

Vaping: Basics for Health Educators

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Learning Objectives

- What are electronic cigarettes?
- How do the devices work?
- What chemicals are in the vaping liquid?
- What are the trends in vaping?
- What are the potential health consequences?
- What are the New York State regulations?
- What are some strategies to help youth avoid and or quit vaping?



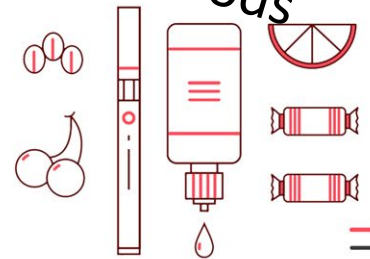
Electronic Cigarettes (E-Cigs)

- devices that use a battery to aerosolize a liquid, usually containing nicotine, flavoring, and other additives, which is inhaled by the user through a mouthpiece.
- known by a variety of names: e-cigs, e-hookahs, vape pens, tank systems, and mods
- can also be used to deliver marijuana and other substances
- using one is sometimes called “vaping”

E- “terminology”

- Vaping
- JUUL'ing
- Ghosting
- Cloud Chasing
- Vape God / Goddess

- E-cigs
- Vape pens
- Vapes
- Pods
- E-hookahs
- Mods

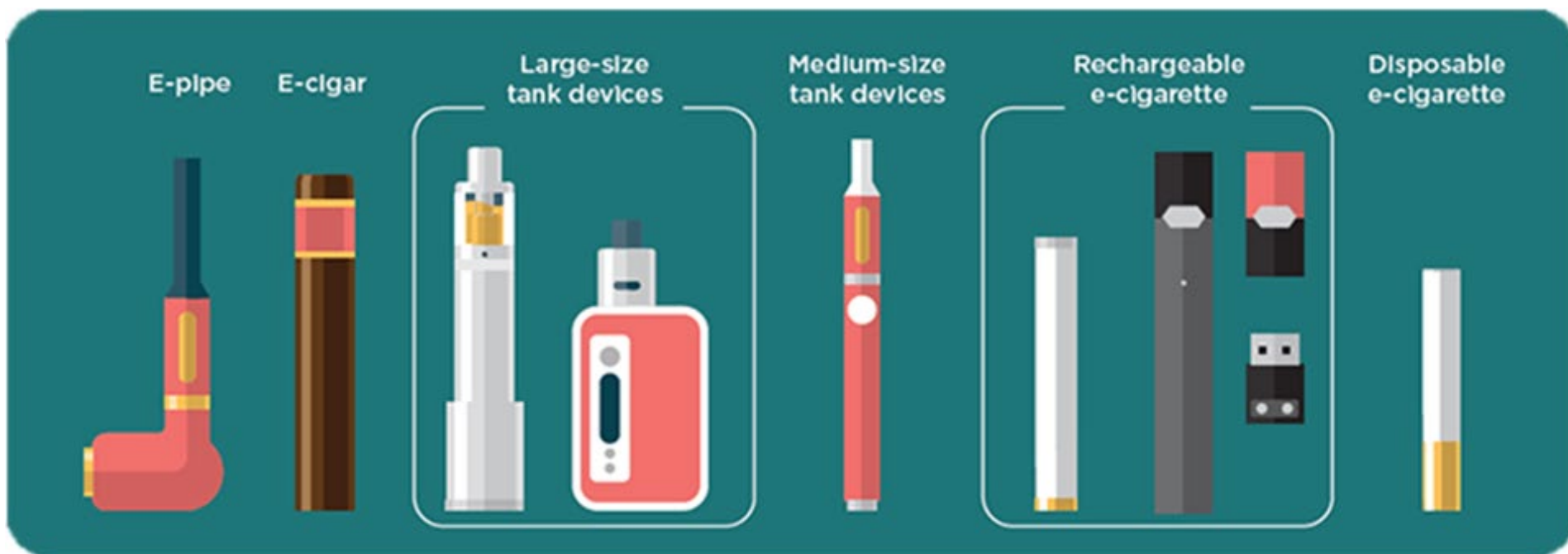


What do E-Cigs look like?

May look like:

- regular cigarettes, cigars, or pipes
- larger e-cigarettes: tank systems or “mods”
- other items used by youth: pens, USB flash drives

WHAT DO E-CIGARETTES LOOK LIKE?



****NOT** FDA-approved for cessation**

Source: E-cigarette Use and Youth: Updated for healthcare providers. Risa Turetsky

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Source: CDC

THIS IS NOT A FLASH DRIVE.



What is it?



Source: E-cigarette Use and Youth: Updated for healthcare providers. Risa Turetsky

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Stealth Vaping



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Stealth Vaping Gear



How do E-Cigarettes work?

- **Mouthpiece:** a cartridge that is fixed to the end of a tube
- **Atomizer:** a heating element that heats the liquid, causing it to aerosolize, which is then inhaled
- **Battery:** powers the heating element; normally a rechargeable
- **Sensor:** activates the heater when the user sucks on the device. An LED may show when it is activated
- **Solution:** made by extracting nicotine from tobacco and mixing it with a base, usually propylene glycol, and flavoring

Anatomy of a Pod-Based E-Cig

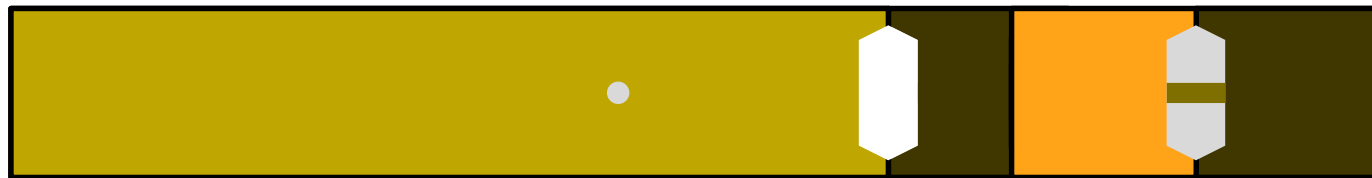
These cartridges/pods do contain

NICOTINE!

Cartridges/Pods



P
H
I
X



J
U
L

Devices with Rechargeable Battery

Covers



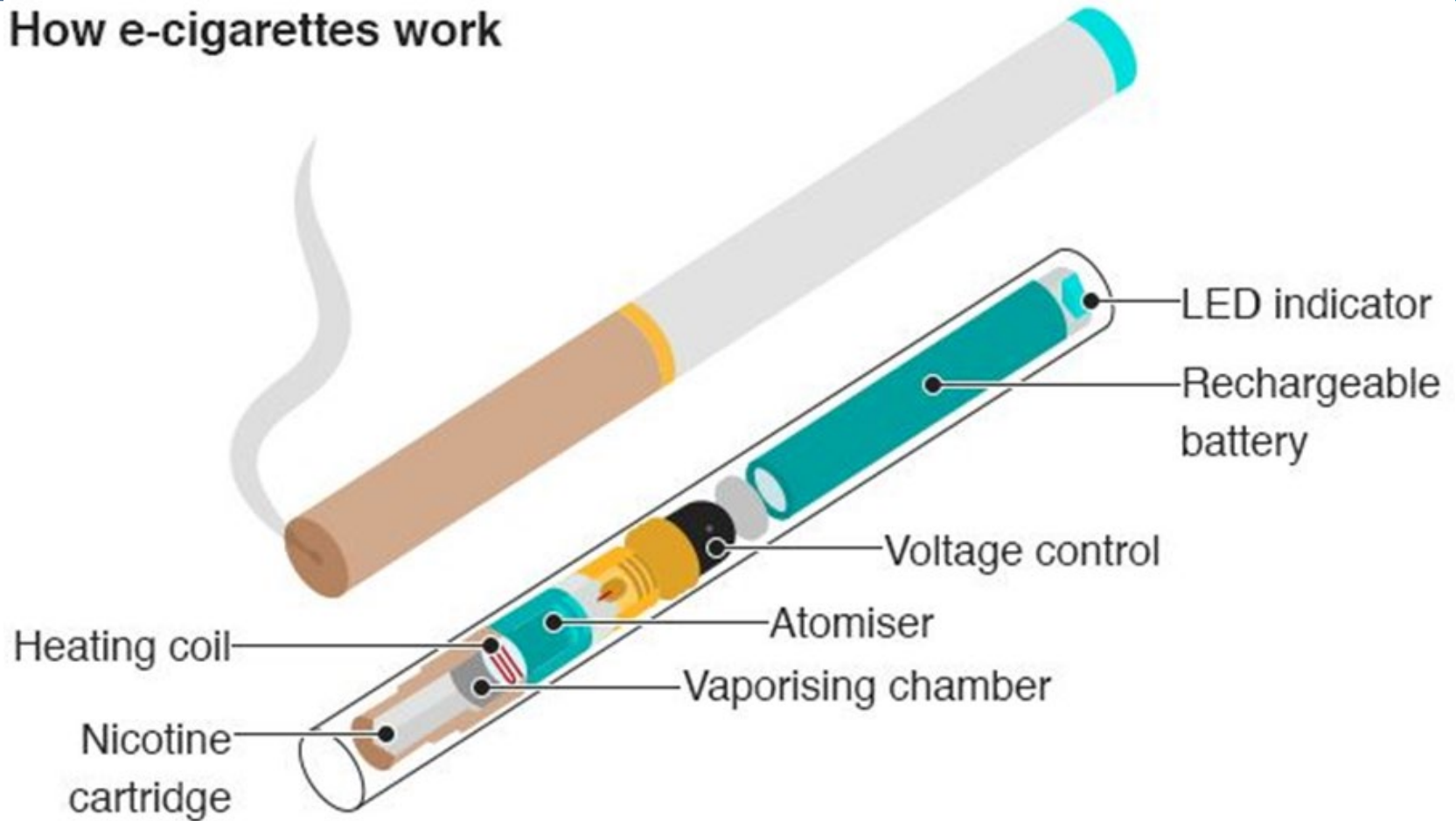
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How e-cigarettes work



BBC



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What is in the vaping liquid?



**Each pod is equivalent
to 1 pack of cigarettes
or 200 puffs**



E- “terminology”

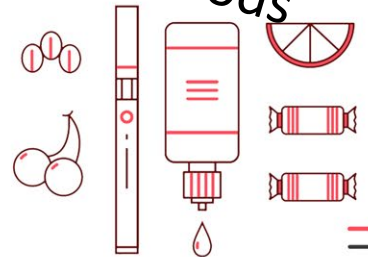
In 2014, 460 brands and 7,764 unique flavors

- Vaping
- JUUL'ing
- Ghosting
- Cloud Chasing
- Vape God / Goddess

flavors

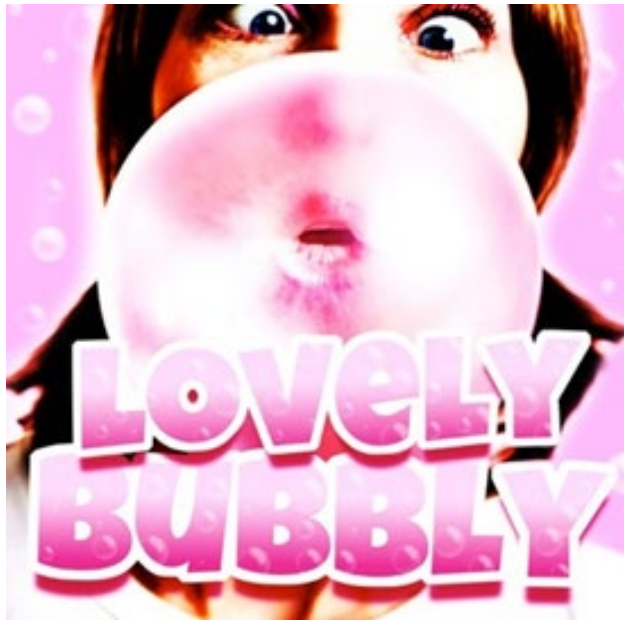
- Clouds
- E-juice
- E-liquid
- Vape juice
- Vape shop

- E-cigs
- Vape pens
- Vapes
- Pods
- E-hookahs
- Mods



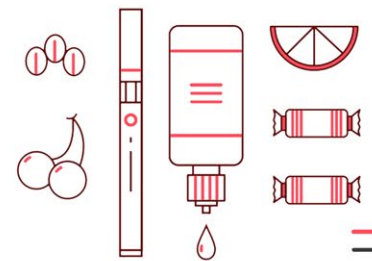
Marketing

Appealing flavors



>2/3

of young tobacco users
said they use tobacco
because ***"it comes
in flavors I like"***



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Chemicals Found in E-Cig/Pod-Based Aerosol?

- Propylene glycol
- Glycerin
- Flavorings (many)
- Nicotine
- NNN
- NNK
- NAB
- NAT
- Ethylbenzene
- Benzene
- Xylene
- Toluene
- Acetaldehyde
- Formaldehyde
- Naphthalene
- Styrene
- Benzo(b)fluoranthene

- Chlorobenzene
- Crotonaldehyde
- Propionaldehyde
- Benzaldehyde
- Valeric acid
- Hexanal
- Fluorine

- Benzo(ghi)perylene
- Acetone
- Acrolein
- Silver
- Nickel
- Tin
- Sodium

- Cadmium
- Silicon
- Lithium
- Lead
- Magnesium
- Manganese
- Potassium

All of these have been found in e-cigarette/pod-based aerosol

- Titanium
- Zinc
- Zirconium
- Calcium
- Iron
- Sulfur
- Vanadium
- Cobalt
- Rubidium

- Fluoranthene
- Benz(a)anthracene
- Chrysene
- Retene
- Benzo(a)pyrene
- Indeno(1,2,3-cd)pyrene

- Boron
- Copper
- Selenium
- Arsenic
- Nitrosamines
- Polycyclic aromatic hydrocarbons



VOLATILE
ORGANIC
COMPOUNDS

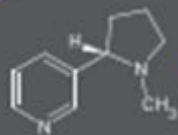


CANCER-CAUSING
CHEMICALS

ULTRAFINE
PARTICLES



HEAVY METALS SUCH AS
NICKEL, TIN, AND LEAD



NICOTINE



FLAVORING SUCH AS DIACETYL,
A CHEMICAL LINKED TO
A SERIOUS LUNG DISEASE

Source: E-cigarette Use and Youth: Updated for healthcare providers. Risa Turetsky

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Source: CDC

What is in the vaping liquid?

Salt-based nicotine

**41.3-68
milligrams
of nicotine**



Freebase nicotine

**25
milligrams
of nicotine**



Youth: My friends use e-cigarettes that don't have any nicotine in them.

Nicotine is very common in e-cigarettes, and e-cigarettes may not be labeled to accurately show their ingredients. Nicotine is very addictive and can harm your brain.



Youth: There's no smoke from e-cigarettes – just harmless water vapor.

- The aerosol that's created when an e-cigarette heats up the e-liquid is not just water vapor, it is aerosol.
- A **vapor** is a substance in the gas phase; an **aerosol** is a suspension of tiny particles of liquid, solid or both within a gas.
- The aerosol is not harmless either for users or for others who are exposed to it secondhand.
- Besides nicotine, which is harmful to young people's health on its own, heavy metals that can cause respiratory distress and disease have been found in e-cigarette aerosol.
- Chemicals that are known to cause cancer and that have been linked to lung disease can also be present in e-cigarette aerosol.

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Youth: I've heard e-cigarettes are less harmful than regular cigarettes.

- E-cigarettes can contain harmful and potentially harmful ingredients, including nicotine.
- Some of the other chemicals in e-liquids and in the aerosol from e-cigarettes are known to cause cancer in humans.
- Heavy metals such as lead and cadmium that have been found in e-cigarette aerosol can cause respiratory distress and disease.
- Some of the chemicals that flavor e-cigarettes are harmful when they are inhaled, even though they've been approved for ingestion. One of them, diacetyl, is used to produce a buttery flavor but has been linked to a serious and permanent lung disease called "popcorn lung."

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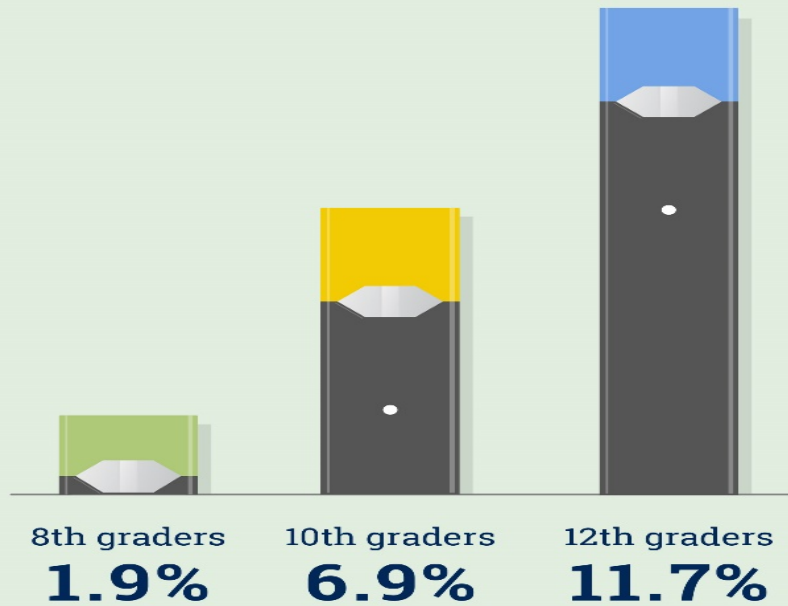


TEEN VAPING CLIMBS SIGNIFICANTLY*

**Both Nicotine and Marijuana (THC)*

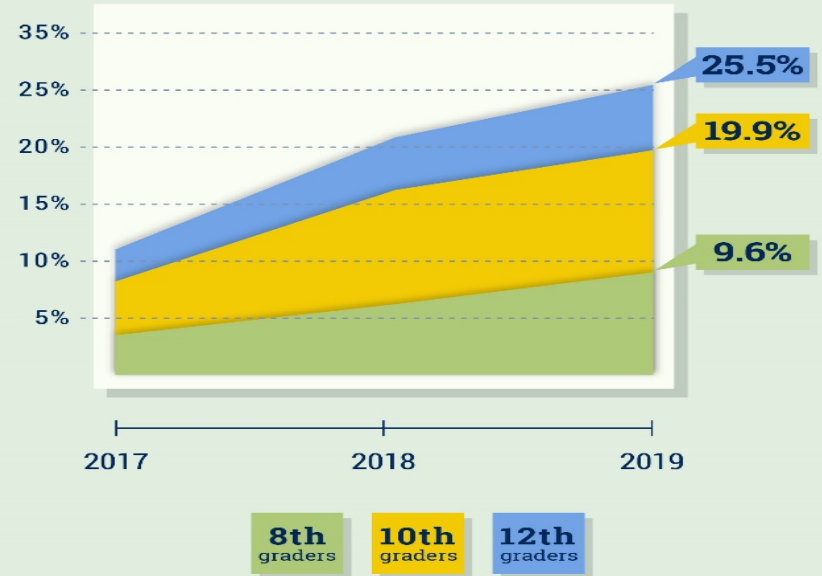
DAILY NICOTINE VAPING¹

Measured for the first time in 2019



NICOTINE VAPING

Past month use



1. Miech R, Johnston L, O'Malley PM, Bachman JG, Patrick ME. Trends in adolescent vaping, 2017–2019. *N Engl J Med* 2019; 381:1490-1491

2019 Past Month Nicotine Vaping Equates to:

1 IN 4 – 12TH GRADERS • 1 IN 5 – 10TH GRADERS • 1 IN 10 – 8TH GRADERS

To view information on other drugs from the 2019 Survey visit:

www.drugabuse.gov/related-topics/trends-statistics/infographics/monitoring-future-2019-survey-results-overall-findings

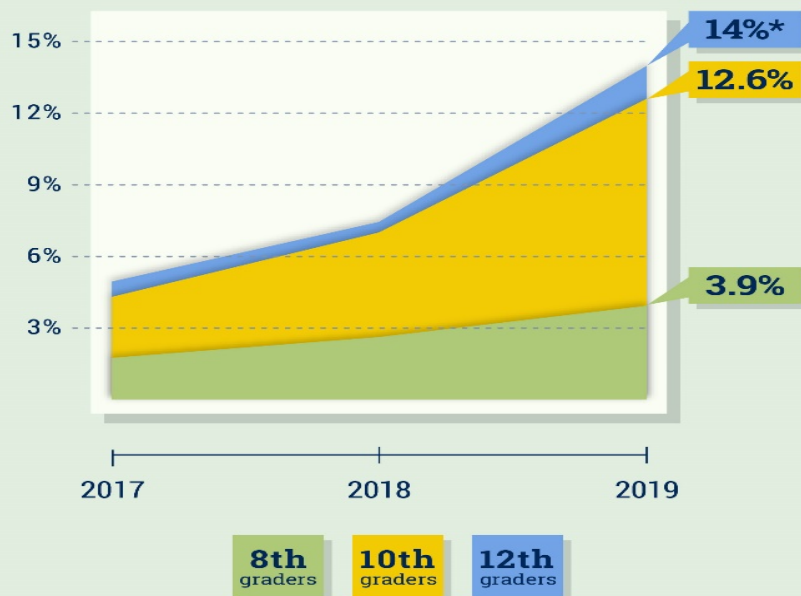


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TEEN VAPING CLIMBS SIGNIFICANTLY*

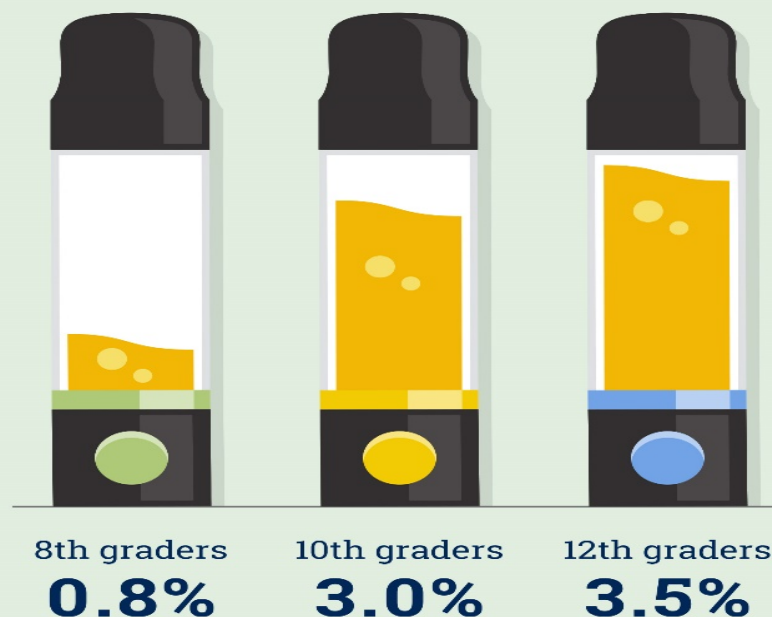
THC VAPING

Past month use



DAILY THC VAPING

Measured for the first time in 2019



***2018 – 2019 INCREASE IS THE SECOND LARGEST ONE-YEAR JUMP EVER TRACKED FOR ANY SUBSTANCE IN THE 45-YEAR SURVEY HISTORY (NICOTINE VAPING WAS THE LARGEST FROM 2017 – 2018)**

To view information on other drugs from the 2019 Survey visit:

www.drugabuse.gov/related-topics/trends-statistics/infographics/monitoring-future-2019-survey-results-overall-findings

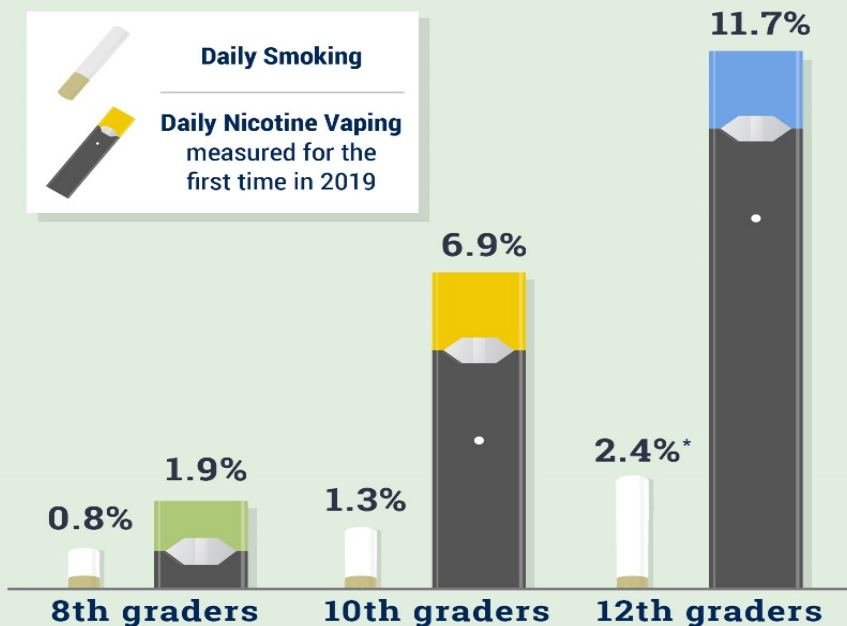


National Institute
on Drug Abuse

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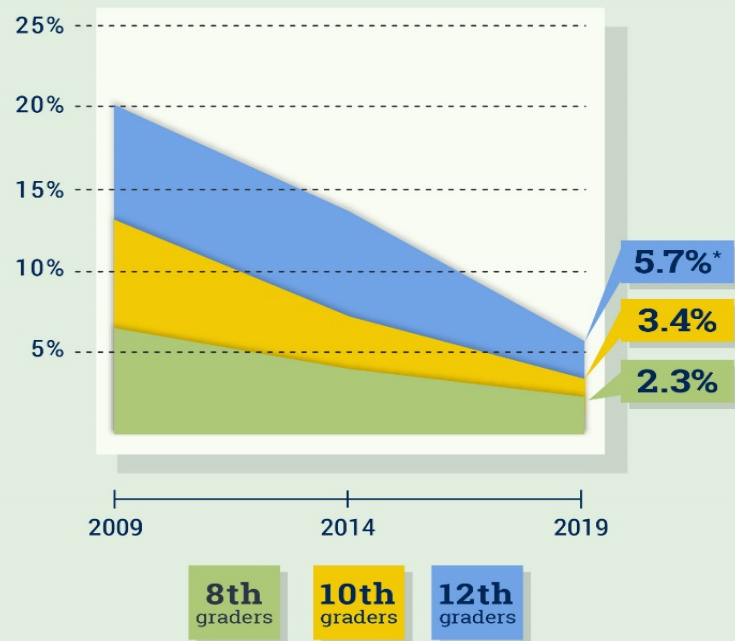
TOBACCO AND NICOTINE: VAPING THREATENS PROGRESS

NICOTINE – DAILY USE



*Significant decline from 2018 (3.6%)

CIGARETTE SMOKING (PAST MONTH) DECLINES OVER PAST TEN YEARS



*Significant decline from 2018 (7.6%)

TO VIEW MORE RESULTS ON VAPING VISIT:

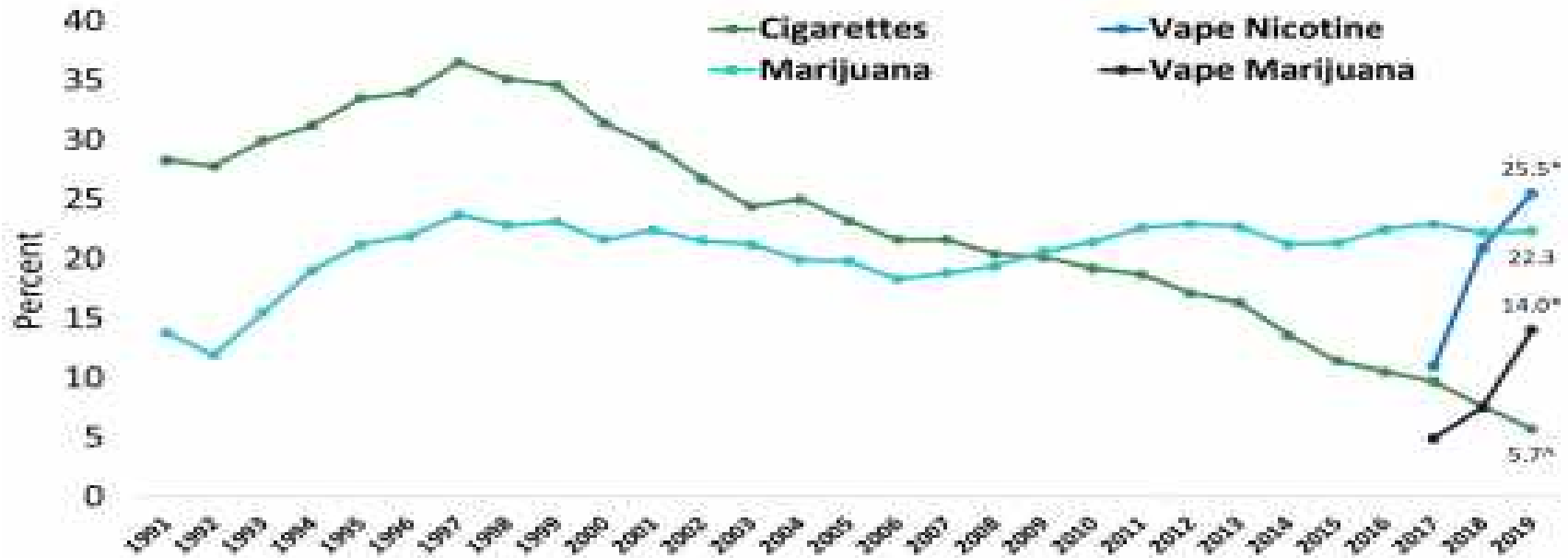
<https://www.drugabuse.gov/related-topics/trends-statistics/infographics/monitoring-future-2019-survey-results-vaping>



National Institute on Drug Abuse

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Percent of Students Reporting Marijuana, Cigarette, Vape Use in Past Month, 12th Grade



*Significant increase or ^significant decline compared to the 2018 MTF Survey.

7 out of 10 middle and high school students who currently use tobacco have used a **FLAVORED** product.

63%

of students who currently use e-cigarettes have used **flavored** e-cigarettes.
(1.6 million)

61%

of students who currently use hookah have used **flavored** hookah.
(1 million)

64%

of students who currently use cigars have used **flavored** cigars.
(910,000)



Source: Morbidity and Mortality Weekly Report (MMWR)

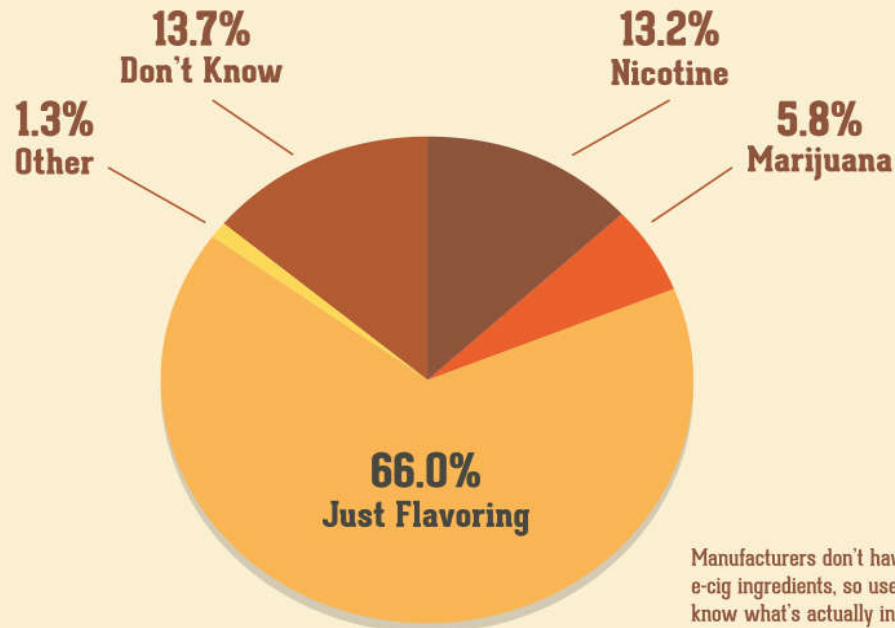
TEEN E-CIG USERS ARE MORE LIKELY TO START SMOKING.*²

Start Smoking Within 6 Months



*Includes combustible tobacco products [cigarettes, cigars, and hookahs]

WHAT DO TEENS SAY IS IN THEIR E-CIG?³



Manufacturers don't have to report e-cig ingredients, so users don't know what's actually in them.

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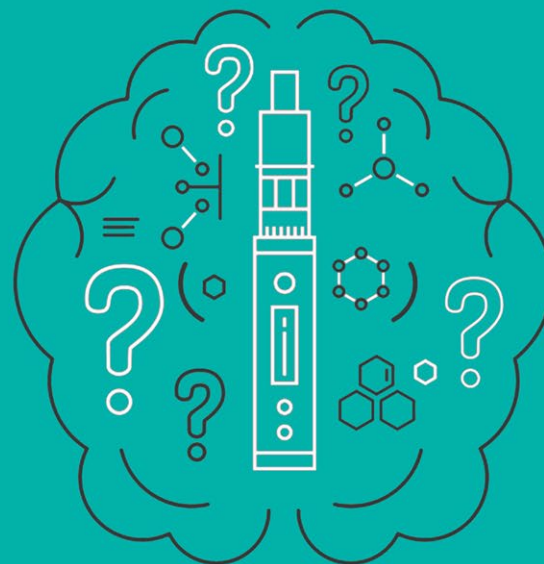
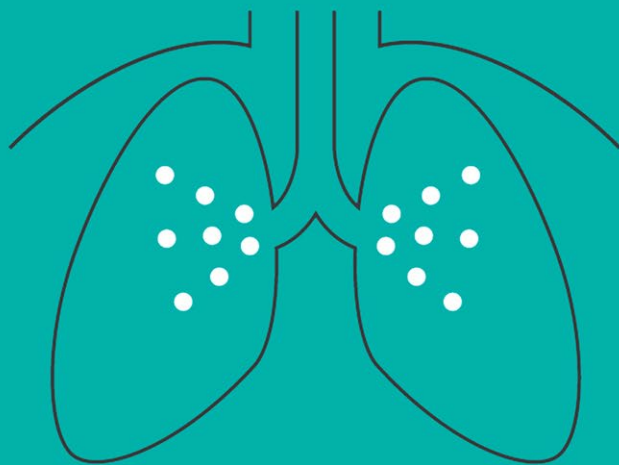
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Patient: I thought e-cigarettes were used to help people quit smoking.

The evidence isn't clear on whether e-cigarettes help people quit smoking regular cigarettes, but we already know that e-cigarette use is a health risk for young people. For example, nicotine can harm brain development, and your brain continues developing until around age 25.



Health Effects



Source: E-cigarette Use and Youth: Updated for healthcare providers. Risa Turetsky

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Vaping: Potential health consequences

- Nicotine & the adolescent brain
- Toxins, carcinogens, respiratory impact
- Contaminants, “vaping illness” cause?
- Exposure: Second-hand “vapor”, prenatal, ingestion
- Increased risk of cigarette smoking & long-term addiction



Vaping: Potential health consequences

- Most e-cigarettes contain nicotine, which is highly addictive.
- Nicotine exposure during adolescence can
 - harm brain development
 - Impact learning, memory, and attention
 - Increase the risk for future addiction to other drugs

Vaping: Potential health consequences

- Nicotine & the adolescent brain
- Toxins, carcinogens, respiratory impact
- Contaminants, “vaping illness” cause?
- Exposure: Second-hand “vapor”, prenatal, ingestion
- Increased risk of cigarette smoking & long-term addiction



Patient: I've heard there are other risks from e-cigarettes.

- Nicotine found in many e-cigarettes is unsafe for pregnant women and fetuses. It can complicate pregnancy and cause health issues for the baby. Nicotine is known as a cause of sudden infant death syndrome.
- The liquid for e-cigarettes can contain high enough levels of nicotine to cause nicotine poisoning if it's ingested or absorbed through the skin. It's especially dangerous for young children, who may be attracted to the liquid because of the flavors and bright colors.
- E-cigarette batteries have been known to explode and cause burns and other injuries.
- The heating element in e-cigarettes can cause burns.

Medical Research

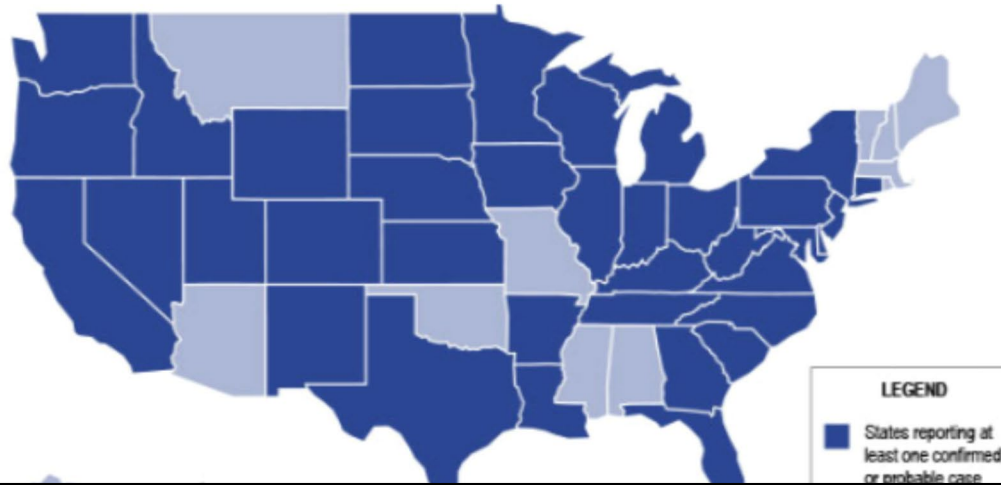
- E-cigarette liquid caused **high rates of lung cell death & inflammation**, potential to cause overactive pulmonary immune responses via inflammasome activation (*in vitro*), **flavors especially**¹
- E-cigarette use causes **unique innate immune response in the lungs** via activation of neutrophils, altered mucin secretion²
- “Chronic vaping exerts **marked biological effects on the lung**”³
- E-cigarette users had increased likelihood of:
 - 34% heart attack**
 - 25% coronary artery disease**
 - 55% depression or anxiety.**⁴
- Contamination - **traces of endotoxin (27%) & glucan (81%)**⁵

Medical Research

1. Bell R, O’Kane C, Shyamsundar M, *et al.* S54 The effects of E-cigarettes on pulmonary inflammation and inflammasome activation. *Thorax* 2018;73:A32-A33.; “Exposure to Flavored E-Cigarette Liquids, E-cigarette Use Exacerbates Cell Dysfunction” American College of Cardiology, ACC News Story, May 28, 2019 Accessed from [website](#).
2. [Am J Respir Crit Care Med](#). 2018 Feb 15;197(4):492-501;
3. [Am J Respir Crit Care Med](#). 2018 Jul 1;198(1):67-76
4. E-Cigarettes Linked to Heart Attacks, Coronary Artery Disease and Depression accessed from www.acc.org
5. “Endotoxin and (1 α)-b-D-glucan Contamination in Electronic Cigarette Products Sold in the U.S.,” Mi-Sun Lee, Joseph Allen, David Christiani, Environmental Health Perspectives, online April 24, 2019



Map of Reported Cases



CNN health Food Fitness Wellness Parenting Vital Signs

LIVE TV Edition

Second vaping-related death in Kansas brings nationwide total to 9



By [Jen Christensen](#) and [Jamie Gumbrecht](#), CNN

Updated 6:27 AM ET, Tue September 24, 2019

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Take Aways - Key Points for Talking to

Important Points:

Understand WHY they are vaping.

Get real facts, connect with resources.

Reset the Norms - not everyone is doing it.

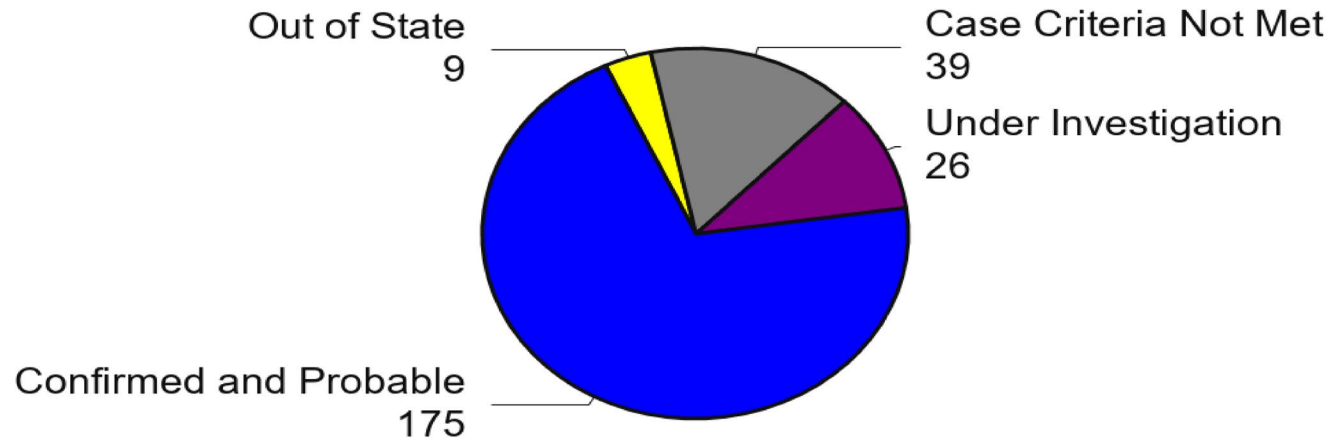
Focus on the Positives.

Again, start by listening!



New York State Vaping-Related Illness Investigation

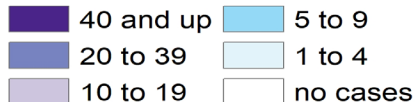
Summary of case data reported to NYS Department of Health through February 25, 2020



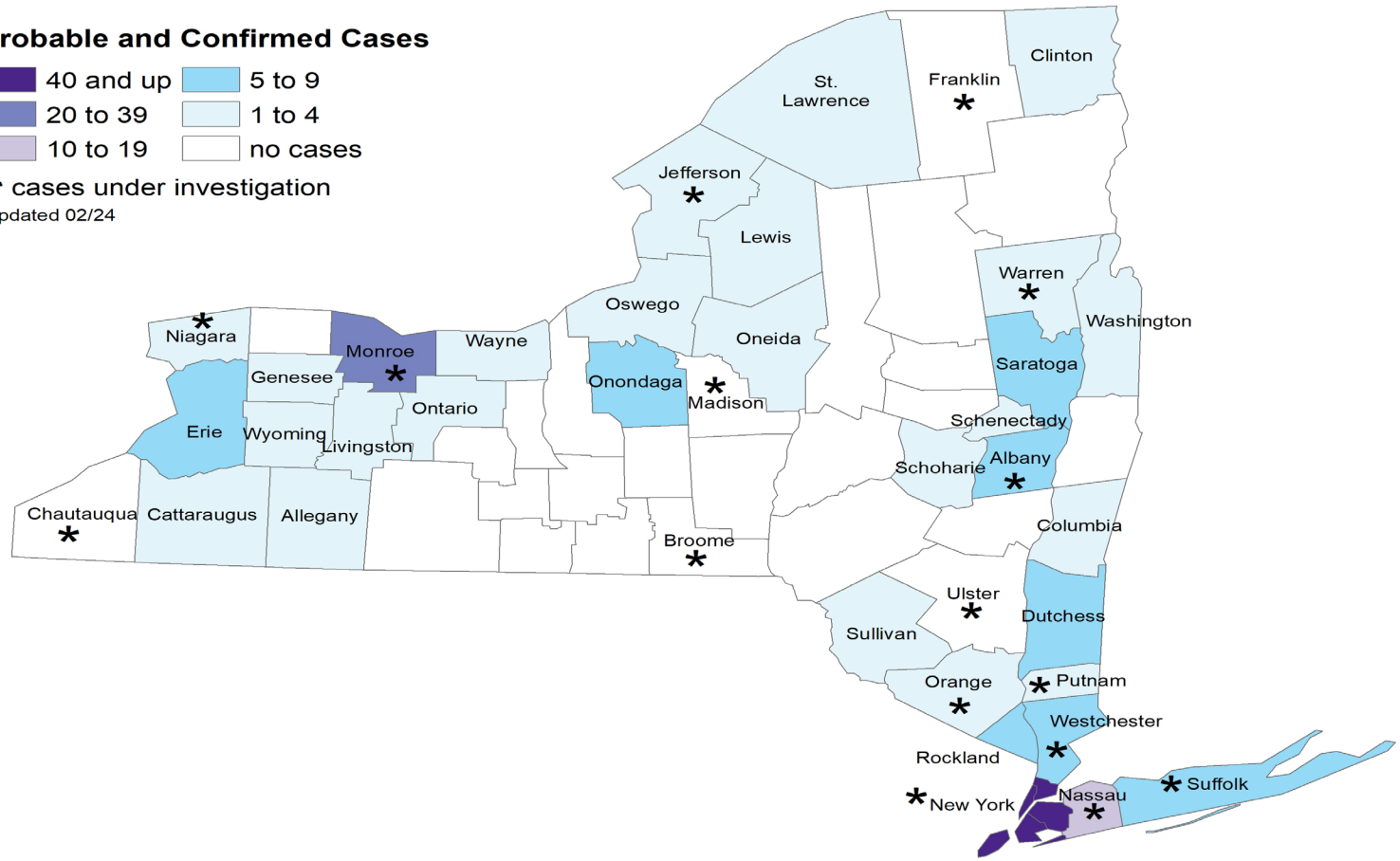
Total reported cases = 249

Vaping Related Illness: Case Report by County

Probable and Confirmed Cases



* cases under investigation
 Updated 02/24



New York State Regulations

- The Clean Indoor Air Act was expanded to include e-cigarettes in 2017
- A tax of 20% of retail price is imposed on all vapor products
- Liquid nicotine ("electronic liquid") must be sold in a child resistant bottle
- The purchase age for tobacco & nicotine was increased to 21 years in 2019
- New York State banned the sale of flavored e-cigarettes, but the State has been barred from enforcing the ban, pending a ruling on that litigation
- New services for e-cigarette users seeking help to stop vaping, including free quit-coaching and nicotine replacement therapy through the New York State Smokers' Quitline

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Source: <https://nyshealthfoundation.org/resource/where-theres-smoke-youth-vaping-in-new-york-state/>



NYS regulations on vaping/products

E-cigarette use prohibited where smoking is prohibited including, but not limited to indoor areas such as work places, restaurants, mass transit, hospitals, schools and dorms, and outdoor areas, such as railroad stations, hospital, library and school grounds (with some exceptions) and most playgrounds.

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Source: <https://publichealthlawcenter.org/resources/us-e-cigarette-regulations-50-state-review/ny>

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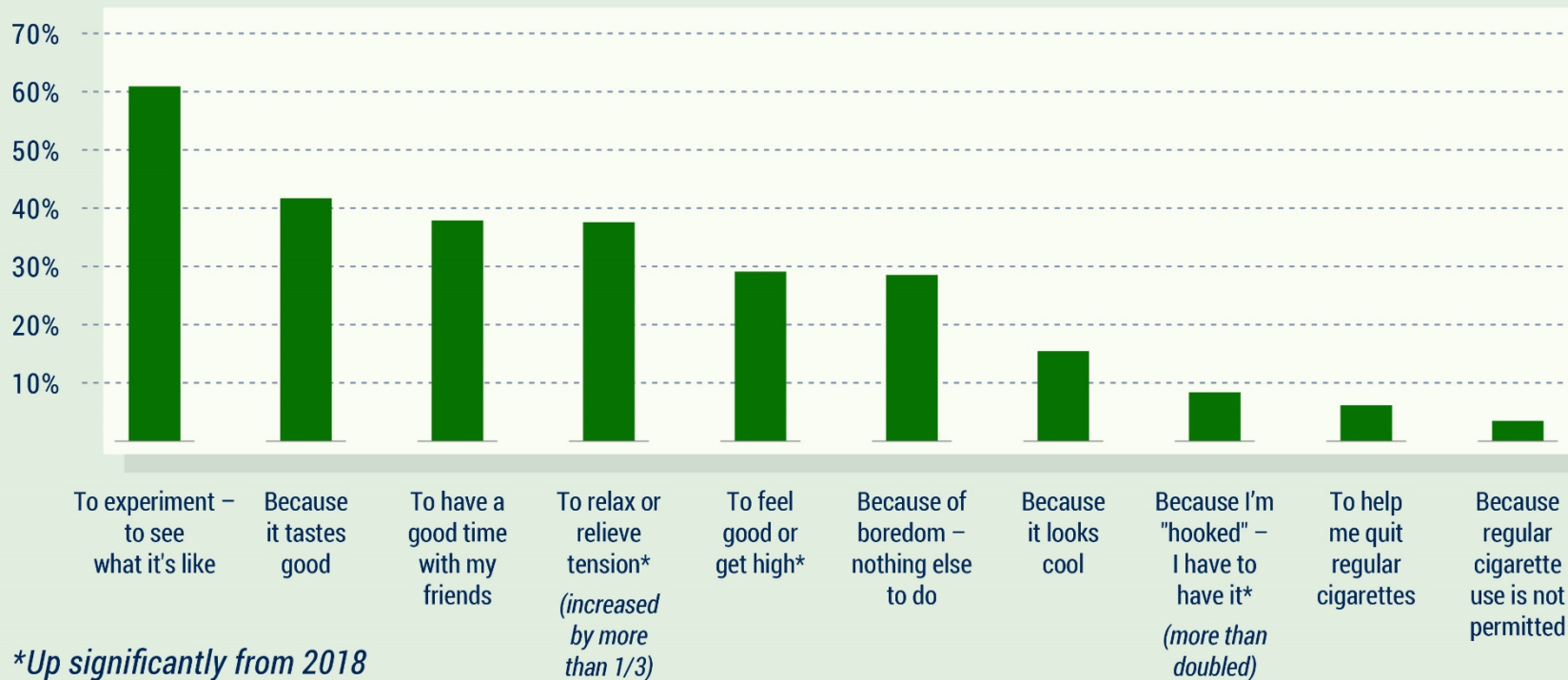
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Prevention and Cessation



TEEN VAPING CLIMBS SIGNIFICANTLY*

TEENS REPORT REASONS FOR VAPING



To view information on other drugs from the 2019 Survey visit:

www.drugabuse.gov/related-topics/trends-statistics/infographics/monitoring-future-2019-survey-results-overall-findings



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1. Reflect

Reflect on your personal point of view

Reflect on your ability to be a role model

Reflect on what you want the result of the conversation to be

Reflect on the context of the conversation



2. Determine Underlying Question

“Am I normal?”

“What is acceptable behavior?”

“Do I have your approval?”

“Can I shock you?”

“What is your personal belief?”



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3. Use O.A.R. to Guide the Conversation

Open-ended questions

Affirmations

Reflective Listening



O.A.R.: Open-ended Questions

“Do any of your friends
JUUL?” →

**“If your friends wanted
to try JUULs, how would
you handle that?”**

“You know people who
vape aren’t living up to
their potential, right?” →

**“How might vaping
impact your ability to do
well in school or at
sports?”**

“Don’t you want to
make your own
decisions, not follow
your friends?” →

**“How might you have a
conversation with your
friends about how their
use impacts you?”**



O.A.R.: Affirmations

Statements to focus on strengths and positive behaviors – no matter how small.

Examples:

“I appreciate that you’re willing to talk with me about this.”

“You are clearly a very resourceful person.”

“It sounds like you handled yourself well in that situation.”

“That’s a good idea.”



Take Aways - Key Points for Talking to

Important Points:

Understand WHY they are vaping.

Get real facts, connect with resources.

Reset the Norms - not everyone is doing it.

Focus on the Positives.

Again, start by listening!



Resources: for health educators and parents:

CDC has updated pages; they are in English and Spanish (and now with handouts in Spanish). They have information e-cigarettes in general as well as about the recent vaping illness.

The CDC section on lung illness is [at this site](#), and if you scroll down to “key resources” there are info sheets for parents (then switch to Spanish at the top).

US Surgeon General's [Tip Sheet for Parents](#)

Partnership for Drug Free Kids' [guide for parents on vaping](#)

Partnership for Drug Free Kids' info on [vaping marijuana](#).

"[Speak Now](#)" resources on how to talk to kids about substances, even broken down by age group.

Videos - [video for teens and adults \(from UCLA\)](#)

Resources: for youth:

"[still blowing smoke](#)" has good info for teens, especially about the impact of vaping on their brains

Truth's [text to quit](#) program - teens can just text DITCHJUUL to 88709 to participate in a semi-interactive text service.

There's also [My Life My Quit](#) from National Jewish which does offer an **interactive text to learn more / quit service.**

For older teens, articles: [article from the Boston Globe](#), by young people, for young people; [article from Men's Health](#) by a cigarette to e-cigarette converter is helpful.

Curriculum for Youth

The [Stanford toolkit for e-cigarettes.](#)

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Ready to Quit? Just want to learn more?



COLORADO
QuitLine™
Be tobacco free



MY LIFE 
MY QUIT™
mylifemyquit.com


HEY BIG VAPE,
#QUITLYING



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Questions

