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Shape Matters: e-cigarettes a blessing or a curse?

Sam Gutterman FSA FCAS MAAA CERA FCA
HonFIA

March 2019

The Shape of Future Smoking
e-cigarettes: a blessing or a curse?

What I'll cover

- What are e-cigarettes
- Their use
- The seven controversies
- Modeling, estimates and uncertainty
- Regulation and the insurance industry response
- Related products
- Outstanding questions
- Current conclusions

What are e-cigarettes?

- Current version introduced in 2006
- Produce an aerosol by heating a liquid that contains a solvent, flavorings, and usually nicotine (also can be marijuana)
- Designed to deliver nicotine through puffing the e-cig without tobacco smoke, with fewer chemicals than combustible tobacco cigarettes
- Originally copied tobacco products; now evolving
- Use is referred to as “vaping”



Adult use

■ United States

- Prevalence of vaping has increased, in some cases dramatically, over the last several years

U.S. adults – 2016 in table, in 2014 current vaping was at 3.7%

Ages	All	18 - 24	25 - 44	45 - 64	65 +
Currently vaping	3.2%	4.5%	4.2%	2.9%	1.0%
Ever e-smoked	15.4	23.5	21.0	13.0	4.5

- 2015 – 58.8% of current e-cig users are dual users (with combustible tobacco cigarettes); 17.7% were never-before smokers
- 18-24 year olds – 40% of vapers had never smoked anything before

■ United Kingdom

- In 2017, 5.5% were current vapers (up from 3.7% in 2015); 19.4% of all adults had ever-vaped
- Only 0.4% were never-before smokers
- Of current vapers, about 15% of cigarette smokers also were vapers (dual smokers)

*U.S. – National Health Interview Survey; U.K. – Office for National Statistics

Youth use

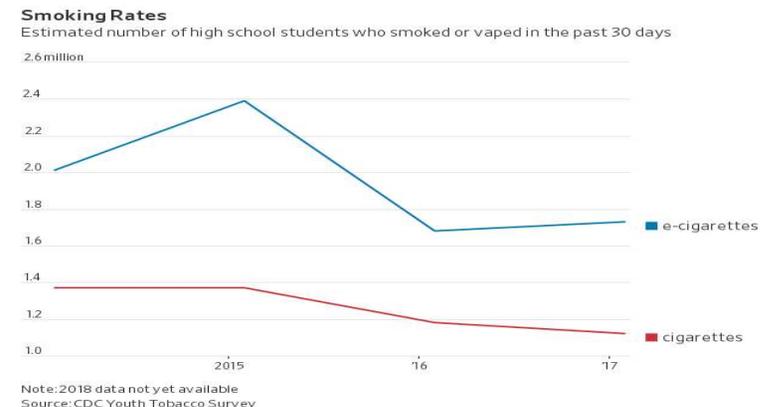
- United States in 2017 and 2018*
 - Current use (last 30 days): high-school – 11.7% (13.3% boys; 9.9% girls) in 2017 to 20.8% in 2018; of current vapers, 20.0% in 2017 to 27.7% in 2018 vaped during more than 20 out of last 30 days
 - Current use in middle school – 3.3% in 2017 to 4.9% in 2018
 - 23% ever-vaped (2014-17 middle school and high school)
 - Use of Juuls by American youth has been referred to as an epidemic[^]
- United Kingdom in 2017#
 - Regular use (once a week): 1.8% of 16-17 year olds
 - 11% ever-vaped

*National Youth Tobacco Survey, from Morbidity & Mortality Weekly, June 8, 2018: “Racial/Ethnic Disparities in Tobacco Product Use Among Middle and High School Students — United States, 2014–2017”, S. Odani, et al.; November 16, 2018: “Use of Electronic Cigarettes and Any Tobacco Product Among Middle and High School Students — United States, 2011–2018” Karen A. Cullen, et al.

[^]Juuls were introduced in the U.K. in the summer of 2018

**Washington Post: September 12, 2018

#Action on Smoking and Health Smokefree Great Britain-Youth Surveys (ASH-Y)



The controversy

1. Vaping origination
2. Health effects
3. Nicotine and addiction
4. Smoking cessation and harm reduction
5. Second-hand vaping
6. Modifications and flavors
7. Accidents

1. Vaping origination

Controversy: is vaping a tool to stop/reduce or a gateway to combustible tobacco cigarette smoking?

- United Kingdom*: those adults and youth who vape almost exclusively have smoked before, although there has been some experimentation
- United States#: for significant percent of youth, vaping was not preceded by smoking; most common reasons for youth to vape:
 - (1) Use by friend or family member
 - (2) Attraction of flavors
 - (3) Less harmful than combustible tobacco cigarettes

*Public Health England (2015)

#2016 National Youth Tobacco Survey

2. Health effects

Controversy: What health risks result from vaping?

- No long-term studies yet
 - Due to limited period since introduction, changes in the product, lag in adverse health conditions, and dual smoking
- Widely publicized U.K. study: e-cigarettes are likely to be at least 95% safer than combustible tobacco smoking*
 - But other studies have found a higher degree of health hazard, with a wide range
 - Most have been performed in the lab, based on biomarker studies of limited duration or numbers of humans, and not outcomes; U.K. study largely relied on expert opinion and a relatively few biomarker studies#
- Fewer harmful chemical ingredients than combustible tobacco smoking, although several may have significant adverse health consequences
 - But remember -- smoking is the leading preventable health hazard
- Are not safe for youth (brain development), young adults, pregnant women (fetuses) or adults who do not currently use tobacco products^
 - Even though e-cigarettes contain significantly less toxins than combustible tobacco cigarettes

*Public Health England (2015)

#Wilson and Gartner (2016), "Potential Range of Relative Harm from E-cigarettes for Major Health Conditions for use in Modelling Work: Based on Recent Biomarker Studies"

^Centers for Disease and Prevention Control website

3. Nicotine and addiction

Controversy: Can vaping help reduce or stop smoking, and can it be stopped?

- Nicotine is extremely addictive
 - With a similar amount of nicotine, it can be an effective harm reducer compared with adverse health effects of tobacco components
 - Once vaping begins for an individual, it may be difficult to stop
 - Often, a smoker becomes a dual smoker (e-cigarettes and combustible tobacco cigarettes)
 - A concern raised is that vaping may ultimately lead to smoking due to nicotine addiction
 - Nicotine in current versions (e.g., Juul) have become increasingly concentrated
- But not all e-cigarettes contain nicotine (but if they don't, they aren't as useful for smoking cessation purposes)

4. Smoking cessation and harm reduction

Controversy: Does vaping help reduce or stop combustible tobacco cigarette smoking?

- The U.K. has so far found it to be a successful tool in helping smokers reduce or eliminate their combustible tobacco cigarette smoking
 - Vaping is less harmful so as long as it doesn't increase overall smoking
 - Even if dual smoking results, it will reduce adverse health effects
- In many countries, e-cigarettes have been introduced as smoking prevalence was decreasing anyway – e.g., in the United States
- Some studies have indicated vaping has not been shown to reduce total vaping/smoking, let alone combustible tobacco cigarette smoking
 - Limited evidence that e-cigarettes are effective aids to promote smoking cessation*
- Recent study of U.K. adults found that e-cigarettes were more effective in helping smoking cessation than nicotine-replacement techniques (at one year, 18% vs 9.9% ceased smoking), but 80% continued vaping while 9% continued nicotine replacement**

*Committee on the Review of the Health Effects of Electronic Nicotine Delivery Systems (2018)

**Hajek et al. (2019). "A Randomized Trial of E-Cigarettes versus Nicotine-Replacement Therapy". *New England Journal of Medicine*. January 30, 2019.

5. Second-hand vaping

Controversy: Are there second-hand vaping health risks?

- Generally, it is thought that e-cigarette vapor is far less harmful than smoke from combustible tobacco cigarettes
- Yet, the Committee on the Review of the Health Effects of Electronic Nicotine Delivery Systems (2018) indicated that there is conclusive evidence that vaping increases airborne concentrations of particulate matter and nicotine in indoor environments

6. Modifications (mods) and flavorings

Controversy: Are e-cigarette mods and flavorings harmful?

- Both mods and flavors can make e-cigarettes attractive
 - Both as a harm reduction product and as a first-time approach to smoking
 - In some countries, use of flavorings in tobacco cigarettes has been banned
- Certain mods can be dangerous
 - Especially due to inadequate quality control where mixed at the retail outlet or at home compared to under highly controlled conditions at a factory
 - Can include cannabis or addictive drugs
- Flavorings may be harmless, but health tests are usually conducted by ingesting rather than inhaling their chemicals
- Due to youth vaping epidemic, U.S. Federal Drug Administration (FDA) has recently asked largest e-cigarette makers to reduce distribution to minors
 - If inadequate response, flavored e-cigarettes may be banned

7. Accidents

Controversy: Are the well-publicized accidents (e.g., explosions) common and dangerous?

- No one wants accidents, but they are rare
- Most due to deficient batteries, their charging or mods
- Some were the result of poor quality control early in the history of e-cigarettes
 - Recently, concern has moved away from accidents to their health effects
- In any case, The Committee on the Review of the Health Effects of Electronic Nicotine Delivery Systems (2018) found conclusive evidence that e-cigarette devices can explode and cause burns and projectile injuries

Modeling, estimates and uncertainties

- Estimating the net harm to health and mortality from vaping is complex
 - Continuing changes and diversity in products and how they are used
 - Uncertainty regarding future prevalence (e.g., dual use), health effects and cessation (from and to tobacco) effects are the result of limited medium-term and long-term studies
- Modeling should reflect expected risk distributions and adjust for changes in vaping/smoking conditions and use
- Partly because of the uncertainties, the WHO has indicated the importance of regulating e-cigarettes as a potential health hazard

Regulation and the insurance industry response

- A wide range of regulations by country
 - From outright ban to no regulation at all
 - Although an increasing number of countries are treating e-cigarettes the same as combustible tobacco cigarettes, others are developing specific rules, especially for e-cigarettes without nicotine
 - Restrictions include minimum age of purchaser, advertising and contents
- Actuaries need to keep up-to-date with new studies and developments
- Insurance industry practice also differs significantly
 - Common approach is to treat vaping and smoking in the same manner due to: dual use, ease of switching, difficulty in testing, and uncertainties

Related products

- The tobacco industry has begun to innovate
 - After a long-time of producing combustible tobacco cigarettes – a “cash-cow” product
- New products being developed
 - Several in Japan, in part because e-cigarettes are not legal
 - Heat-not-burn (HNB) cigarettes piloted there and are now 20% of market, e.g., the I-Quit-Ordinary-Smoking (IQOS) product
 - The few studies conducted of HNB products (all so far sponsored by HNB companies) indicate health effects are between combustible tobacco cigarettes and e-cigarettes
 - Low nicotine products may be forthcoming, resulting from possible U.S. maximum nicotine rules

Outstanding questions

- Can e-cigs help to further reduce or eliminate the use of combustible cigs?
- Will e-cigs lead to new or further use of combustible e-cigs?
- How much healthier are e-cigs than combustible cigs?
- Which components of e-cigs pose the greatest health risks and what action should be taken as a result?
- Is the recent increase in U.S. vaping among the youth a fad and will it spread to other countries?
- How will e-cigs evolve?
- What type of regulation will emerge and will they be effective?

Current conclusions

- The debate will continue
 - It is likely that e-cigarettes are less harmful than combustible tobacco cigarettes
 - But smoking is the most harmful preventable mortality driver
 - The lifecycle of their use, just as the products themselves, will continue to evolve
 - Key differences in opinion
 - Are they useful harm-reduction products compared with combustible tobacco cigarettes
 - Especially because of youth use and a nicotine component that is addictive, they might serve as a gateway to combustible tobacco cigarettes use or long-term use
- Research needed to address the controversies, including
 - Medium and long-term health risks
 - Effectiveness as a harm reduction product
 - Effects of product evolution

Thank you

sam.gutterman1@gmail.com

