

# **Myths & Truths about the Risks of Electronic Smoking Devices**

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# Electronic cigarettes & Heated Tobacco Products banned in Brazil

- Tobacco interests lobbying government to allow sales
- Brazil an international model of tobacco control with significant reduction in tobacco use as a result

# Myths

- Substantially safer than cigarettes
- Help smokers quit
- Don't appeal to kids



BRITISH AMERICAN TOBACCO







IMPERIAL BRANDS



With Altria licensing agreements

# Types of e-cigarettes

Product	Description	Some Brands
<b>Disposable e-cigarette</b> 	Cigarette-shaped device consisting of a battery and a cartridge containing an atomizer to heat a solution (with or without nicotine). Not rechargeable or refillable and is intended to be discarded after product stops producing aerosol. Sometimes called an e-hookah.	NJOY OneJoy, Aer Disposable, Flavorvapes
<b>Rechargeable e-cigarette</b> 	Cigarette-shaped device consisting of a battery that connects to an atomizer used to heat a solution typically containing nicotine. Often contains an element that regulates puff duration and /or how many puffs may be taken consecutively.	Blu, GreenSmoke, EonSmoke
<b>Pen-style, medium-sized rechargeable e-cigarette</b> 	Larger than a cigarette, often with a higher capacity battery, may contain a prefilled cartridge or a refillable cartridge (often called a clearomizer). These devices often come with a manual switch allowing to regulate length and frequency of puffs.	Vapor King Storm, Totally Wicked Tornado
<b>Tank-style, large-sized rechargeable e-cigarette</b> 	Much larger than a cigarette with a higher capacity battery and typically contains a large, refillable cartridge. Often contains manual switches and a battery casing for customizing battery capacity. Can be easily modified.	Volcano Lavatube

# JUUL



**THIS IS NOT  
A FLASH DRIVE.**

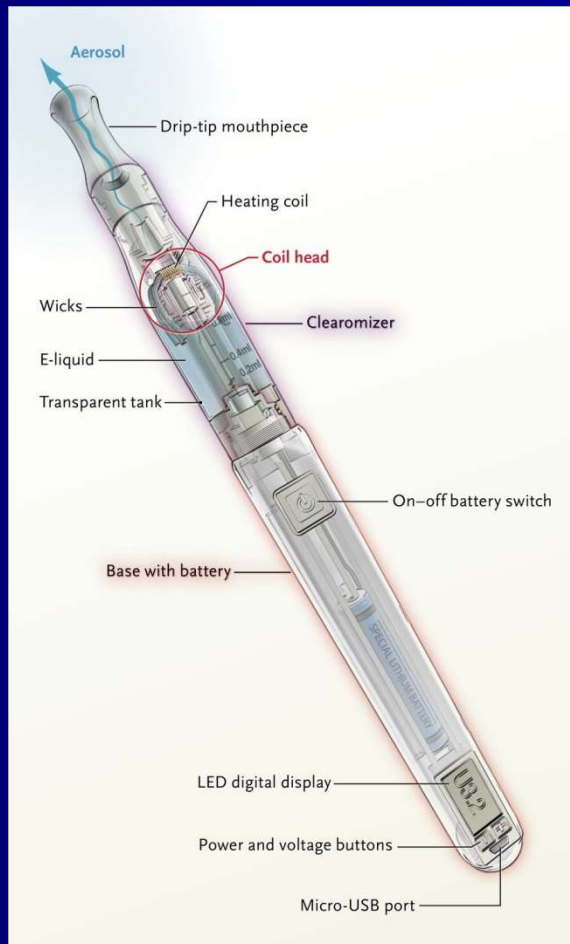
**it's flavored tobacco.**

[FlavorsHookKids.org](http://FlavorsHookKids.org)

# Many shapes and sizes

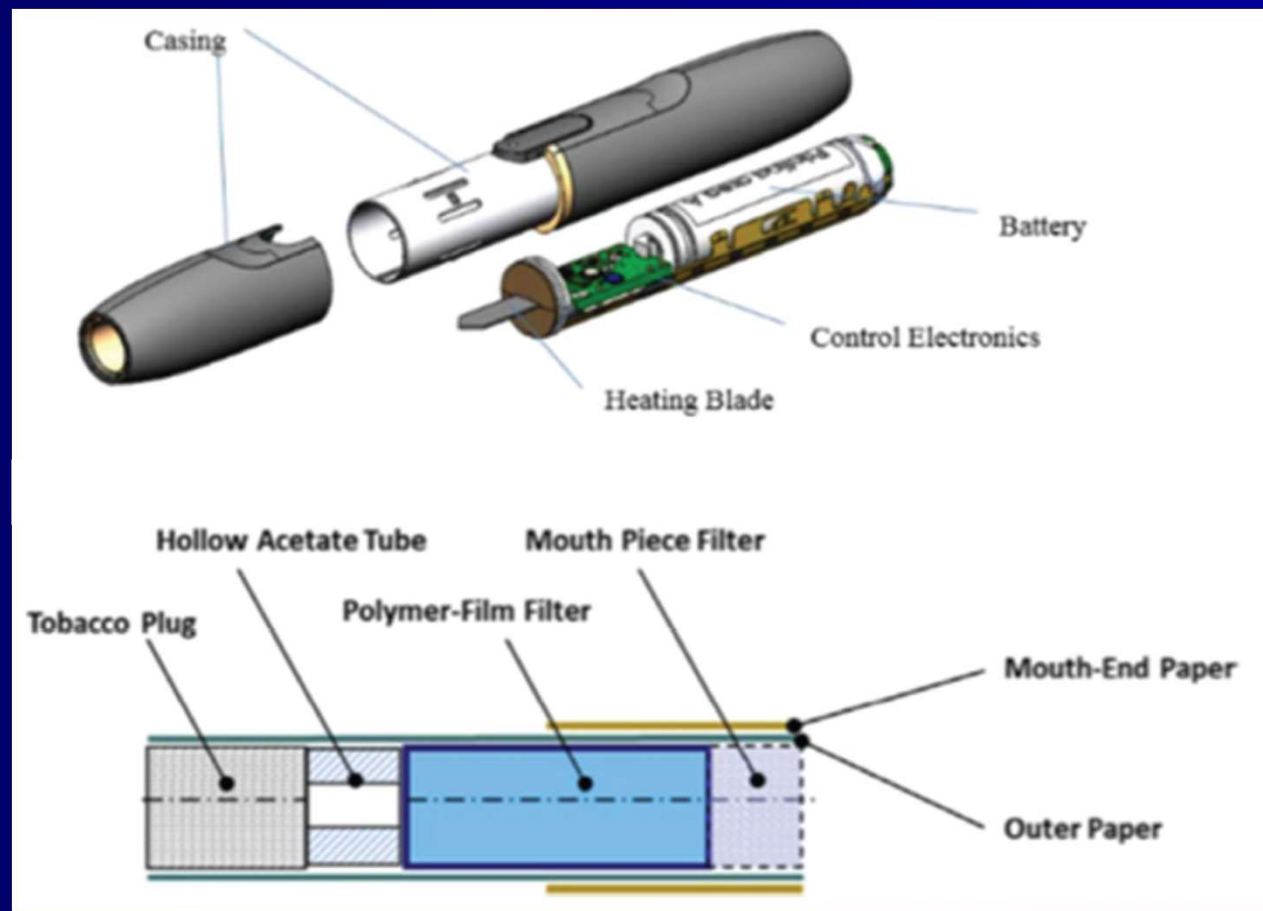


# How e-cig works





# How HTP works



# JUUL on Instagram



**JUUL** juulvapor • Following

**juulvapor** It's an Auto-Ship Gold Rush. Limited Edition Blush Gold is now available online while supplies last, exclusively for #JUUL Auto-Ship Subscribers. Click the link in our bio to learn more. .

WARNING: This product contains nicotine. Nicotine is an addictive chemical. #juulvapor

Load more comments

**dancquach** @phillyfreeze1 @dnovakowski @kay\_rey

**pauldedo** @juulvapor thank you!

**mxkeyyh** kids like u

**advxcadxs** @666whoami666 creme brulee same thing

**klake10** @xo\_\_lala



3,231 likes

4 DAYS AGO

Add a comment...

April 4, 2018, <https://www.instagram.com/p/BhKfDqrg9Xz/?taken-by=juulvapor>

# Launch Parties

JUUL

JUUL  @JUULvapor · 4 Jun 2015

Having way too much fun at the #JUUL launch party #LightsCameraVapor #NYC

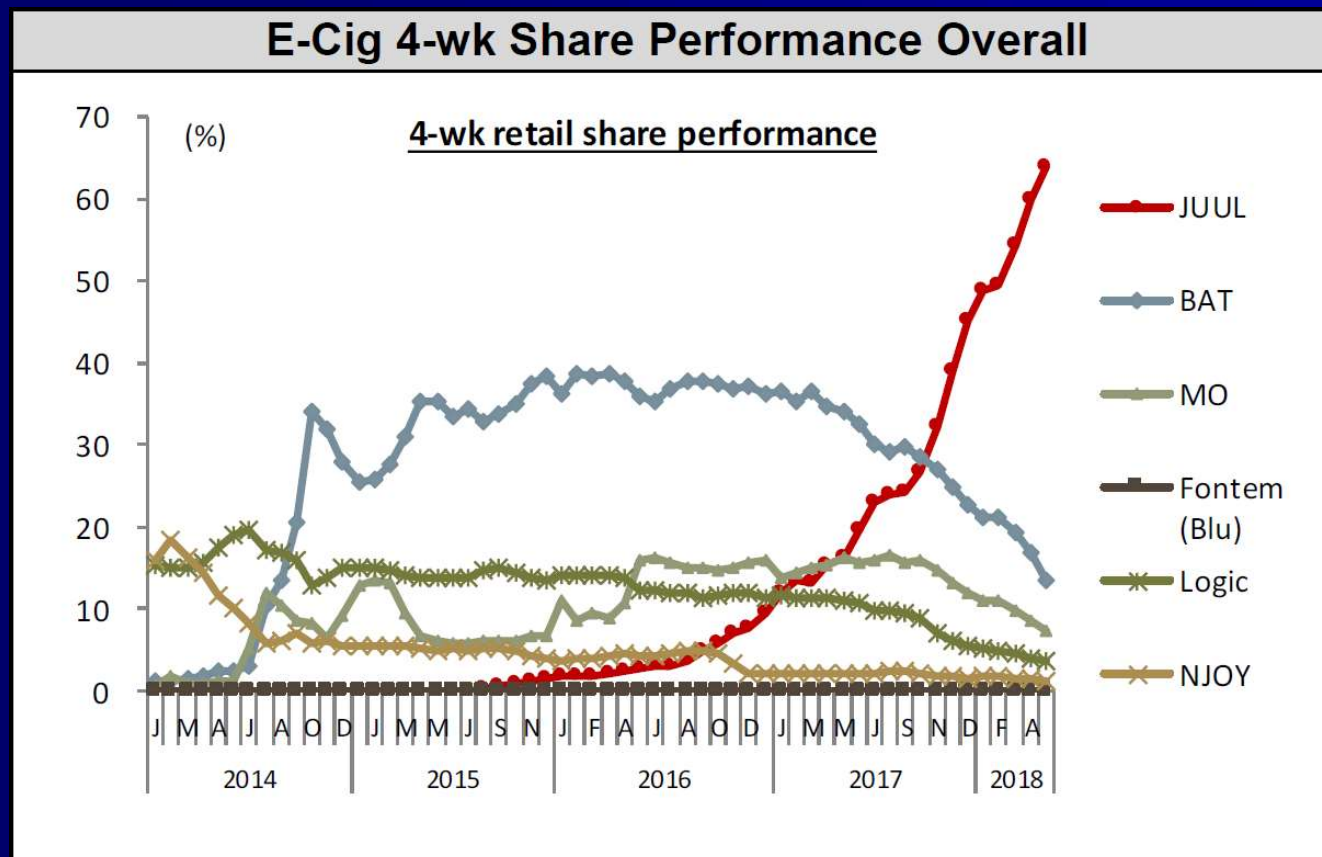


June 4, 2015 <https://twitter.com/JUULvapor/status/606656253885038592>

# It worked: US social media

- Seven Juul related accounts had over a *250,000* followers
- Juul related YouTube videos exceeded 100,000
- More than 15,000 members discussed Juul on Reddit

# It worked

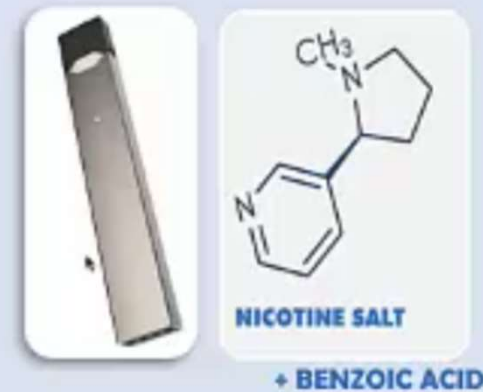


**Source:** Nielsen Total US xAOC/Convenience Database & Wells Fargo Securities, LLC (c/o TFK)

# More than clever marketing

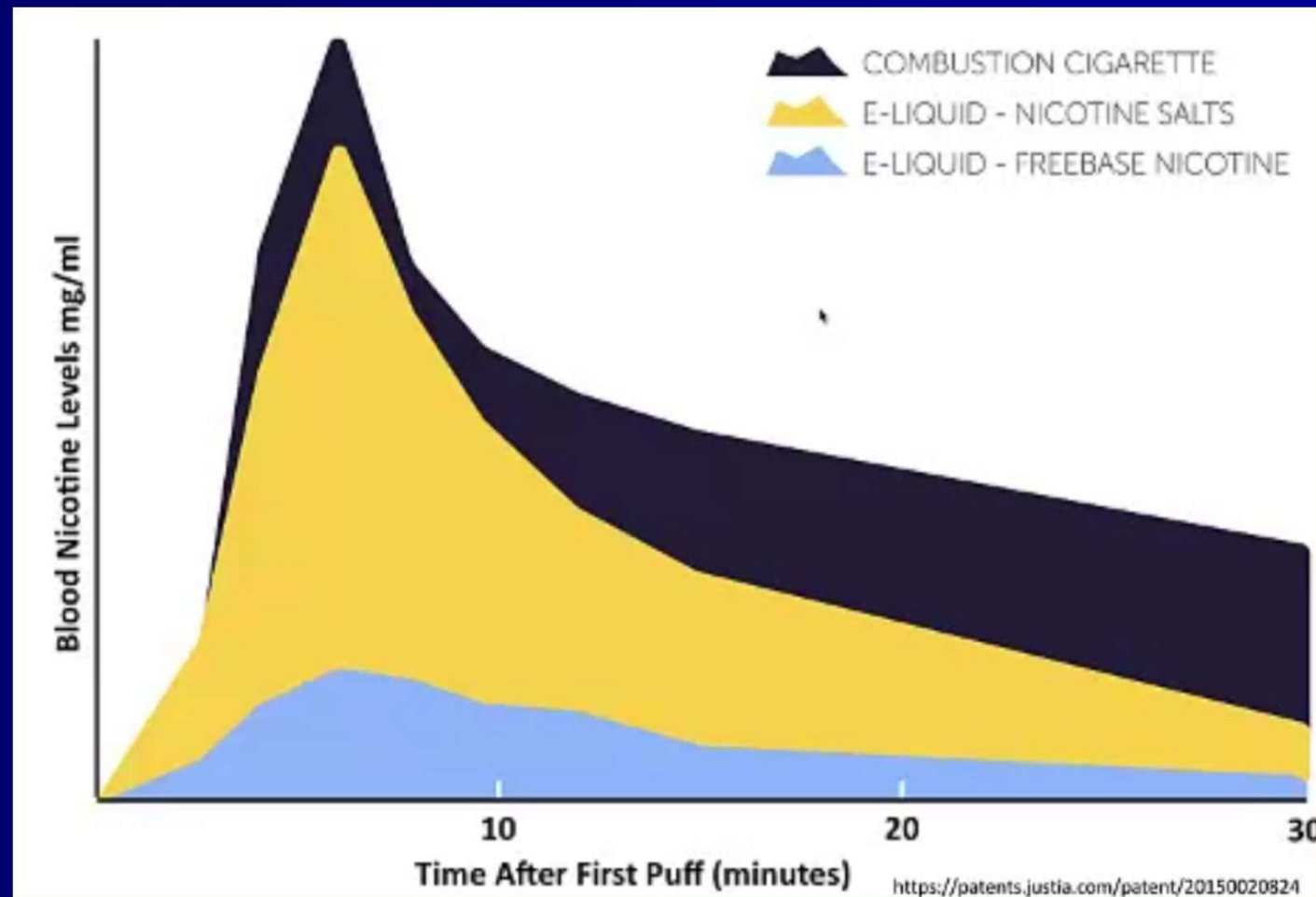


**Basic pH**  
**Irritating**  
to throat  
**Tolerability limited**  
**Good Stability**



**Acidic/Neutral pH**  
**Smoother "hit"**  
to throat  
**Tolerability enhanced**  
**Improved Stability**

# More & faster nicotine absorption



# 95% safer?



**Adiction Research**

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## E-cigarette industry funded experts who ruled vaping is safe: Official advice is based on research scientists in the pay of manufacturers

David J. Nutt<sup>3</sup> | La Martin Dockrell<sup>4</sup> | Anders Milton<sup>1</sup> | R

<sup>3</sup>Imperial College London, Science, and Facilitations | UK; <sup>4</sup>TACTAC Communicat Dundee, UK; <sup>5</sup>Faculty of L of Medicine, Hershey Pa., I Consulting, Stockholm, Sv Prevention and Cure of To

**Key Words**  
Smoked tobacco pro Electronic cigarettes - Harm assessment - EN systems)

**Abstract**  
**Background:** An intern Independent Scientific multi-criteria decision

- PHE called for electronic 'nicotine sticks' to be prescribed on the NHS
- Agency claimed using e-cigarettes is 95% safer than smoking tobacco
- But assertion relied on study by scientists in pay of e-cigarette industry
- Experts say conflict of interest raises questions about report's findings

By BEN SPENCER, MEDICAL CORRESPONDENT FOR THE DAILY MAIL  
PUBLISHED: 20:39 EDT, 27 August 2015 | UPDATED: 07:51 EDT, 1 September 2015

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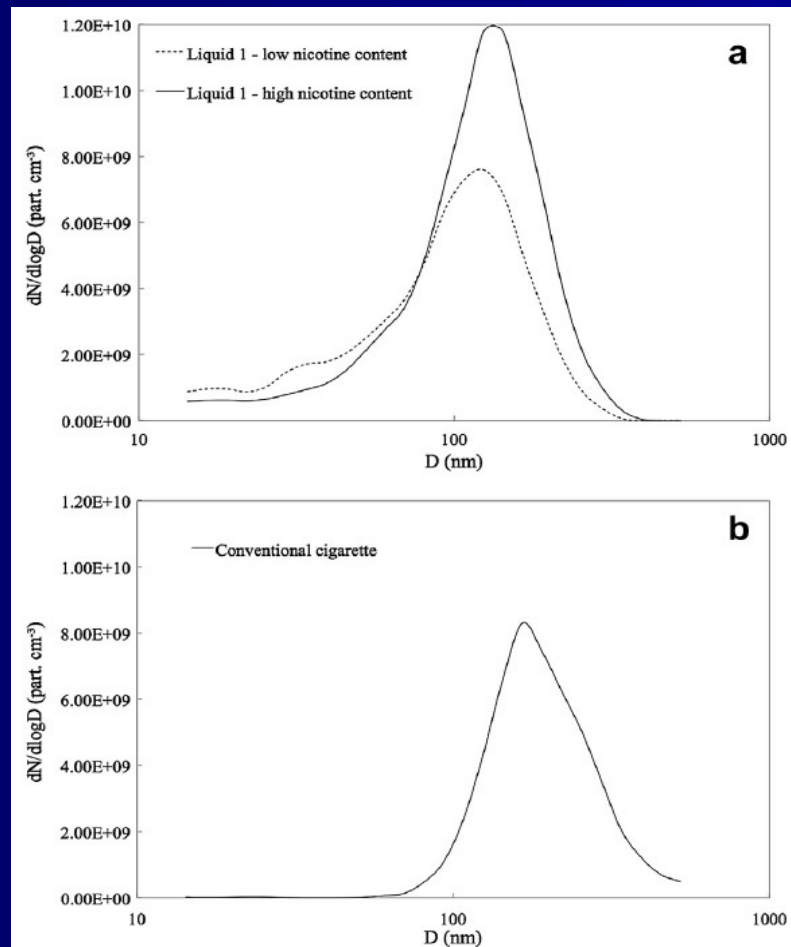
# E-cigarettes deliver lower levels of some toxins

Toxins	e-cigarette (15 puffs)	conventional cigarette	Nicotine inhaler
Formaldehyde (µg)	0.20 - 5.61	1.6 – 52.0	0.20
Acetaldehyde (µg)	0.11 - 1.36	52.0 – 140.0	0.11
Acrolein (µg)	0.07 - 4.19	2.4 – 62.0	ND
o-methylbenzaldehyde (µg)	0.13 - 0.71	--	0.07
Toluene (µg)	ND - 0.63	8.3 – 70.0	ND
p,m-xylene (µg)	ND - 0.2	--	ND
NNN (ng)	ND - 0.00043	0.0005 - 0.19	ND
NNK (ng)	ND - 0.00283	0.012 - 0.11	ND
Cadmium (µg)	ND - 0.022	--	0.003
Nickel (µg)	0.01 - 0.03	--	0.019
Lead (µg)	0.003 - 0.057	--	0.004

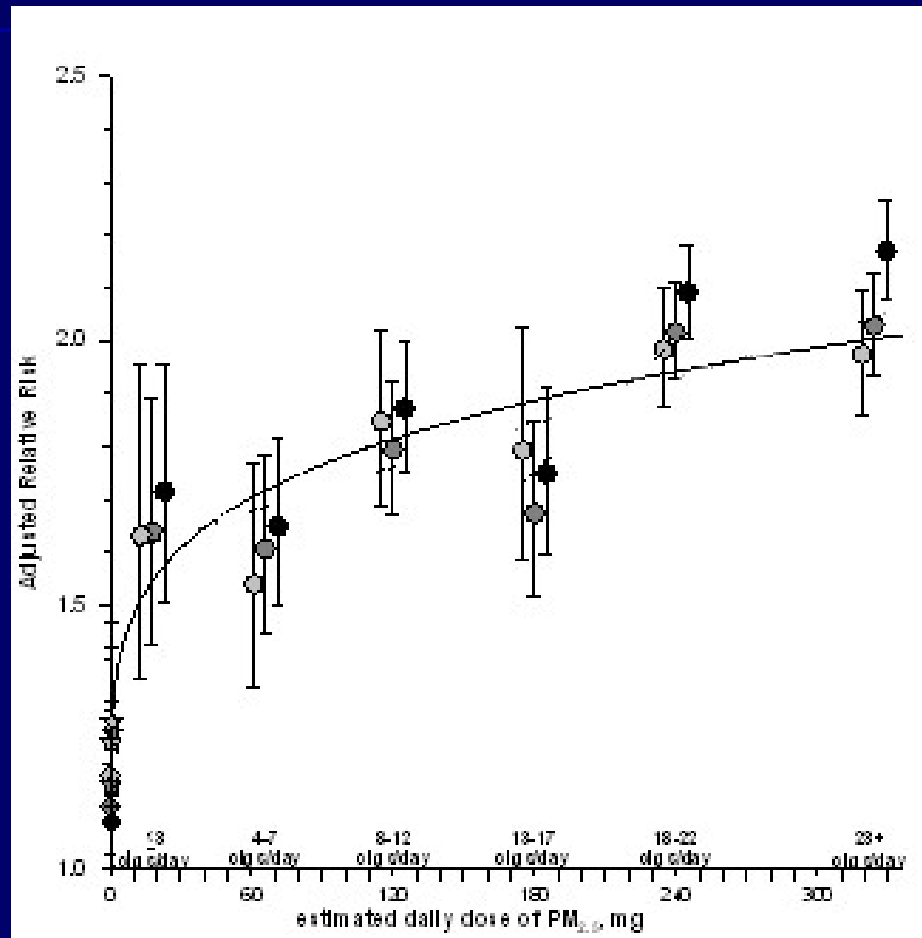
ND = Not Detected; -- = not reported

Data from Goniewicz et al. 2013 using lowest and highest values reported

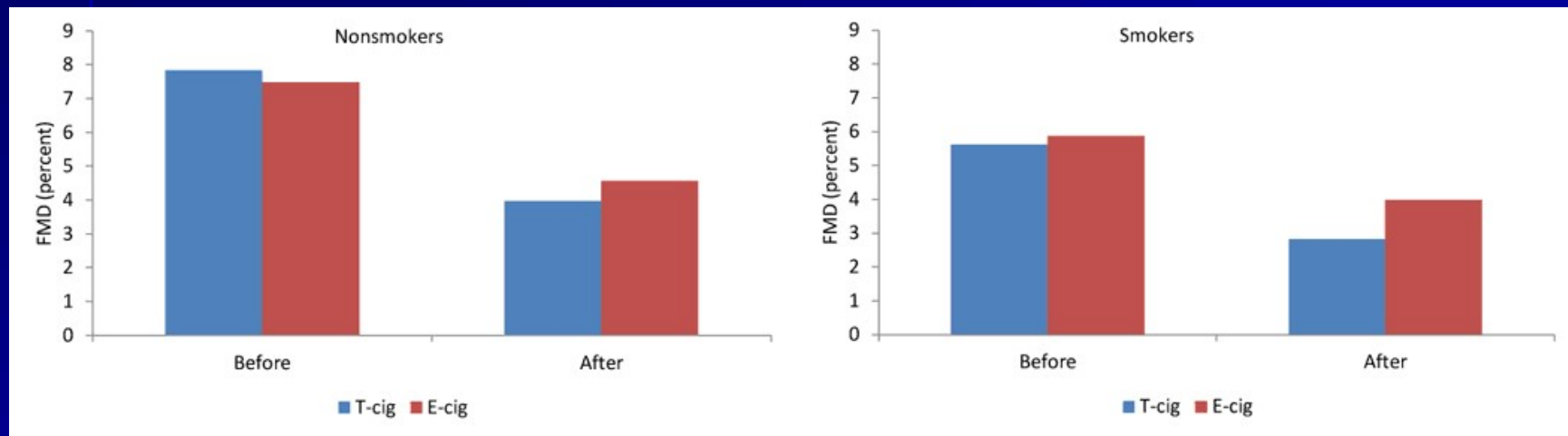
# But, particles from e-cigs are like cigarettes



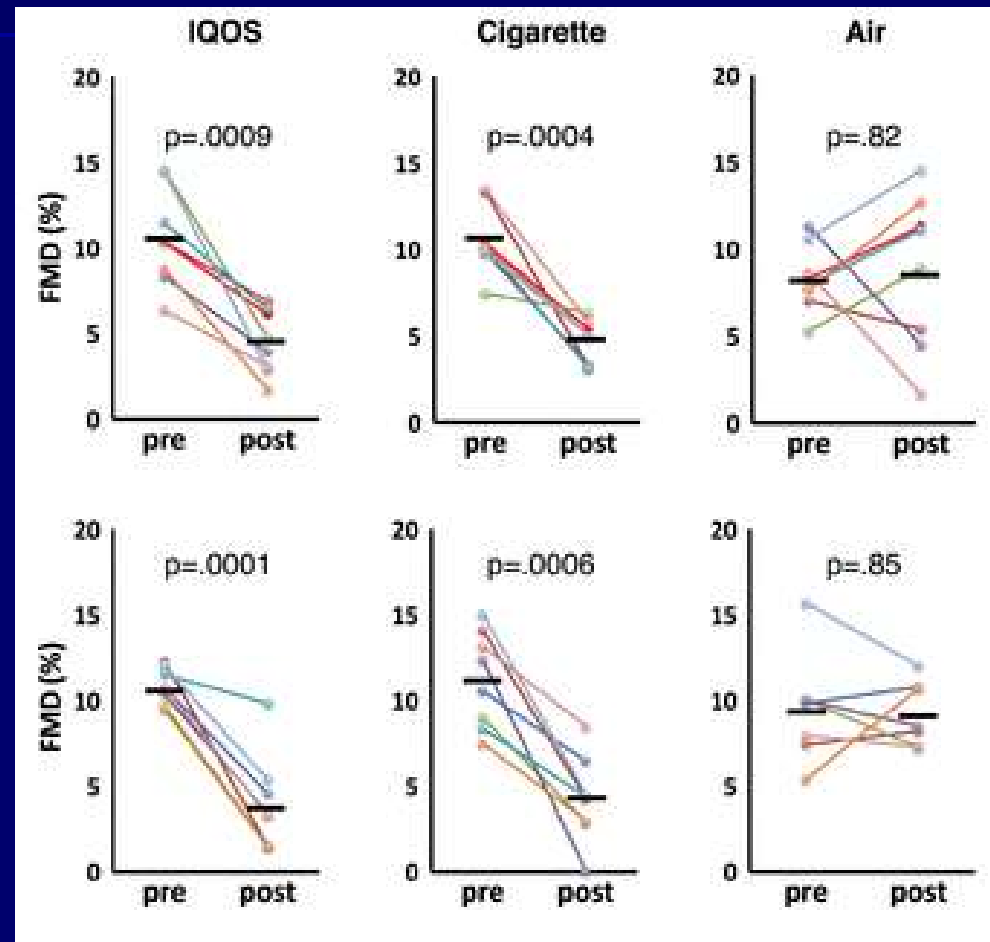
# Nonlinear dose-response: particles and heart disease



# Vascular effects of cigarettes and e-cigs

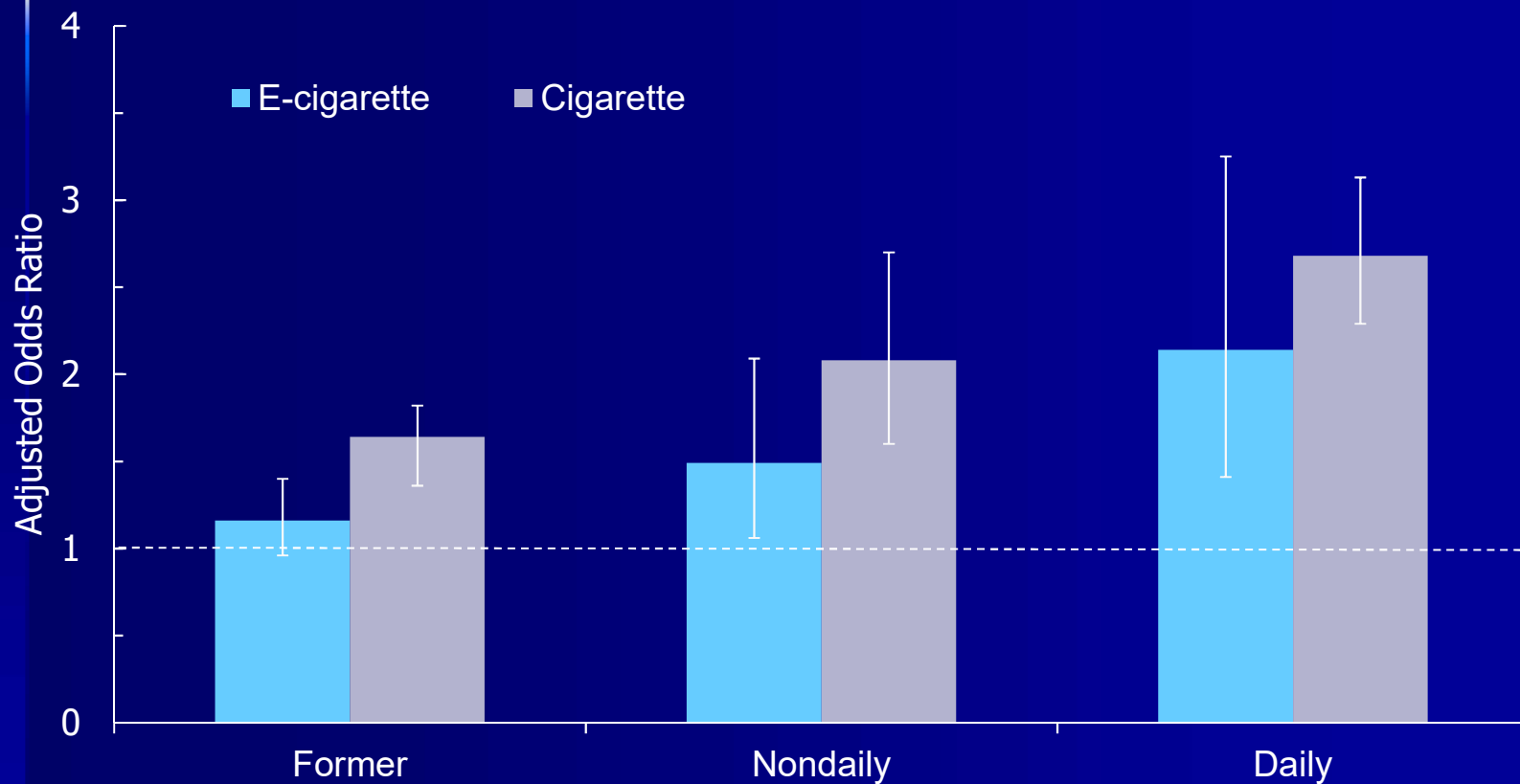


# IQOS is like cigarettes



Nabavizadeh et al. Vascular endothelial function is impaired by aerosol from a single IQOS HeatStick to the same extent as by cigarette smoke. *Tob Control*. 2018 Nov;27(Suppl 1):s13-s19

# Heart attack risk of cigarettes and e-cigs



Alzahrani , et al. Association Between Electronic Cigarette Use and Myocardial Infarction. Am J Prev Med. 2018 Oct;55(4):455-461. (updated to include 2014-2016 NHIS)

# Lung toxicants in e-cigs

E-liquid  
Base



VG



PG



# COPD increased risk

- 2013-4 PATH
  - including emphysema, chronic bronchitis
- Ecigs every day or some day
- Propensity score matching
  - Including smoking and SHS
- COPD odds ratio 1.86 (95% 1.22-2.83)



## *First Death in a Spate of Vaping Sickesses Reported by Health Officials*



Since June, 193 people in 22 states have reported vaping-related injuries, the C.D.C. said.  
Jason Henry for The New York Times

By Matt Richtel and Sheila Kaplan

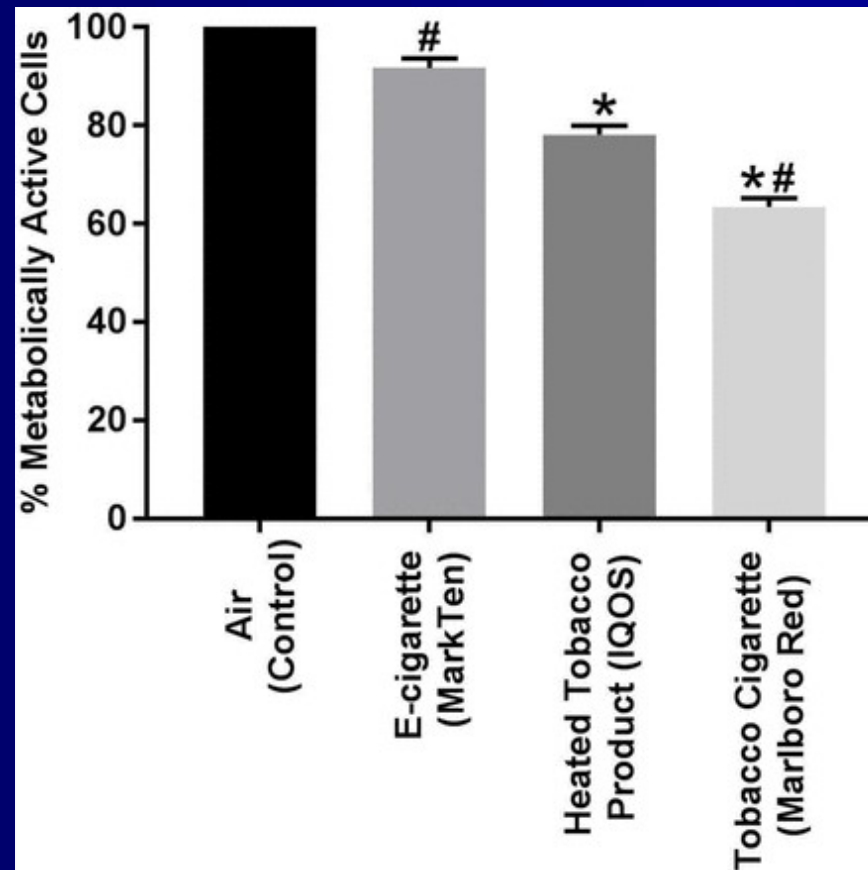
Aug. 23, 2019



A patient in Illinois is the first to die of a mysterious lung illness linked to vaping, public health officials announced on Friday.

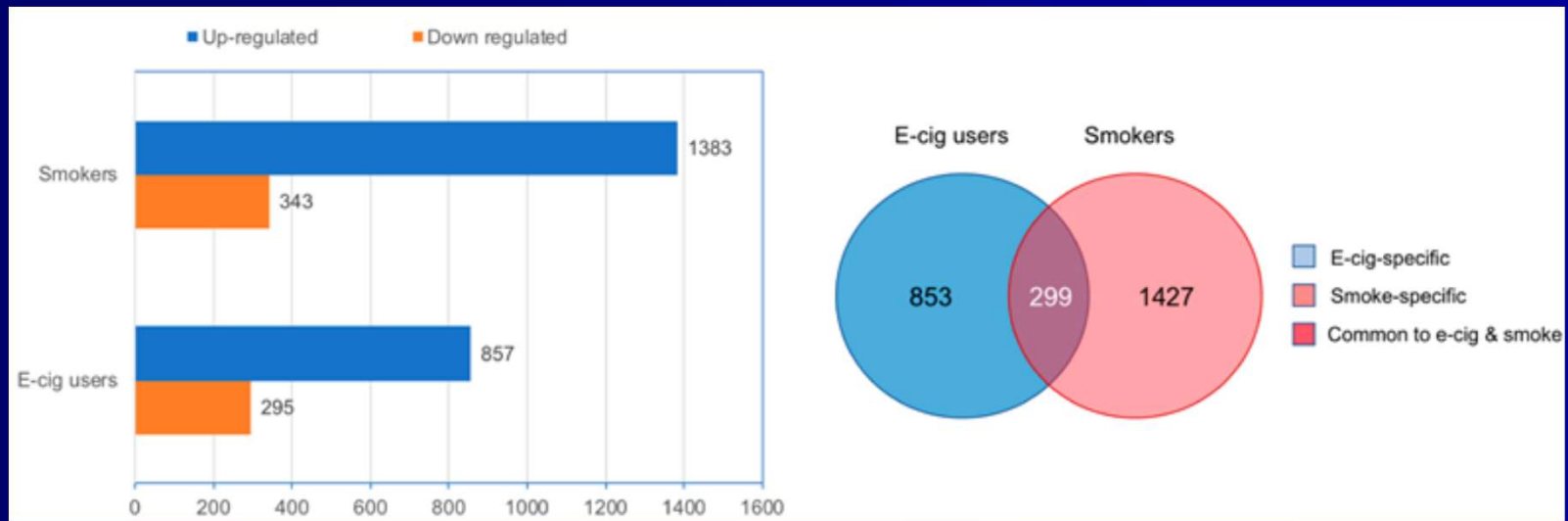
The death occurred as doctors and hospitals nationwide report an increasing number of vaping-related respiratory illnesses this summer: 193 cases have now been reported in 22 states, including

# IQOS hurts lung more than e-cigs



Leigh et al. Cytotoxic effects of heated tobacco products (HTP) on human bronchial epithelial cells. *Tob Control*. 2018 Nov;27(Suppl 1):s26-s29

# E-cigs and Cancer



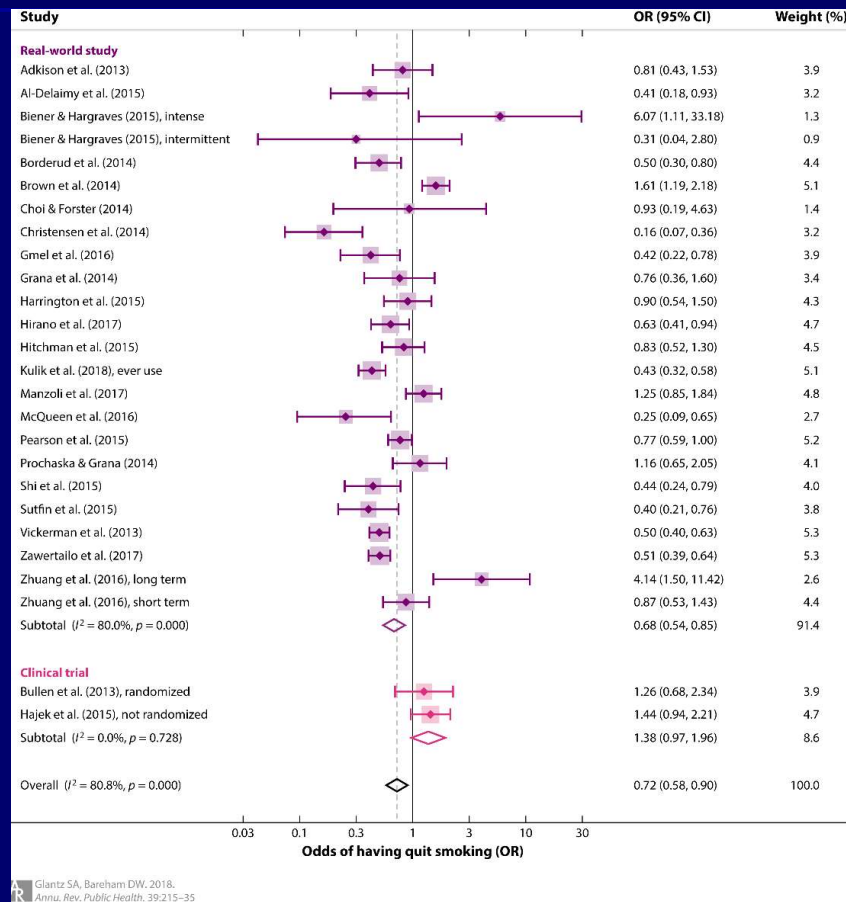
Tommasi et al. Deregulation of Biologically Significant Genes and Associated Molecular Pathways in the Oral Epithelium of Electronic Cigarette Users. *Int. J. Mol. Sci.* 2019, 20(3), 738; <https://doi.org/10.3390/ijms20030738>

# PMI data shows IQOS has clinical effects like cigs

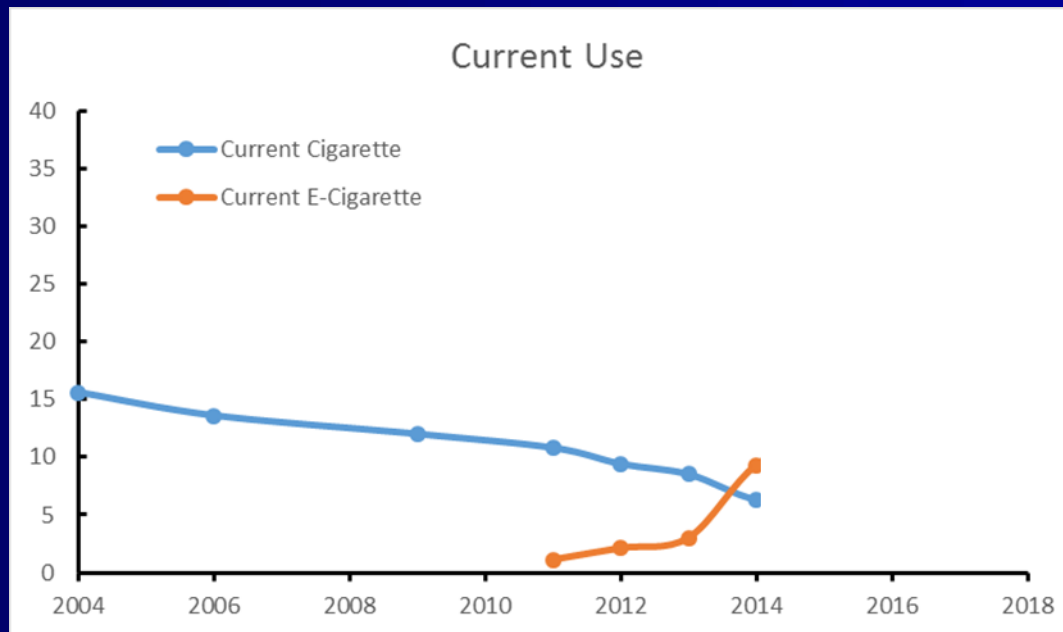
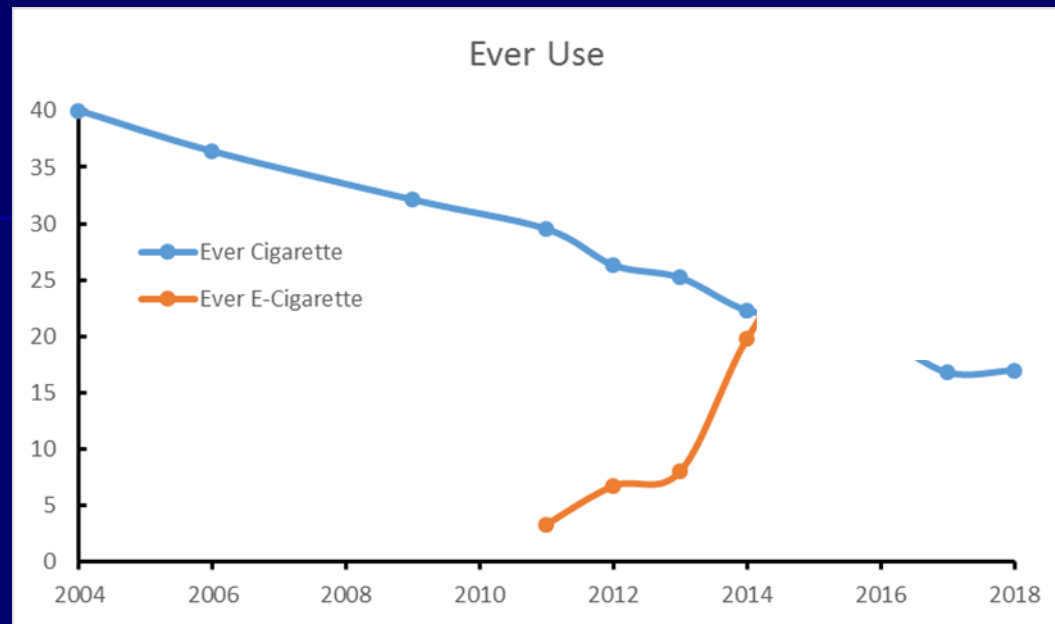
- Inflammation
- Oxidative stress
- Cholesterol and triglycerides
- Blood pressure
- Lung function

Glantz S. PMI's own in vivo clinical data on biomarkers of potential harm in Americans show that IQOS is not detectably different from conventional cigarettes.. Tob Control. 2018 Nov;27(Suppl 1):s9-s12.

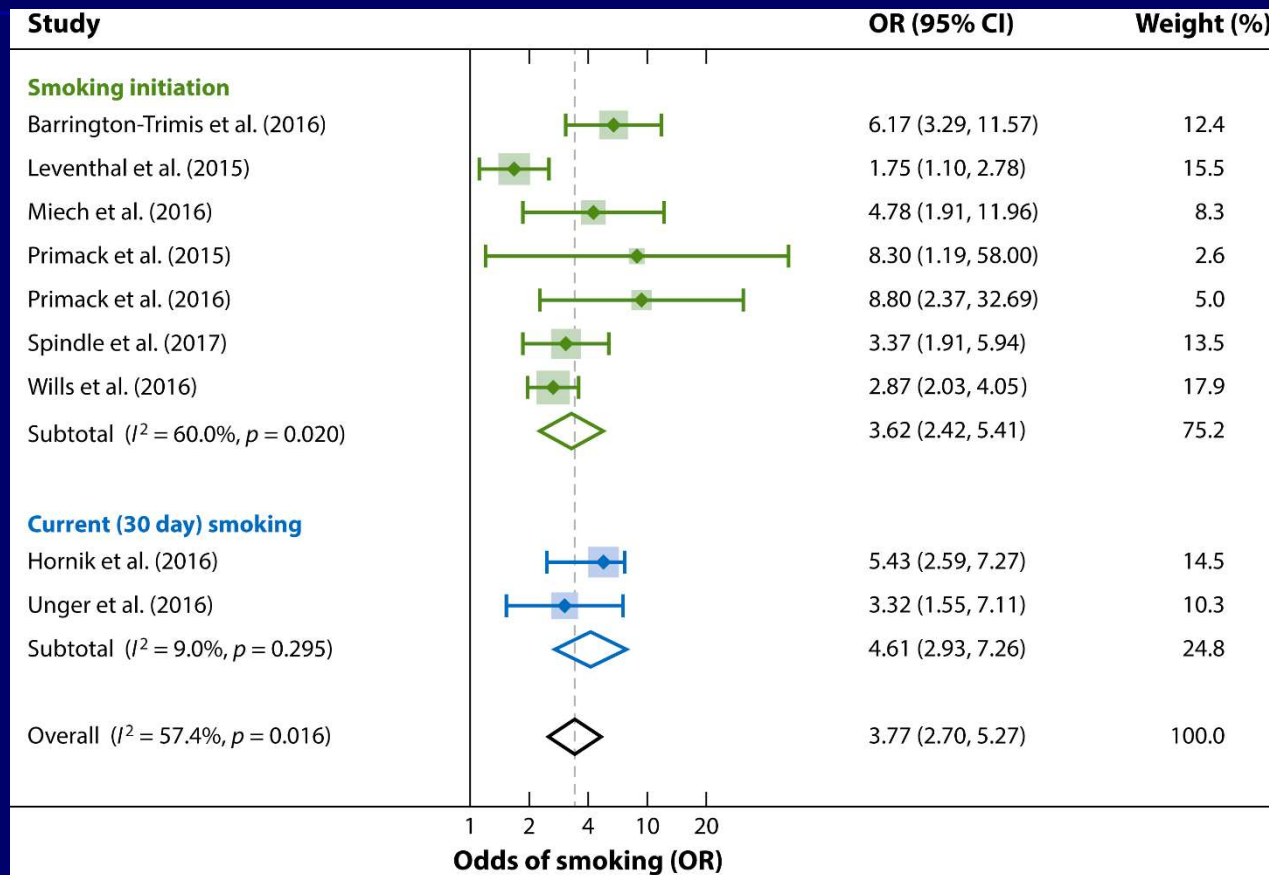
# Population Studies of *all* smokers: E-cigarettes = less quitting



# What about kids?



# Longitudinal Youth Studies



# 80 kids start for every smoker that quits

 PLOS ONE

RESEARCH ARTICLE

## Quantifying population-level health benefits and harms of e-cigarette use in the United States

Samir S. Soneji<sup>1,2\*</sup>, Hai-Yen Sung<sup>3</sup>, Brian A. Primack<sup>4</sup>, John P. Pierce<sup>5,6</sup>, James D. Sargent<sup>1,2\*</sup>

1 Norris Cotton Cancer Center, Geisel School of Medicine at Dartmouth, Lebanon, NH, United States of America, 2 Dartmouth Institute for Health Policy & Clinical Practice, Geisel School of Medicine at Dartmouth, Lebanon, NH, United States of America, 3 Institute for Health & Aging, School of Nursing, University of California, San Francisco, San Francisco, CA, United States of America, 4 Division of General Internal Medicine, Department of Medicine, School of Medicine, University of Pittsburgh, Pittsburgh, PA, United States of America, 5 Moores Cancer Center, University of California, San Diego, San Diego, CA, United States of America, 6 Department of Family Medicine & Public Health, University of California, San Diego, San Diego, CA, United States of America

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 Check for updates

**OPEN ACCESS**

**Citation:** Soneji SS, Sung H-Y, Primack BA, Pierce JP, Sargent JD (2018) Quantifying population-level health benefits and harms of e-cigarette use in the United States. *PLoS ONE* 13(3): e0193328. <https://doi.org/10.1371/journal.pone.0193328>

**Editor:** Mark Allen Pechousek, University of Montana, UNITED STATES

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**Data Availability Statement:** All relevant data have been uploaded to the Harvard Dataverse and are accessible using the following DOI: [10.7927/H729/CV](https://doi.org/10.7927/H729/CV).

**Funding:** This work was supported by the National Institute of Health [R01CA19792 to S.S., R01CA077026 to J.S., R01-CA140150 and R21-CA185767 to B.P., and R01-CA190347 to J.P.P.]. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

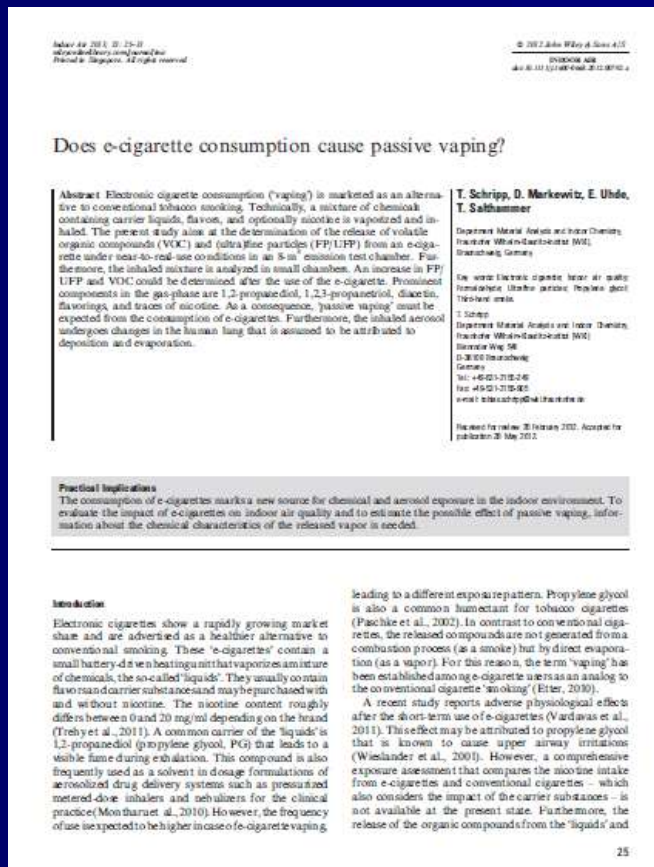
PLOS ONE | <https://doi.org/10.1371/journal.pone.0193328> March 14, 2018

1/19

- Probably worse than that
- Most optimistic quitting estimate
- Youth numbers predate Juul & explosion of youth use



# E-cigs pollute the air



- Less polluting than cigs
- But elevated
  - Acetic acid
  - Acetone
  - Isoprene
  - Formaldehyde
  - Acetaldehyde
  - Fine particles
- Bystanders absorb nicotine

# The bottom line

- Combustion is not as important as we thought
- Rapid youth uptake
  - Promoting progression to cigarettes
- Deterring quitting
- Pollute nonsmokers' air
- Dual use more dangerous than just smoking
- Expanding the tobacco epidemic

# Policy response

- Keep e-cigs and HTP illegal
- Public education to debunk safety and cessation claims
  - May be as dangerous as cigarettes
  - Make it harder to quit cigarettes
  - Dual use is more dangerous than just smoking

# FlavorsHookKids.org

