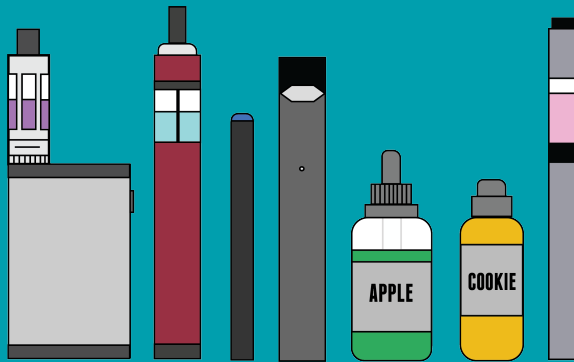


What's the deal with E-cigarettes?

Steven H. Kelder, PhD, MPH



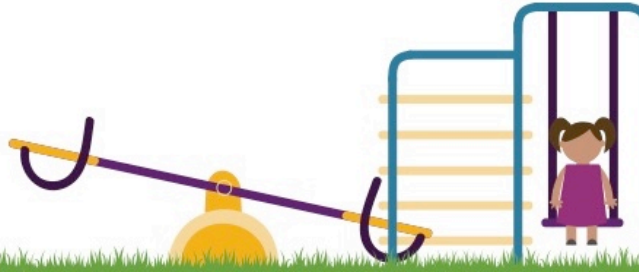
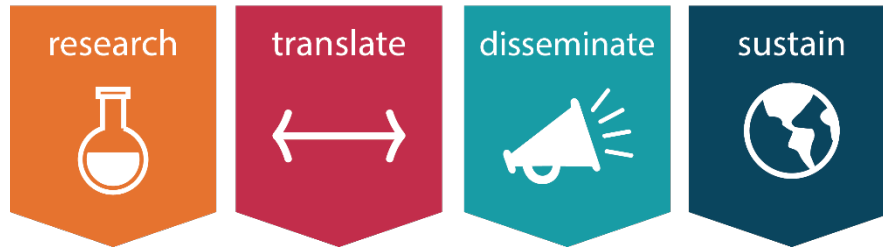


MICHAEL & SUSAN DELL CENTER *for* HEALTHY LIVING

Healthy children in a healthy world.

We advance health and healthy living for children and families through cutting-edge research, innovative community-based programs, and dissemination of evidence-based practices.

STRATEGIC PLAN GOALS



JOEL PITT

...AND THERE'S NO WAY THEY'RE AS DANGEROUS AS TOBACCO... I THINK... HOPE.. UNLESS THEY ARE...

E-Cig



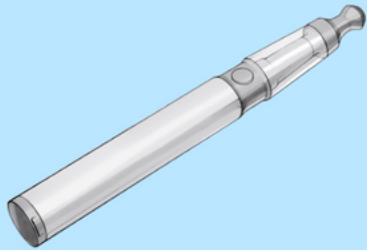
12/14/14

Public Health Debate



Harm Re

- E-cigare
- than co
- E-cigare
- without



E-CIGARETTES
CANNOT SIMPLY BE CATEGORIZED AS
EITHER BENEFICIAL OR HARMFUL.

WHAT DOES THE SCIENCE SAY?



Read the report at
nationalacademies.org/eCigHealthEffects

 #eCigHealthEffects

S

e nicotine.
e attracted
nd flavors.
equences

Two Comprehensive Reports

*The National
Academies of*

SCIENCES
ENGINEERING
MEDICINE

About Ordering Information New Releases

2018 NAS Report



E-Cigarette Use Among Youth and Young Adults

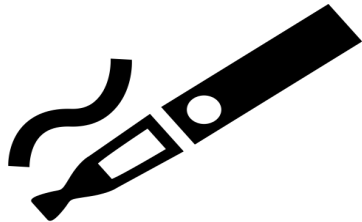
A Report of the Surgeon General

2016 CDC Report



U.S. Department of Health and Human Services

This talk is divided into 4 parts...



E-Cigarette Basics



Aerosol Contents



Health Risks



Marketing Tactics

The components of E-Cigarettes (Ecigs)



Number of parts in a basic e-cig

- Battery
- Atomizer
- Cartridge



The Rise of E-Cigarettes



The closed system:

The cig-alike: similar in size and shape to a traditional cigarette. Disposable, and cannot be used again (\$).

The open system:

- **Reusable with disposable parts**: Contain a rechargeable battery where the cartomizer is disposable - no need for e-liquids or refilling etc (\$\$).
- **The “APV” (advanced personal vaporizer) or “mod” (modification)**: These e-cigs have a rechargeable battery and refillable cartomizers (\$\$\$).

Cig-A-Likes



-
-



Variations



PREMIUM DISPOSABLE
E-HOOKAH



Watch out for JUUL!



mango

It's back.

BUY NOW



SIGN UP TO GET THE LATEST JUUL NEWS AND EXCLUSIVE OFFERS



Experience intensely satisfying vapor

TRY NOW

JUUL

\$49.99

FREE SHIPPING

Everything you need to get started in one package:

1 x rechargeable JUUL device

1 x Multi JUULpod 4-pack*

USB charger

1 year device warranty

ADD TO CART

Taxes vary by location

*Contains one JUULpod each of Virginia Tobacco, Cool Mint, Fruit Medley and Creme Brulee. Each JUULpod contains 0.7mL with 5% nicotine by weight, approximately equivalent to 1 pack of cigarettes or 200 puffs.

MAKE IT MONTHLY.

Sign up for Auto-Ship

15% OFF

your next purchase

 AUTO-SHIP



MICHAEL & SUSAN DELL
CENTER for HEALTHY LIVING

What's wrong with this picture?

JUULpod

\$15.99 per 4-pack

FREE SHIPPING*

Each pack contains 4 pods. Each JUULpod contains 0.7mL with 5% nicotine by weight, approximately equivalent to 1 pack of cigarettes or 200 puffs.

What does .7ml with 5% nicotine mean?

No product information about mg/ml.

No product information on the cartridge.

mango

QTY

cool
mint

QTY

virginia
tobacco

QTY

fruit
medley

QTY

creme
brulee

QTY

(<https://www.juulvapor.com/shop-pods>; accessed at 2/14/2018; 12:51 pm)

How to Choose the **RIGHT** E-Liquid Nicotine Strength

For Your Device!



0-3
mg



6-12
mg



12-18
mg

- E-Liquid strength is measured in milligrams (weight) per milliliter (volume); expressed as mg/mL
- E-Liquid, or E-Juice, comes in many strengths depending largely on the manufacturer, sometimes even as high as **42 or 56 mg/mL**



“Below is a general guide that can help you work out the correct nicotine strength required.

Due to [Tobacco Products Directive](#) (known as TPD for short) that came into effect on **20th of May 2017**, **the maximum strength of nicotine in an e-liquid sold in the UK (and EU) is now limited to 20mg/ml (or 2.0%).**”

www.Vaporized.co.uk

E-liquid nicotine strength:

3mg/ml or 0.3% (Very low)

6mg/ml or 0.6% (Low)

12mg/ml or 1.2% (Medium)

18mg/ml or 1.8% (High)

20mg/ml or 2.0% (Very high)

Suitable for people smoking:

Up to 5 cigarettes a day

Up to 10 cigarettes a day

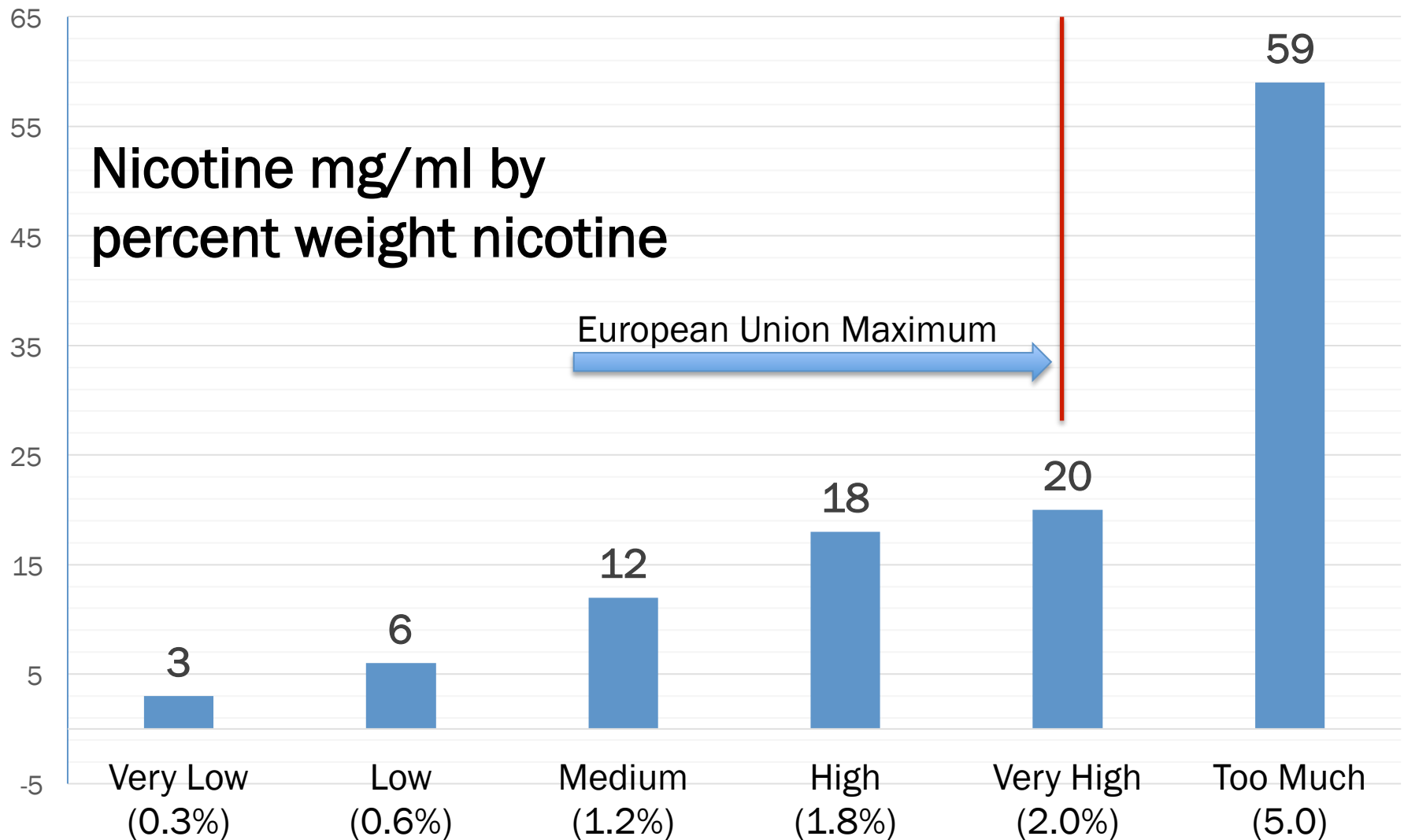
Up to 20 cigarettes a day

Up to 30 cigarettes a day

Up to 40 cigarettes a day

(<http://www.vaporized.co.uk/are-you-using-the-right-strength-of-nicotine/>;
accessed 2018)

How Much Nicotine is Too Much?

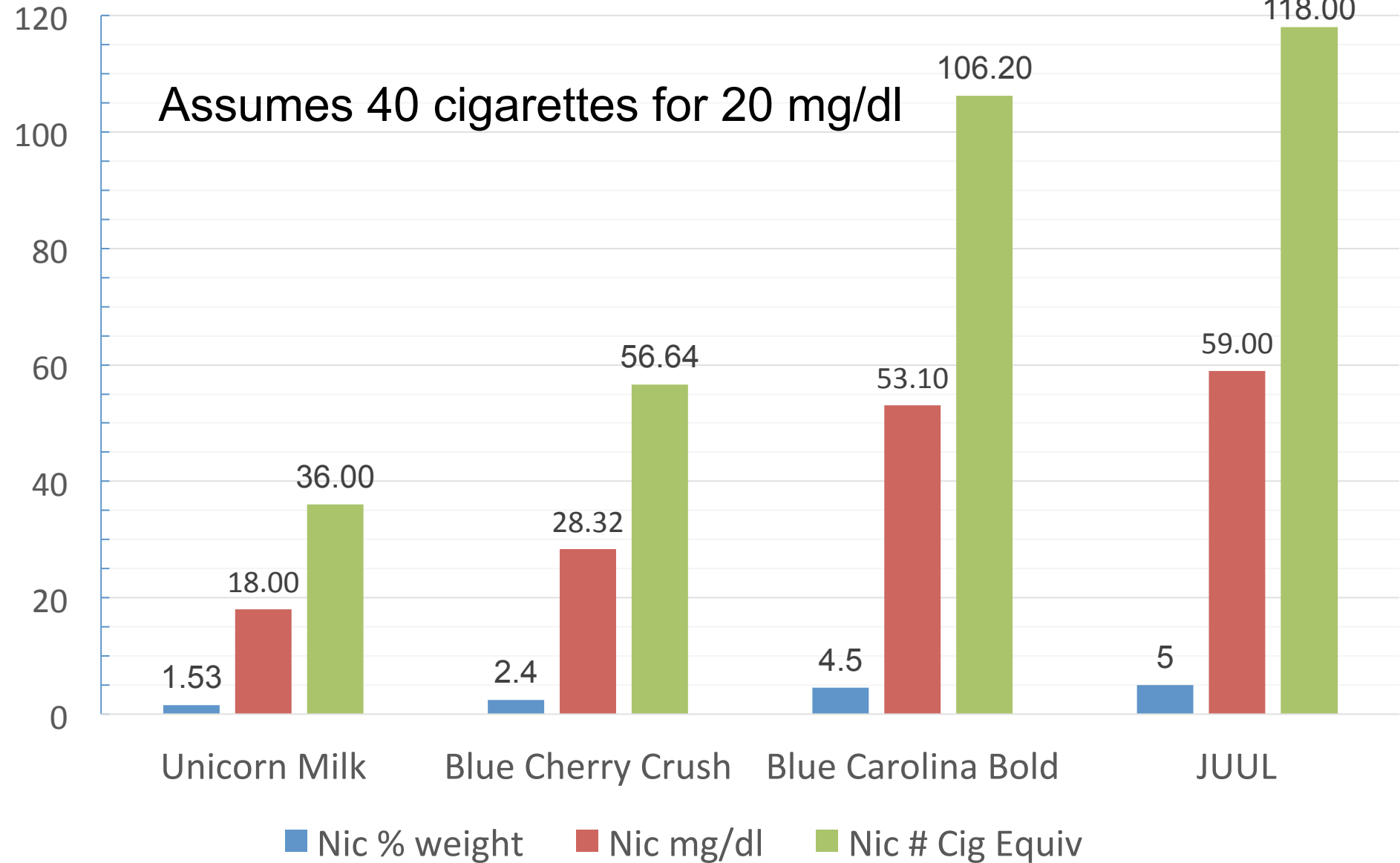


(<http://www.vaporized.co.uk/are-you-using-the-right-strength-of-nicotine/>;
accessed 2-21-2018)

Equivalents across differing brands and nicotine concentrations



Assumes 40 cigarettes for 20 mg/dl



Teenagers Say JUUL Is A Discreet Way To Vape In Class : Shots - NPR

<https://www.npr.org/.../teenagers-embrace-juul-saying-its-discreet-enough-to-vape-in-cla...>

Dec 4, 2017 - The long term effects of vaping e-liquids — a solution of propylene glycol, vegetable glycerine, flavors and nicotine or **hash oils** – are still not known, says Morean, who is an author on the study. But researchers are skeptical that the vapor is harmless. "You're still breathing in like hot chemicals into your ...

JUUL E-Cig Buy Online | Electric Tobacconist® | Paypal Accepted

<https://www.electrictobacconist.com/juul-m54> ▼

Shop our **JUUL** range, including the **JUUL V3**, pods and batteries. Shop now with free shipping on orders over \$20 at Electric Tobacconist® USA. PayPal accepted.

8 Best THC Cartridges On The Market • Green Rush Daily

<https://greenrushdaily.com> > Technology ▼

Mar 16, 2017 - Weed consumption is at an all-time high in the United States. One cannabis product rapidly increasing in popularity is the pre-filled **hash oil** pen aka THC cartridges. The THC cartridges are then screwed onto a 510 thread battery for vaporization. You can consume cannabis discreetly with a vape pen and ...

Hash oil in Juul? : juul - Reddit

https://www.reddit.com/r/juul/comments/6806rd/hash_oil_in_juul/ ▼

Apr 28, 2017 - 6 posts - 4 authors

So I've seen some videos where people have replaced the ejuice in juuls with **hash oil**. Is this safe for the device and does this work?

THC oil in juul pod : juul	8 posts	Jul 28, 2017
I smoke weed out of the Juul : vaporents	3 posts	Apr 26, 2017
Co2 cannabis oil in Juul ? : StonerEngineering	5 posts	Apr 25, 2017
[Discussion] Filing A Juul By Pax Labs With Hash Oil ...	3 posts	Dec 11, 2016

More results from www.reddit.com

JUUL™

HoodRat
5% strength



JUUL™

Marijuana
5% strength

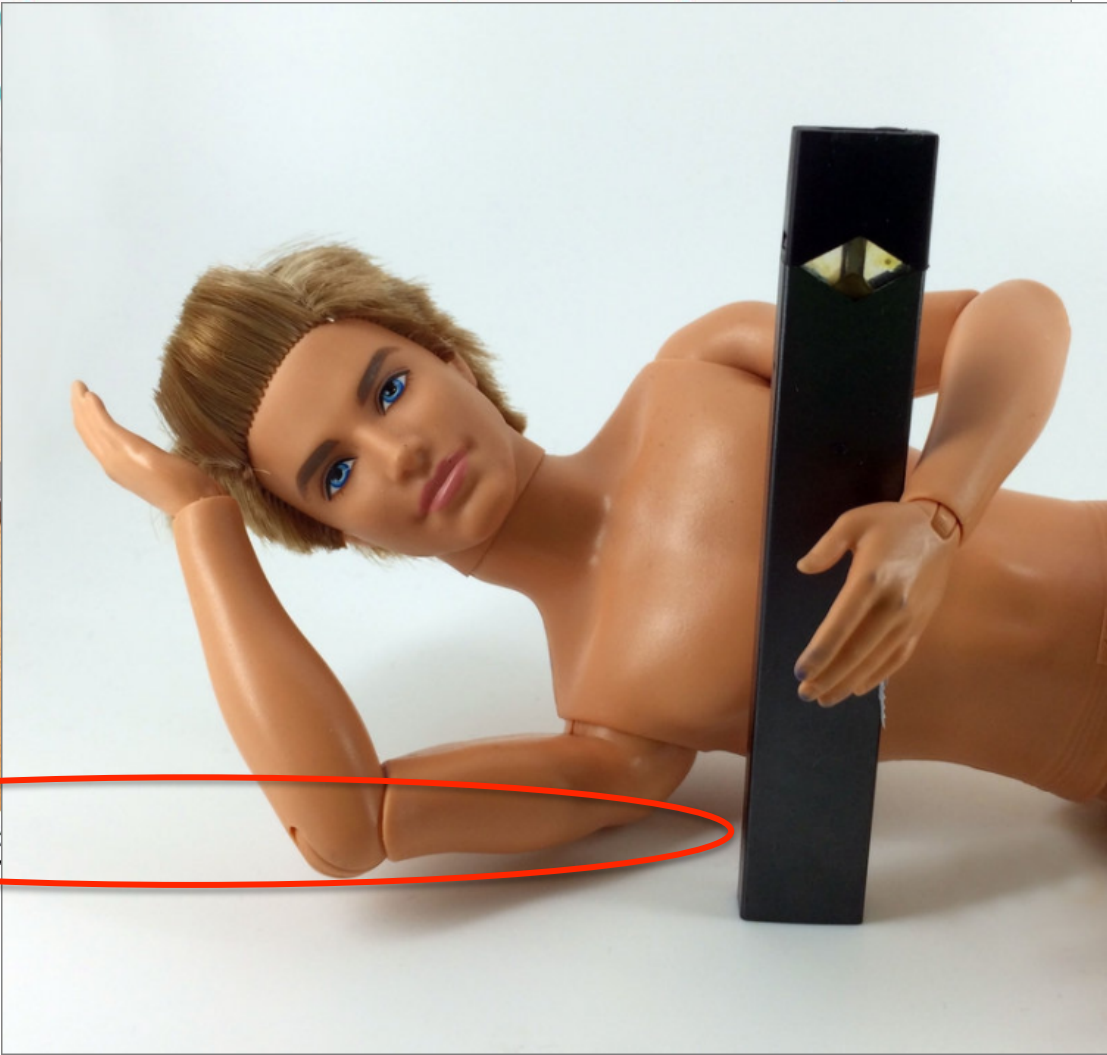


4 pods

Welcome The Weekend With



WARNING: This prod



eGos, Tanks, Mods, APV's



E-Juice/E-Liquid: You would be amazed...



Blueberry E Juice by Mt Baker Vapor

★★★★☆ 1144 Reviews

8 Questions \ 13 Answers

Bottle Size: Required

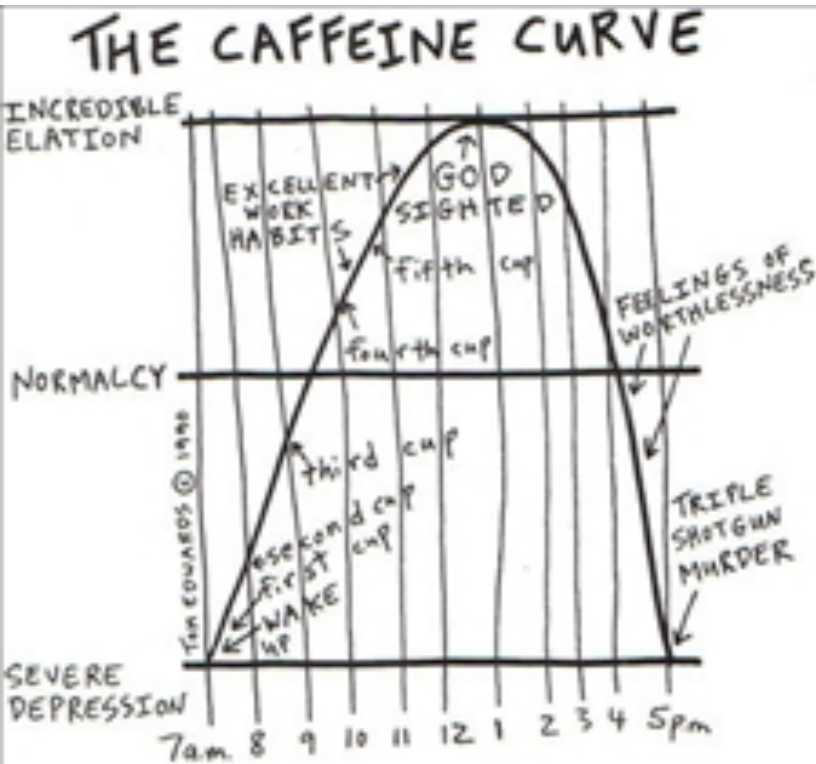
- 30ml
- 60ml
- 240ml

Nicotine: Required

- 3 mg/ml
- 6 mg/ml
- 12 mg/ml
- 18 mg/ml
- 24 mg/ml



Nicotine is way more harmful than caffeine



E-Cigarettes/Vape Pens: Just Water Vapor?



2018 NAS Report



- There is **substantial evidence** that e-cigarette use increases risk of ever using combustible tobacco cigarettes among youth and young adults.
- Among youth and young adult e-cigarette users who ever use combustible tobacco cigarettes, there is **moderate evidence** that e-cigarette use increases the frequency, intensity, and duration of subsequent combustible tobacco cigarette smoking.
- There is **insufficient evidence** from randomized controlled trials about the effectiveness of e-cigarettes as cessation aids compared with no treatment or to Food and Drug Administration–approved smoking cessation treatments

<https://www.nap.edu/catalog/24952/public-health-consequences-of-e-cigarettes>

2016 CDC Report

E-Cigarette Use Among Youth and Young Adults

A Report of the Surgeon General



U.S. Department of Health and Human Services

- Nicotine exposure during adolescence can cause **addiction** and can harm the developing brain.
- Hazardous compounds have been found in ENDS liquids, or in the heated aerosol produced by ENDS, including **formaldehyde, acetaldehyde and acrolein**, which are known cancer producing toxicants.
- Nicotine can cross the placenta and has known effects on fetal and postnatal development.
- Therefore, nicotine delivered by e-cigarettes during pregnancy can result in harmful consequences, including
 - **Sudden infant death syndrome (SIDS)**
 - Altered **corpus callosum**
 - Deficits in **auditory processing**
 - **Obesity**

https://www.cdc.gov/tobacco/basic_information/e-cigarettes/index.htm

2016 CDC Report

E-Cigarette Use Among Youth and Young Adults

A Report of the Surgeon General



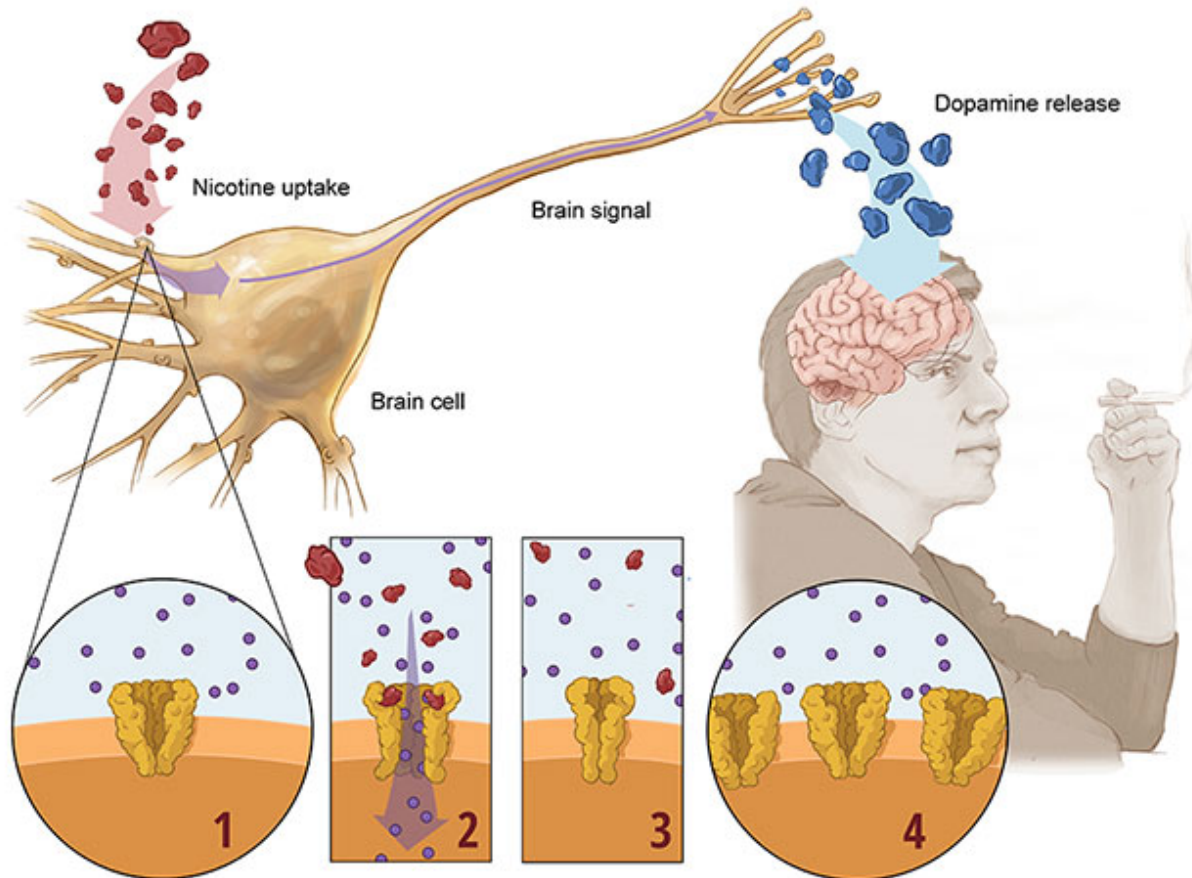
U.S. Department of Health and Human Services

https://www.cdc.gov/tobacco/basic_information/e-cigarettes/index.htm

- Youth and young adults are uniquely vulnerable to the **detrimental consequences** from nicotine exposure, including:
 - Reduced impulse control
 - Mood dysfunction
 - Deficits in:
 - Attention
 - Cognition

Nicotine is MORE harmful to adolescents and young adults.

NICOTINE ADDICTION AND YOUR BRAIN



Craving
No nicotine in the blood stream.

Cigarette
In the presence of nicotine, the receptor opens and lets the signal through.

Cigarette just finished
The receptor is desensitized and does not respond to more nicotine.

Long term smoking increases craving
More receptors are formed with long-term exposure to nicotine.

Nicotine exposure during adolescence can cause addiction and can harm the developing brain.

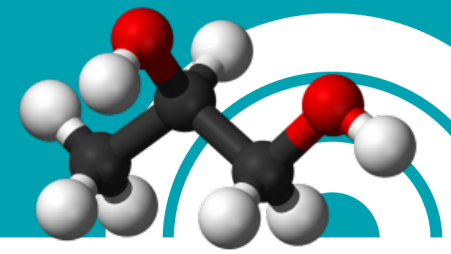


Nicotine influences:

- **Acetylcholine receptors**, which have action on:
 - **Cholinergic areas**: which control
 - Muscle movement, Breathing, Heart rate, Memory, Motivation
 - **Neurotransmitters and hormones**, such as:
 - Acetylcholine, Norepinephrine, **Dopamine**, Serotonin, Vasopressin, Beta-endorphin and Adrenocorticotrophic hormone (ACTH).
 - **Dopamine**, produces feelings of pleasure/reward. It's the same neurotransmitter involved in addiction to cocaine and heroin.

Strong Biologic Plausibility: Reduced impulse control, deficits in attention and cognition, and mood disorders.

What is Propylene Glycol (PG) and why is it used



- Propylene glycol is a clear, colorless liquid at room temperature. To exist in aerosol form, must be heated.
- In E-cigs, PG is added to dilute the pure liquefied form of nicotine and to serve as a vaporizable base.
- PG also allows atomization to take place at much lower temperatures than tobacco cigarettes.
- Propylene glycol is “**generally recognized as safe**” by FDA for ingestion, but little is known about the effects of inhaling it as a aerosol.

All of these have been found in e-cigarette/vape pen aerosol

Compounds in **yellow** are from FDA 2012, Harmful and Potentially Harmful Substances – Established List

- | | | |
|---|---|---|
| <ul style="list-style-type: none">• Propylene glycol• Glycerin• Flavorings (many)• Nicotine• NNN• NNK• NAB• NAT• Ethylbenzene• Benzene• Xylene• Toluene• Acetaldehyde• Formaldehyde• Naphthalene• Styrene• Benzo(b)fluoranthene | <ul style="list-style-type: none">• Chlorobenzene• Crotonaldehyde• Propionaldehyde• Benzaldehyde• Valeric acid• Hexanal• Fluorine• Anthracene• Pyrene• Acenaphthylene• Acenaphthene• Fluoranthene• Benz(a)anthracene• Chrysene• Retene• Benzo(a)pyrene | <ul style="list-style-type: none">• Benzo(ghi)perylene• Acetone• Acrolein• Silver• Nickel• Tin• Sodium• Strontium• Barium• Aluminum• Chromium• Boron• Copper• Selenium• Arsenic• Nitrosamines• Polycyclic aromatic hydrocarbons |
|---|---|---|

E-Cigarette Explosions



INDUSTRY N

Eight

E-cigarette Poisoning

American Association of Poison Control Centers

Electronic Cigarettes and Liquid Nicotine Data January 31, 2018



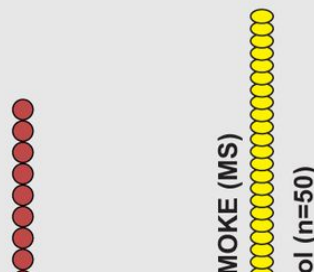
Year	Number of Cases
2011	271
2012	460
2013	1,543
2014	4,024
2015	3,774
2016	2,886
2017	2,454
2018	237

Relative cancer potency modelled for common forms of nicotine delivery

William E Stephens Tob Control 2018;27:10-17

EMISSIONS

- Tobacco smoke (HCl protocol)
- Tobacco smoke (ISO protocol)
- Heat-not-Burn devices (HCl protocol)
- E-cigarettes: Goniewicz subset



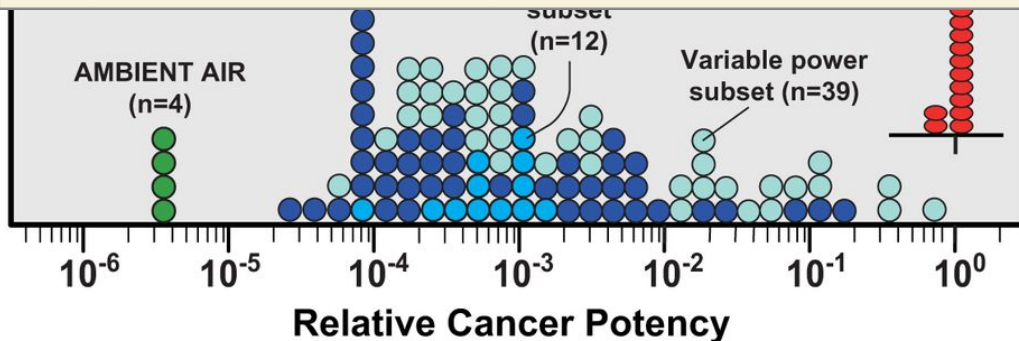
Comparison of sample toxicants emitted by tobacco cigarettes and e-cigarettes

Toxic compound	Tobacco cigarette (μg in mainstream smoke)	E-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

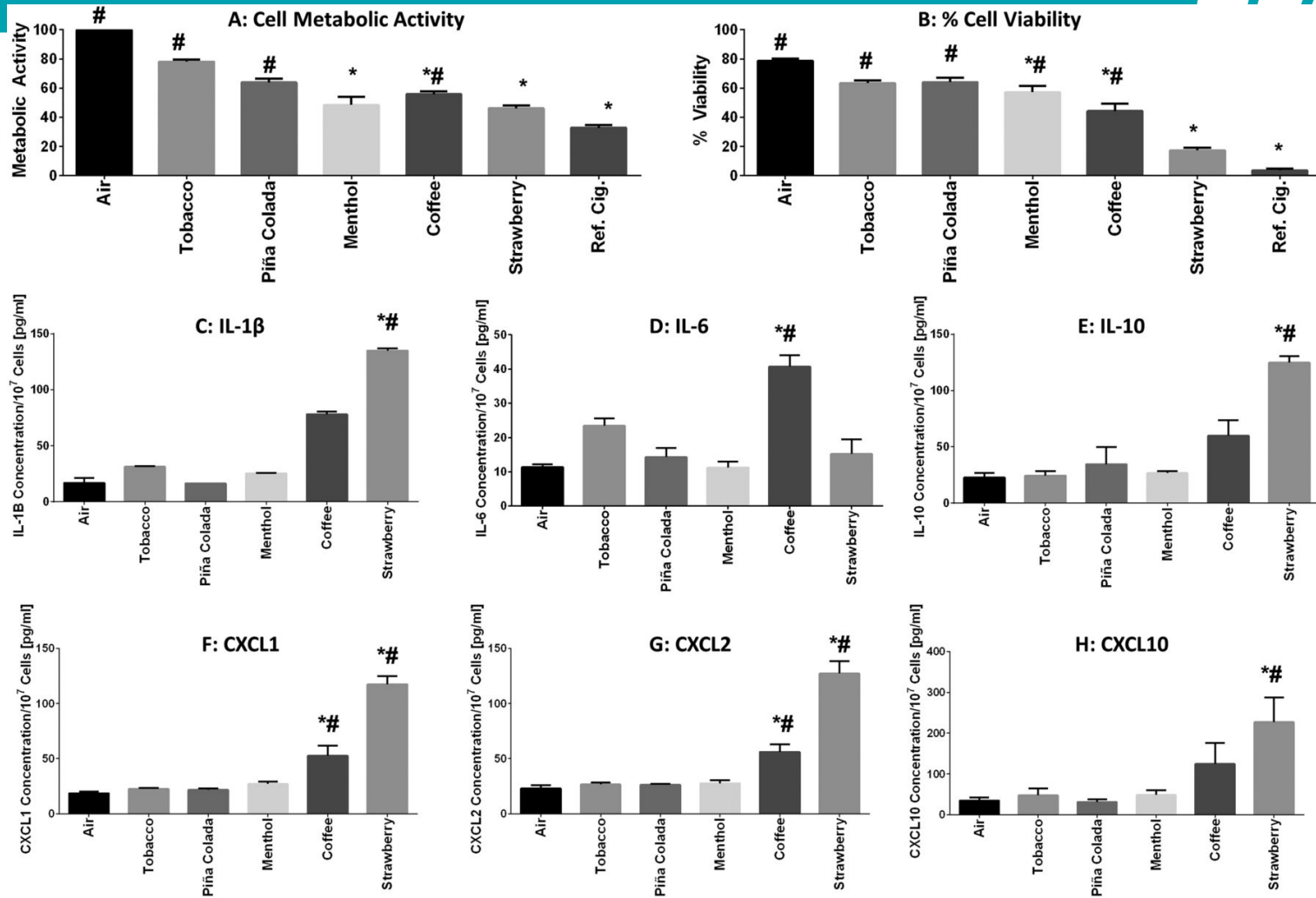
* The authors assumed smokers of e-cigarettes would take an average of 15 puffs per vaping session, corresponding to smoking one tobacco cigarette.

** Tobacco-specific nitrosamine, a carcinogenic compound that originates in the curing and processing of tobacco.

Adapted from Goniewicz et al. (2014)⁴



Comparison of cellular toxicity and levels of released inflammatory mediators (cytokines) from H292 bronchial epithelial cells directly exposed at the air-liquid interface to 55 puffs of flavoured ENDS aerosols.



Noel J Leigh et al. Tob Control 2016;25:ii81-ii87

WHY QUIT? SWITCH TO BLU

blu is the smart choice for smokers wanting a change. Take back your freedom to smoke when and where you want without ash or smell. blu is everything you enjoy about smoking and nothing else. Nobody likes a quitter, so make the switch today.

Visit blucigs.com

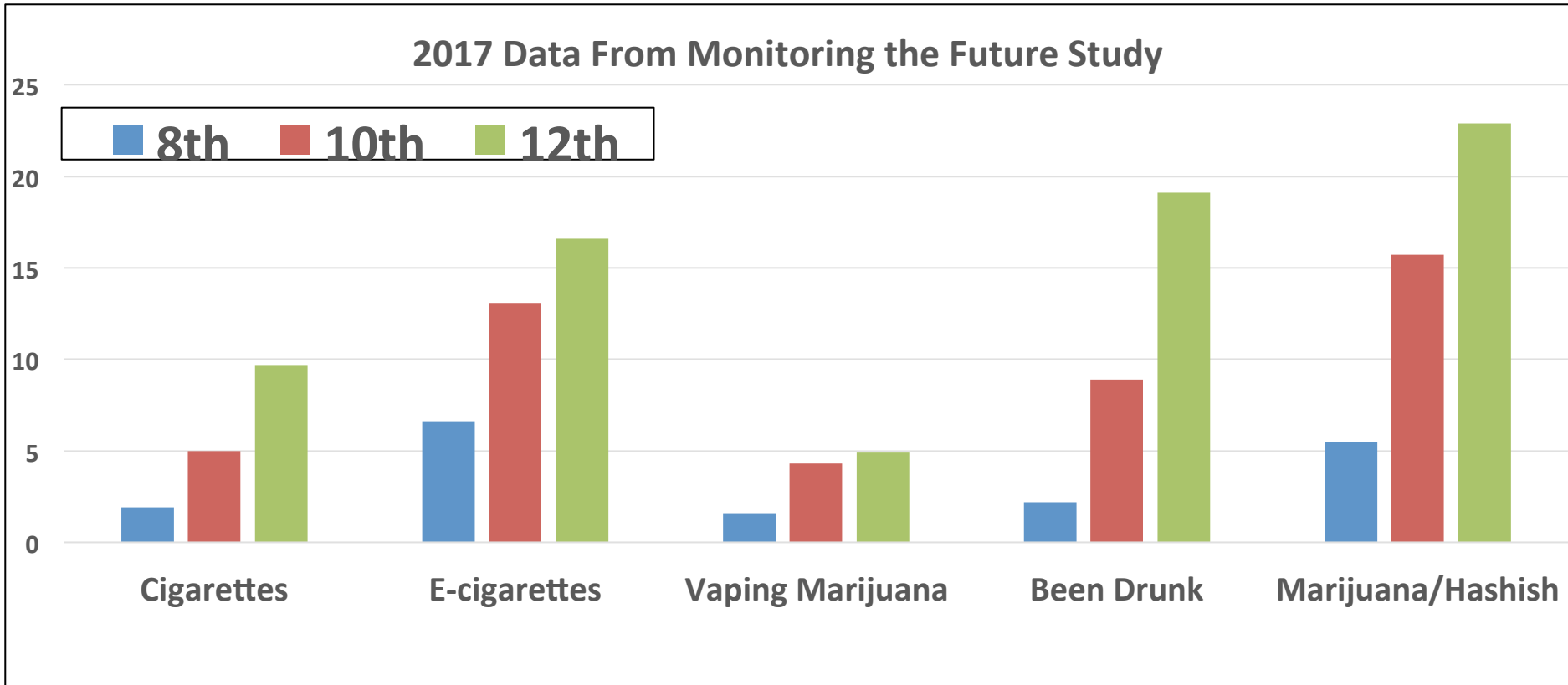


In the past 30 days, have you used?



2017 Data From Monitoring the Future Study

8th 10th 12th



<http://www.monitoringthefuture.org/data/17data/17drtbl1.pdf>

Federal, state and local policies related to e-cigarettes



- The Family Smoking Prevention and Tobacco Control Act (2009)
 - On April 25, 2014, FDA issued a proposed rule that would extend its regulatory capacity to additional tobacco products.
- At least 40 states have laws in place restricting e-cigarettes sales to minors ([Gov. Abbott signed SB 97 in May 2015](#))
- Cities and counties are rapidly setting restrictions on the use of e-cigarettes
 - Implement laws to restrict use in venues including workplaces, restaurants and bars

E-Cigarette Constituents



- The Tobacco Control Act provides FDA authority to regulate cigarettes, cigarette tobacco, roll-your-own tobacco, smokeless tobacco, and any other tobacco products that the Agency by regulation deems to be subject to the law.
- The Food and Drug Administration (FDA) is proposing to deem products meeting the statutory definition of "tobacco product," except accessories of a proposed deemed tobacco product, to be subject to the Federal Food, Drug, and Cosmetic Act (the FD&C Act), as amended by the Family Smoking Prevention and Tobacco Control Act (Tobacco Control Act).

SB 97: Signed in May 2015. Health and Safety Code
Sections 161.081-8; 161.251-6; 161.301-2; 161.356;
161.452-457



- Prohibits sale, purchase, or use of e-cigarettes or nicotine containers to a minor under the age of 18. Upon conviction, a class C misdemeanor, including a fine up to \$500 may be imposed.
- Nicotine containers must be child-resistant.
- Retailers must post a sign.
- A retailer shall adequately supervise and train the retailers agents to prevent a violation.
- Conviction leads fine or awareness program.

<https://legiscan.com/TX/text/SB97/2015>

Section 38.006. E-Cigarettes and Tobacco Products on School Property



- The board of trustees of a school district shall:
 - Prohibit smoking or using e-cigarettes or tobacco as a school –related or school-sanctioned activity on or off school property.
 - Prohibit students from possessing e-cigarettes or tobacco products at a school-related or school sanctioned activity on or off school property.
 - Ensure that school personnel enforce the policies on school property.

Section 28.004. E-Cigarettes and Tobacco Products on School Property



Westlake High School Student Handbook, 2017-18

Tobacco and E-Cigarettes Prohibited

- Students are prohibited from possessing or using any type of tobacco product, electronic cigarettes (e-cigarettes), or any other electronic vaporizing device, while on school property at any time or while attending an off-campus school-related activity.
- The district and its staff strictly enforce prohibitions against the use of all tobacco products, e- cigarettes, or any other electronic vaporizing device, by students and all others on school property and at school-sponsored and school-related activities. [See the Student Code of Conduct and policies at FNCD and GKA.]

Section 28.004. E-Cigarettes and Tobacco Products on School Property



- A school district must publish in the student handbook and district website a statement:
 - Of policies adopted to ensure adequate PA.
 - The number of times the SHAC has met in the preceding year.
 - Whether the district complies vending machine and food service regulations.
 - Whether the district has adopted and enforces policies and procedures for use of e-cigarettes and tobacco.

Comptroller Rules



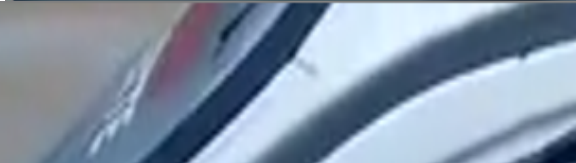
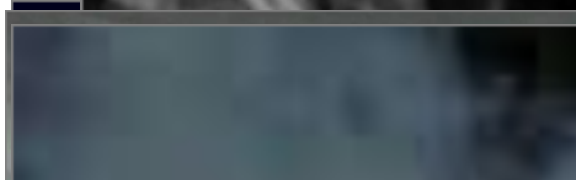
If the Comptroller finds, after notice and hearing, that a retailer has sold cigarettes, cigars and/or tobacco products to a minor, at a place of business for which a permit is issued, the Comptroller may suspend or revoke the permit for that place of business or assess an administrative fine in an amount up to \$1000 per violation. (Tax Code, [Sec. 154.1142](#) and [Sec. 155.0592](#))

Introducing the CATCH Global Foundation

CATCH GLOBAL FOUNDATION

The CATCH Global Foundation is a 501(c)3 public charity founded in 2014. Our mission is to improve children's health worldwide by developing, disseminating and sustaining the CATCH platform in collaboration with researchers at UTHealth. The Foundation links underserved schools and communities to the resources necessary to create and sustain healthy change for future generations.





Your knuckleheads
wouldn't do this??



What's the deal with E-Cigarettes?



Steven Kelder, PhD, MPH

Beth T Grossman Distinguished Professor, UTHealth School of Public Health in Austin
Investigator, Michael & Susan Dell Center for Healthy Living

UTHealth | The University of Texas Health Science Center at Houston
School of Public Health in Austin

Michael & Susan Dell Center for Healthy Living

1616 Guadalupe | Suite 6.300 | Austin, TX 78701



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