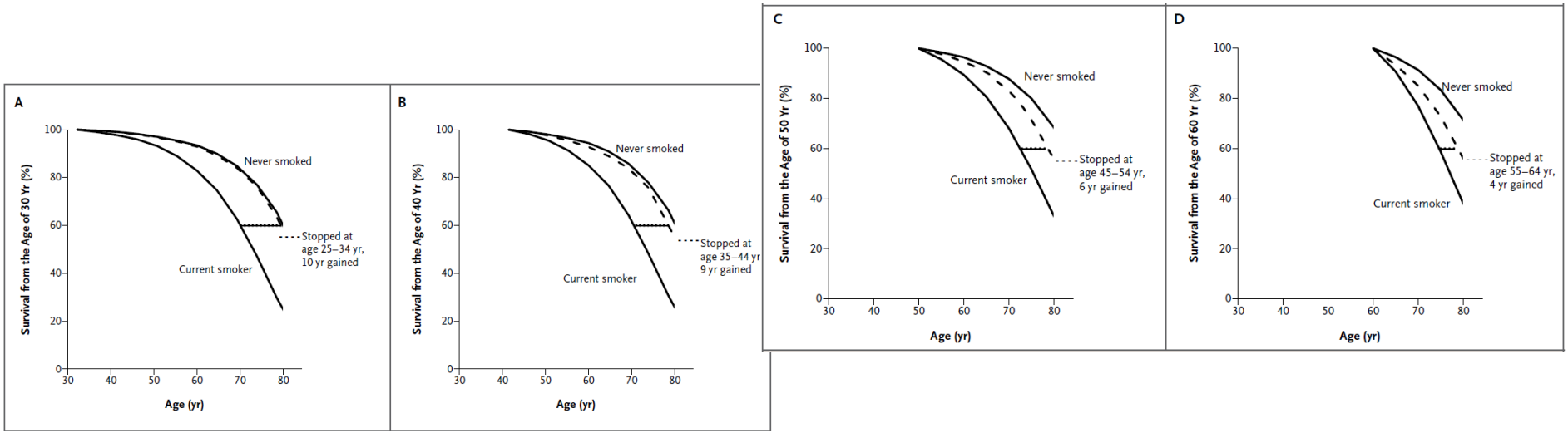
- Concerns
- Testing of use
- Beyond vaping
- **Where to from here?**

How does quitting (/switching?) improve health?

- Stopping gains 4 -10 yrs of life (age dependent)



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N Engl J Med 2013;368:341-50

Impact on insurance – relative risk compared to S/NS

Vaping/Smoking Behaviour**		Vaping harm (compared to smoking)				Risk relative (to S/NS starting point)
		Harmless	Less Harmful	Equally Harmful	More Harmful	
Current Smoker (S)	Continues smoking	-	-	-	-	no change/smoker risk (S)
	Quits everything	-	-	-	-	better (eventual 'near' non-smoker risk) (NS)
	Dual use*	no change/S	no change/S	no change/S	worse/S+	depends on (relative) vaping harm
	Total switch to vaping**	better/NS	better/S-	no change/S	worse/S+	depends on (relative) vaping harm
Current Non-Smoker (NS)	No vaping (or smoking)	-	-	-	-	no change (true non-smoker risk) (NS)
	Exclusive vaping**	no change/NS	worse/S-	worse/S	much worse/S+	depends on (relative) vaping harm
	Exclusive smoking**	-	-	-	-	worse (smoker risk) (S)
	Dual use*	worse/S	worse/S	worse/S	much worse/S+	worse (smoker risk) (S), but varies

*dual use harm may be amplified (or reduced) if (1) an interaction exists between smoking and vaping, and (2) depending on proportion of vaping vs. smoking
** persistency of behaviour change likely to be variable (for example many "only vapers" may end up being dual users), hence risk could shift

Notes

Time from quitting to risk assessment will make a difference in risk ito relapse likelihood, and actual risk reduction over time
Number of cigarettes smoked will affect smoker risk, as will duration of smoking
Vaping liquid content assumed to be stable, regulated, without ad hoc adulterants being added

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Cotinine

- Positive in any product containing nicotine
- CO levels increase with combustion, but levels remain detectable for **up to 4 hours only**
- No other commercial test available today to differentiate product use

Currently we cannot test for differentiated use, and we have no long term data on harm, or reduction of harm, nor on long term "compliance" of nicotine product use.

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Questions

Comments

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