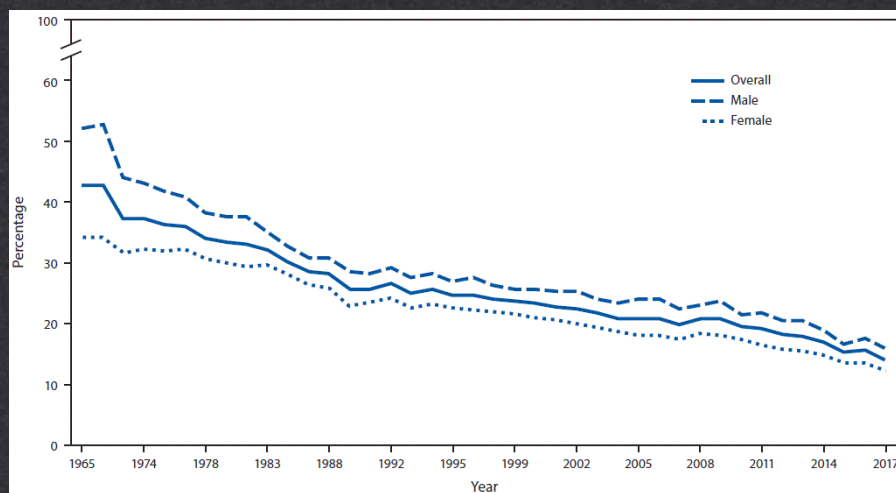


# Electronic cigarettes

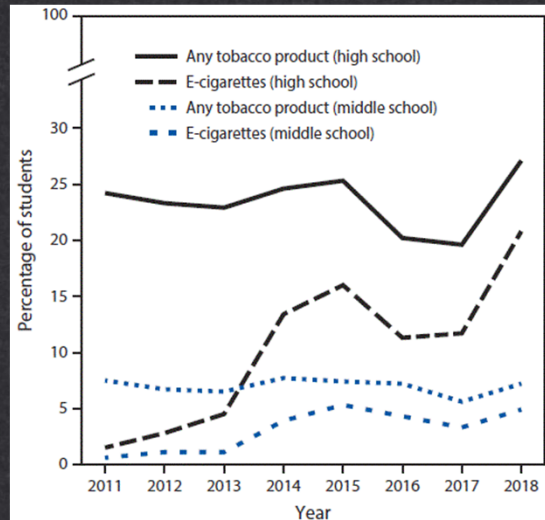
**MuChun (Joanna) Tsai, MD**  
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## Decrease in Cigarette Use in the US



Center for Disease Control and Prevention

# E-cigarette Use on the Rise in Teens and Young Adults



Center for Disease Control and Prevention

## Electronic cigarettes

- E-cigarette (e-cig)
- E-hookahs
- E-cigars
- Vape sticks
- Vape pens
- Vaping devices
- Electronic Nicotine Delivery System (ENDS)



<https://www.fda.gov/tobacco-products/products-ingredients-components/vaporizers-e-cigarettes-and-other-electronic-nicotine-delivery-systems-ends>

# E-cigarette Components

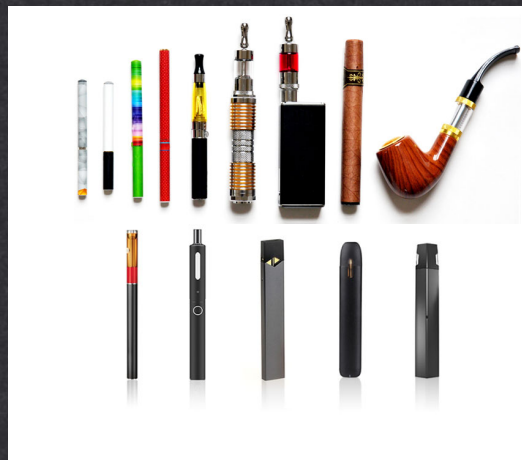
- **E-liquid or e-juice**
  - Propylene glycol
  - Vegetable glycerin
  - Nicotine
  - Flavoring
- **Vaporizing chamber**
- **Power source/Battery**



<https://www.fda.gov/tobacco-products/products-ingredients-components/vaporizers-e-cigarettes-and-other-electronic-nicotine-delivery-systems-ends>

# E-cigarette Devices

- **First generation – “cig-alike”**
- **Second generation – “vape pens”**
- **Third generation – “mods”**
- **Fourth generation - JUUL**



<https://www.fda.gov/tobacco-products/products-ingredients-components/vaporizers-e-cigarettes-and-other-electronic-nicotine-delivery-systems-ends>

## Is it Safe to Vape?

- E-cig aerosol generally contain fewer toxic chemicals vs traditional smoking
- E-cigs contain nicotine and other harmful chemicals
  - Carcinogens
  - Volatile organic compounds
  - Diacetyl in flavoring – “popcorn lung”
- Propylene glycol and glycerin in many food products
  - Safety has not been established for aerosolizing or inhaling them

## Is it Safe to Vape?

- Nicotine use during pregnancy can affect fetal development
- Nicotine exposure in adolescence can become an addiction
  - Younger the exposure, stronger the influence
  - Impulse control problems
  - Disruptive behaviors
  - Early engagement with other substances

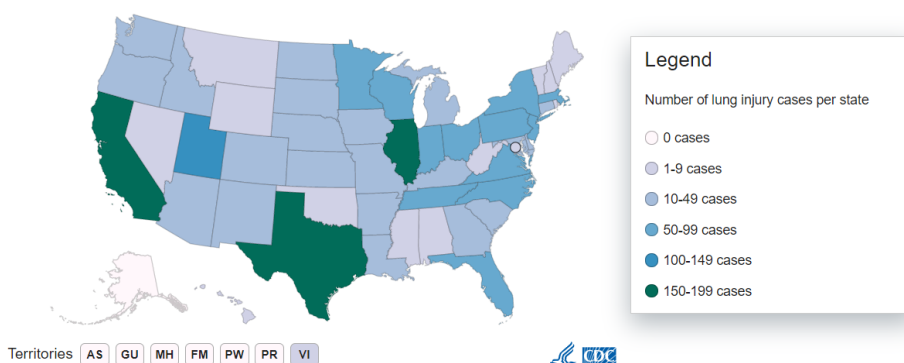


# Is it Safe to Vape?

- E-liquids are often custom-mixed at home or vape shops
  - 1000s of unique flavoring
  - Marijuana-related products
- No safety regulations
- Some evidence e-cigarette aerosol toxicity
  - Direct toxicity to lung tissue
  - Impair host defense
  - Interfere normal lung development
- Unknown long-term effects

## E-cigarette or vaping associated lung injury (EVALI)

Number of Lung Injury Cases Reported to CDC as of November 5, 2019



# EVALI Symptoms

## **Constitutional:**

- Fever
- Chills
- Weight Loss

## **Respiratory:**

- Cough
- Shortness of Breath
- Chest Pain

## **GI:**

- Abdominal Pain
- Nausea/vomiting
- Diarrhea

# Clinical Evaluation

- Inquire about symptoms
- Thorough vaping history
  - Substance used
  - Brand
  - Frequency
  - Time of last use
  - Method of use
- Physical Exam
- Laboratory Testing:
  - CBC with diff
  - Inflammatory markers
  - Urine or serum toxicology screen
  - Rule out infection
- CXR or CT chest
- Consider bronchoscopy

## Management/Treatment

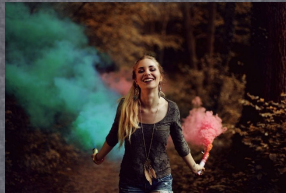
- Supportive care
- +/- Corticosteroids
- Antibiotics

## Quit Smoking Using E-cigs?

- Currently not approved by FDA as a smoking aid
- Mixed studies
  - Some evidence e-cigs with nicotine can help smokers long-term compared to placebo
  - Most adult users do not stop smoking and continue to use both
  - Among quitters, majority were still vaping



## E-cigarette Friend or Foe plus Quit Tips



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The Ohio State University Wexner Medical Center

## Case Report

- Rebecca is a 56 year old female who has a 40 py history of smoking.
- Quit using regular cigarettes 6 years ago using e-cigarette
- Has continued to use the e-cigarette since quitting.
- She is worried if she quits “vaping”, she will return to smoking regular cigarettes
- Has she gained anything by her switch?



## Who is using E-cigarettes?

- Middle school students
- High School Students
- Adults
  - Current regular cigarette smokers
  - Former smokers
  - Never regular smokers



Source: Fair Expert

Office on Smoking and Health, National Center for Chronic Disease Prevention and Health. MMWR. DEC 6, 2019/vol. 68/SS-12  
*BMJ* 2018;360:j5543. 1 Action on Smoking and Health (ASH). Use of e-cigarettes (vapourisers) among adults in Great Britain 2017. <http://ash.org.uk/download/use-of-e-cigarettes-among-adults-in-greatbritain-2017>. 2 West R, Beard B, Brown J. Trends in electronic cigarette use in England: Smoking Toolkit Study. [www.smokinginengland.info/latest-statistics](http://www.smokinginengland.info/latest-statistics).

## Risks of E-cigarettes for Kids, Teenagers, and Young Adults?

- Most e-cigarettes contain nicotine.
- Can contain other harmful substances besides nicotine.
- Young people who use e-cigarettes may be more likely to smoke cigarettes in the future
- Increase risk for future addiction to other drugs.

[https://www.cdc.gov/tobacco/basic\\_information/e-cigarettes/pdfs/OSH-E-Cigarettes-and-Youth-What-HCPs-Need-to-Know-20190327-508.pdf](https://www.cdc.gov/tobacco/basic_information/e-cigarettes/pdfs/OSH-E-Cigarettes-and-Youth-What-HCPs-Need-to-Know-20190327-508.pdf)

## Dangers of e-cigarettes

- Can deliver high levels of nicotine – highly addictive
- Health danger to pregnant women and their developing fetuses
- Ingestion has poisoned children and adults
- Difficult for consumers to know what e-cigarette products contain
- Long-term effects on health are still being studied

[https://www.cdc.gov/tobacco/basic\\_information/e-cigarettes/pdfs/OSH-E-Cigarettes-and-Youth-What-HCPs-Need-to-Know-20190327-508.pdf](https://www.cdc.gov/tobacco/basic_information/e-cigarettes/pdfs/OSH-E-Cigarettes-and-Youth-What-HCPs-Need-to-Know-20190327-508.pdf)

## Are E-cigarettes less harmful than regular cigarettes? Yes, but...

### Benefits

- Lower exposure to carcinogens
- Second hand smoke exposure
- May help smokers to quit smoking.

### Concerns

- No evidence of safety of long term use
- No convincing evidence of efficacy as aid to quitting over approved methods
- Inconsistent levels of nicotine aerosol delivery and nicotine blood levels
- Impurities in solutions



## **E-cigarette as quitting aid?**

- Currently insufficient evidence to make recommendation
- Not approved by the FDA
- Use of currently FDA approved methods have a proven track record of success
- Safety concerns
- Most e-cigarette users don't stop but become "dual" users.

## **RECOMMENDATIONS FOR E-CIGARETTE USAGE?**



## **CDC Public Health Recommendations**

### **Do not:**

- Use an e-cigarette, or vaping product that contains THC
- Buy any type of e-cigarette, or vaping products, particularly those containing THC, from informal sources (such as family, friends, or in-person or online dealers)
- Modify or add any substances to e-cigarette, or vaping, products that are not recommended by the manufacturer

AAFP Pharmacologic Product Guide of FDA-Approved Medications for Smoking Cessation

## **CDC Public Health Recommendations**

- E-cigarette, or vaping products should never be used by youth, young adults, or pregnant women
- If not currently smoking, do not start using e-cigarette, or vaping
- If using e-cigarettes to quit smoking, consider changing to an FDA-approved nicotine replacement therapy
- People who continue using e-cigarette, or vaping products:
  - Carefully monitor themselves for symptoms
  - See a health care provider immediately, if symptoms develop

AAFP Pharmacologic Product Guide of FDA-Approved Medications for Smoking Cessation

# RECOMMENDATIONS FOR HELPING SMOKERS QUIT

# The 5 A's of Treating Tobacco Use

```
graph TD
    GP[General population] --> PPH[Patient presents to a healthcare setting (clinic, hospital, work site, others)]
    PPH --> AS[Ask—screen all patients for tobacco use]
    AS --> CU[Current users]
    AS --> NU[Never users]
    AS --> FU[Former users]
    NU --> PP[Primary prevention]
    PP --> GP
    FU --> PR[Prevent* relapse]
    PR --> GP
    CU --> AC[Advise to quit]
    AC --> AW[Assess willingness to quit]
    AW -- No --> PM[Promote motivation to quit See Table 8]
    PM --> AW
    AW -- Yes --> AA[Assist with quitting See Tables 2–7]
    AA --> AF[Arrange follow-up See Tables 9–10]
    AF --> Relapse
    Relapse --> AC
    AF --> Abstinent
    Abstinent --> PR
    PR --> GP
    PM --> PR
    Relapse --> PR
    PR --> GP
```

**Figure 2.** Model for treatment of tobacco use and dependence

\*Relapse-prevention interventions are not necessary in the case of the adult who has not used tobacco for many years.

**Clinical Practice Guideline Treating Tobacco Use and Dependence 2008 Update Panel, Liaisons, and Staff.**  
A clinical practice guideline for treating tobacco use and dependence: 2008 update. A U.S. Public Health Service report. *Am J Prev Med.* 2008;35(2):158–176. doi:10.1016/j.amepre.2008.04.009

## FTND

- How soon after you wake up do you smoke your first cigarette?
  - After 60 minutes (0), 31-60 minutes (1), 6-30 minutes (2), Within 5 minutes (3)
- Do you find it difficult to refrain from smoking in places where it is forbidden?
  - No (0) Yes (1)
- Which cigarette would you hate most to give up?
  - The first in the AM (1) Any other (0)

## FTND

- How many cigarettes per day do you smoke?
  - 10 or less (0), 11-20 (1), 21-30 (2), 31 or more (3)
- Do you smoke more frequently during the first hours after awakening than during the rest of the day?
  - No (0) Yes (1)
- Do you smoke even if you are so ill that you are in bed most of the day?
  - No (0) Yes (1)



## Readiness to Quit Ladder

*Circle the one number that shows what you think about quitting. Please read each sentence carefully before deciding.*

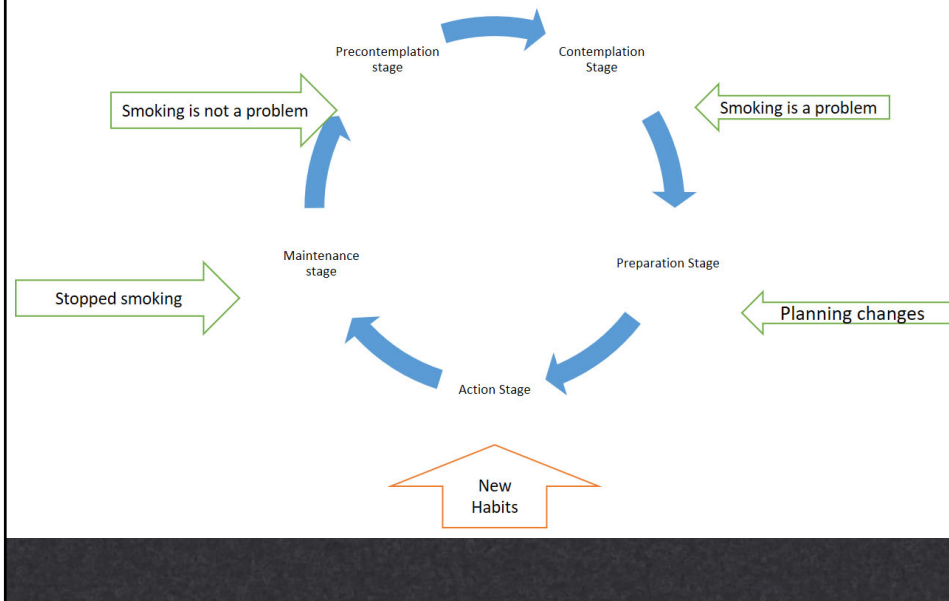
- 10 I have quit smoking.
- 9 I have quit smoking, but I still worry about slipping back, so I need to keep working on living smoke free.
- 8 I still smoke, but I have begun to change, like cutting back on the number of cigarettes I smoke. I am ready to set a quit date.
- 7 I definitely plan to quit smoking in the next 30 days.
- 6 I definitely plan to quit smoking in the next 6 months.
- 5 I often think about quitting smoking, but I have no plans to quit.

## Readiness to Quit Ladder

*Circle the one number that shows what you think about quitting. Please read each sentence carefully before deciding.*

- 4 I sometimes think about quitting smoking, but I have no plans to quit.
- 3 I rarely think about quitting smoking, and I have no plans to quit.
- 2 I never think about quitting smoking, and I have no plans to quit.
- 1 I have decided not to quit smoking for my lifetime. I have no interest in quitting.

## Stages of change



## Process of Nicotine addiction

- **Chemical**
  - Medications
- **Psychological**
  - Develop new coping mechanisms
- **Habit or conditioned behavior**
  - New habit

# Triggers and Action Plan

Trigger Strength (0-4)	When do I smoke	What is my routine	New strategies for dealing with each trigger
3	During Breakfast	Wake up, drink coffee, smoke	<ol style="list-style-type: none"> <li>1. Switch to drinking tea.</li> <li>2. Eat in different room.</li> <li>3. Water flowers</li> </ol>

# Self Monitoring Log

#Cig. Date/Time Notes	#Cig. Date/Time Notes	#Cig. Date/Time Notes	#Cig. Date/Time Notes
1. _____	1. _____	1. _____	1. _____
2. _____	2. _____	2. _____	2. _____
3. _____	3. _____	3. _____	3. _____
4. _____	4. _____	4. _____	4. _____
5. _____	5. _____	5. _____	5. _____
6. _____	6. _____	6. _____	6. _____
7. _____	7. _____	7. _____	7. _____
8. _____	8. _____	8. _____	8. _____
9. _____	9. _____	9. _____	9. _____
10. _____	10. _____	10. _____	10. _____
(1)	(2)	(3)	(4)
#Cig. Date/Time Notes	#Cig. Date/Time Notes	#Cig. Date/Time Notes	#Cig. Date/Time Notes
11. _____	11. _____	11. _____	11. _____
12. _____	12. _____	12. _____	12. _____
13. _____	13. _____	13. _____	13. _____
14. _____	14. _____	14. _____	14. _____
15. _____	15. _____	15. _____	15. _____
16. _____	16. _____	16. _____	16. _____
17. _____	17. _____	17. _____	17. _____
18. _____	18. _____	18. _____	18. _____
19. _____	19. _____	19. _____	19. _____
20. _____	20. _____	20. _____	20. _____
(1)	(2)	(3)	(4)



## Quit Plan

- Set a quit date
  - Start daily medication 1-2 weeks before your quit date
  - Start as needed medication on your quit date
- Cut back on a regular basis
  - Eq. cut out 2 cigarettes per week.
  - Use as needed medication to help you cut back
  - Start daily medication 1-2 weeks before you are scheduled to be quit. (if needed)

## Managing Cravings

- |                             |                              |
|-----------------------------|------------------------------|
| • Avoid triggers            | • Smoke Free Zone.           |
| • Get support               | • Use approved medications.  |
| • List reasons for quitting | • Take it one day at a time. |
| • Stay busy                 |                              |

## Supporting your Quitter

- Emphasize positive outcomes of stopping tobacco, not on just the costs of continued use.
- Do not nag or criticize
- If you are a smoker, do not smoke around them
- Get rid of items that could be a trigger, lighters, ash trays or spit cups.
- Make your home and car a “smoke free” zone.

The Ohio State University Wexner Medical Center, Thinking about Quitting. May 30, 2012.

## Has Rebecca gained anything by switching?



## What's the bottom line?

- E-cigarettes have the potential to benefit adult smokers who are not pregnant if used as a complete substitute for regular cigarettes and other smoked tobacco products.
- E-cigarettes are not safe for youth, young adults, pregnant women, or adults who do not currently use tobacco products.
- While e-cigarettes have the potential to benefit some people and harm others, scientists still have a lot to learn about whether e-cigarettes are effective for quitting smoking.
- If you've never smoked or used other tobacco products or e-cigarettes, don't start.
- Additional research can help understand long-term health effects.

“Source: CDC”; “Materials developed by CDC”);