

# Vaping Related Lung Disease: A Community Warning

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# Vaping Related Lung Disease

A representative story .....

18 year old male present to emergency room with nausea and flu like symptoms over the last few days. He also had mild nonproductive cough.

In the morning prior to ER he noted chest pain and shortness of breath.

In the ER he was anxious with blood oxygen level reduced to 80%.

His chest xray should look like this



# Vaping Related Lung Disease



..... but this is CXR result

he requires high flow oxygen and is admitted to intensive care

medical history: only notable for mild intermittent childhood asthma

social history: he is a student preparing to go back to college with no recent travel and no sick contacts, there has been no relevant travel history, he reports regular vaping with flavored nicotine cartridges or pods in a “Juul”

# Vaping Related Lung Disease

despite initial treatments for pneumonia and trial of steroids  
progressive respiratory failure  
requiring mechanical ventilation

continued progression of hypoxia  
requiring referral for ECMO and  
evaluation for emergent lung  
transplant



# Vaping Related Lung Disease: Epidemic

- CDC, FDA and PA Department of Health investigating multistate outbreak of lung disease associated with E cigarette products.
- E cigarettes include a variety of delivery systems but all heat a liquid to produce a aerosol that users inhale in their lungs – the content can include nicotine, THC, CBD oils and other additives.
- As of 9/11/2019 there are 380 cases confirmed nationally with 6 deaths – overall incidence expected to be higher.
- Locally Eight cases have been reported across MLH with two requiring referral for ECMO / transplant evaluation.

# Vaping Related Lung Disease: Epidemic



The NEW ENGLAND  
JOURNAL of MEDICINE

9/6/2019 Wisconsin  
and Illinois Study

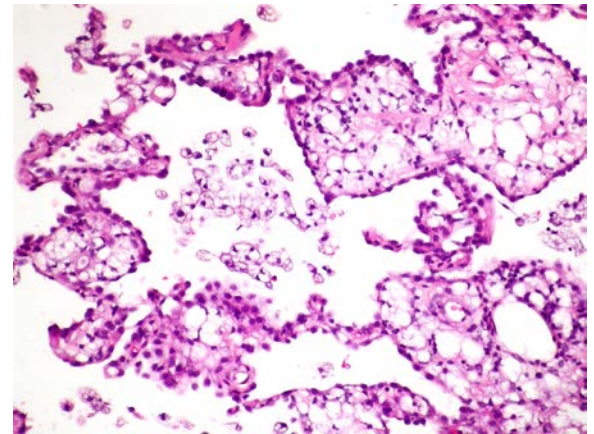
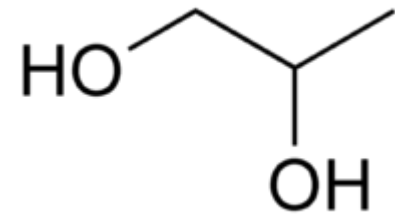
- There were 53 case patients, 83% of whom were male; the median age of the patients was 19 years. The majority of patients presented with respiratory symptoms (98%), gastrointestinal symptoms (81%), and constitutional symptoms (100%). All case patients had bilateral infiltrates on chest imaging (which was part of the case definition). A total of 94% of the patients were hospitalized, 32% underwent intubation and mechanical ventilation, and one death was reported. A total of 84% of the patients reported having used tetrahydrocannabinol products in e-cigarette devices, although a wide variety of products and devices was reported. Syndromic surveillance data from Illinois showed that the mean monthly rate of visits related to severe respiratory illness in June through August of 2019 was twice the rate that was observed in the same months in 2018.

# Vaping Related Lung Disease: Symptoms

- Symptoms have included nonproductive cough, pleurisy chest pain and shortness of breath several days to weeks prior to hospitalizations.
- Systemic symptoms include tachycardia, fever, chills or fatigue.
- Many have GI symptoms including nausea, vomiting abdominal pain and diarrhea preceding respiratory symptoms.
- Hospital presentation notable for significant hypoxia.

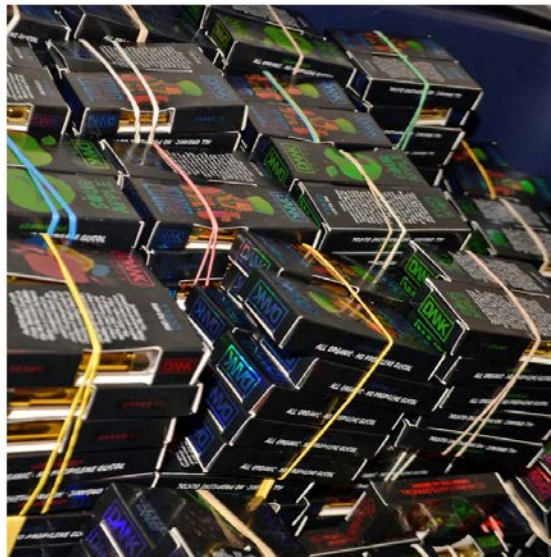
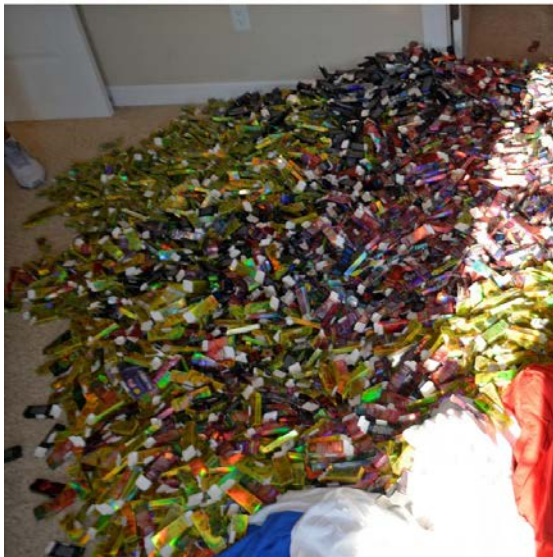
# Vaping Related Lung Disease: Mechanism, Treatment and Outcomes

- Clinical improvement has been reported with systemic steroids in some cases but not consistent with some cases progressing to severe respiratory failure.
- Most cases have reported products including THC but no specific product has been identified.
- Other content includes propylene glycol or glycerol - organic solvents
- Suspected mechanism may be acute exogenous lipoid pneumonia.
- Vitamin E implicated
- Black Market THC products
- All suspected cases should be reported to Poison Control with exposure details 1(800) 222 – 1222









# Vaping Related Lung Disease: Delivery Systems

All predicated on heating a liquid to form a aerosol capable of being inhaled

## First Generation

First practical E cigarette 2004

Promoted as less dangerous option for smokers

- Come in disposable or rechargeable
- May emit a light when the user puffs
- Shorter battery life than later generation
- Generally less expensive



# Vaping Related Lung Disease

## Second Generation

Short for “vaporizer pen”

- Come in various sizes
- Not shaped like a cigarette
- Slim like a pen
- Can come in disposable or rechargeable forms paralleling rise of improved batteries and internet availability
- Refillable with e-juice/e-liquid evolution of flavored e -liquids



# Vaping Related Lung Disease

## Third generation

### MODS

Larger in shape and size

- Include modification options
- Have larger battery capacity and replaceable batteries
- Typically rechargeable
- Typically deliver much more nicotine dose than earlier generations



# Vaping Related Lung Disease

## Juul PODS

Resembles a USB flash drive

- Available in several flavors sold as 'pods' which contain nicotine and attach to the device
- Has a subtle and sleek design that can easily be hidden from parents or teachers
- Can be recharged in a laptop or any USB charger

THC - both legal and illegal



# Vaping Related Lung Disease: Consequences of Vaping and Adolescent Risks

Nicotine dependence

Adverse effects

Normalizing behavior

Long term effects not yet known

Major Concern:

The percentage of high school-age children reporting past 30-day use of these products rose by more than 75% between the 2017 and 2018 surveys. Use among middle school-age children increased nearly 50%.

## Adverse effects of vaping

*Brain*

- Addiction

*Eyes*

- Irritation

- Blurry vision

- Wounds and burns in case of e-cigarette explosion

*Mouth and airways*

- Irritation

- Cough

- Increased airway resistance

*Heart and circulation*

- Increased heart rate

- Chest pain

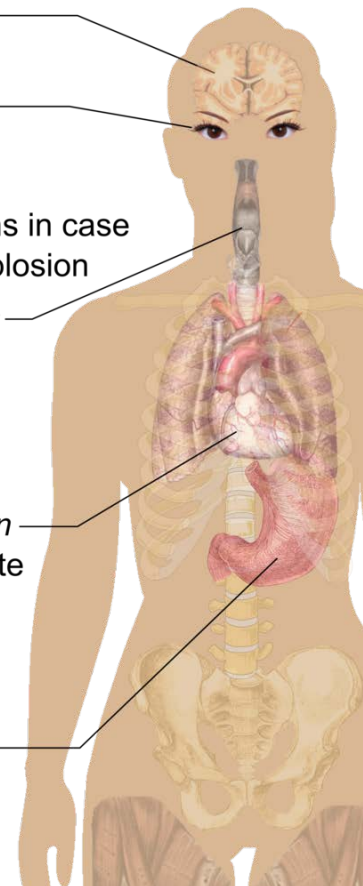
- Increased blood pressure

*Stomach*

- Vomiting

- Nausea

- Pain



# Vaping Related Lung Disease: Legislation

**Federal** - Family Smoking Prevention and Tobacco Control Act - originally for tobacco products

modified 2016 - extended to e cigarettes that contain nicotine - banning sales to age under 18 - disclosure of ingredients and demonstrate safety

did not prohibit advertising or sales of flavored e cigarettes - recent move by administration to ban flavored nicotine products

**CDC** - CDC - E-cigarette products should never be used by youths, young adults, pregnant women, or by adults who do not currently use tobacco products. Adult smokers who are attempting to quit should use evidence-based smoking cessation treatments, including counseling and FDA-approved medications

**State and Local** - 13 states and 752 municipalities have banned public e cigarette use in areas where cigarette use is banned

PA HB 97 - proposed to ban vaping on school grounds

Michigan flavored E cigarette ban 9/4, NY considers ban yesterday



# Vaping Related Lung Disease:

Closing points:

There is a ongoing epidemic of severe lung injury associated with vaping.

While early E cigarettes were intended to be a less dangerous smoking substitute, vaping has rapidly emerged as a independent health issue with adolescents and young adults at greatest risk.

There has been a rapid evolution of vaping technology has led to more potent and compact delivery systems.

Counterfeit THC and other E oils dangerous new addition.

Medical study and protective legislation has been slower to evolve.

Aggressively advance protections for minors at every level - Federal - State - Local.