

# Lung Injury Associated with Vaping

## Kentucky Department for Public Health

**October 15, 2019**



**Kentucky Public Health**  
Prevent. Promote. Protect.

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# Agenda

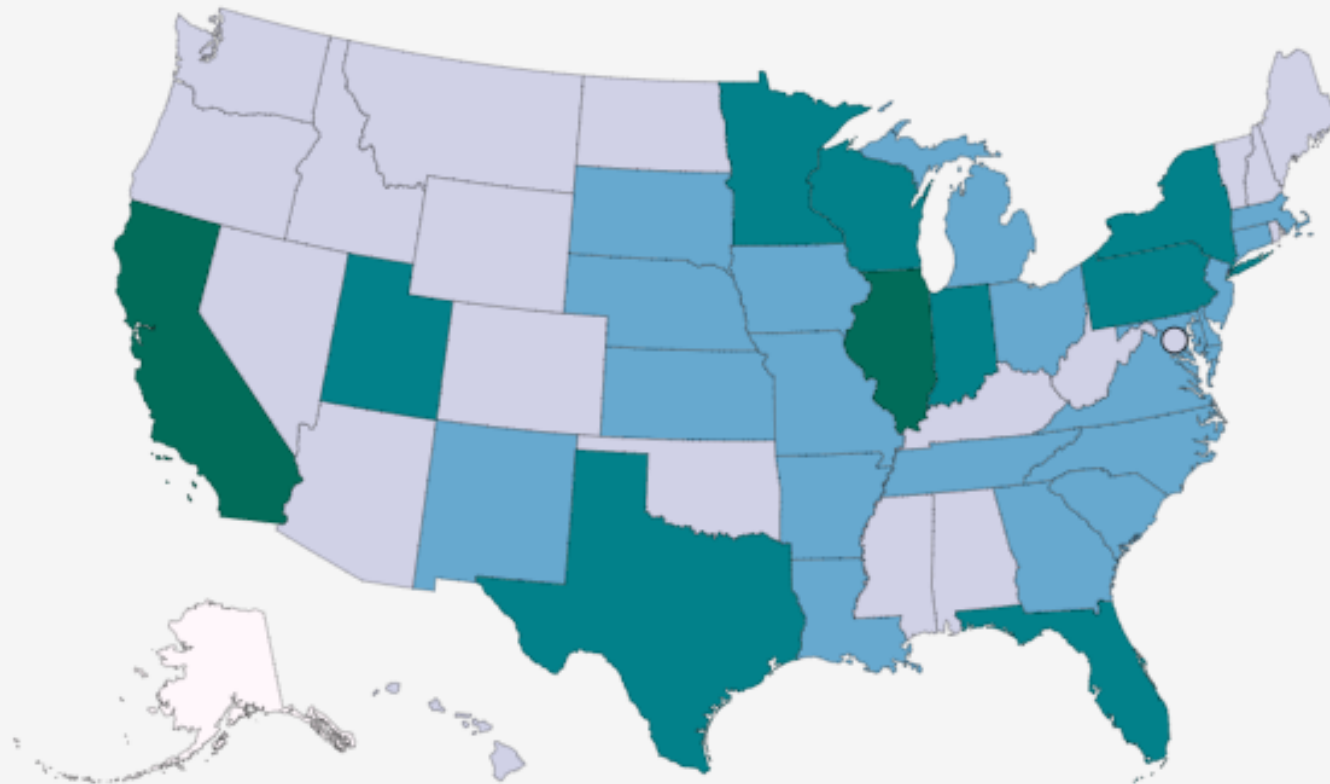


# Background\*

- July, 2019 – Illinois and Wisconsin launch joint investigation
  - Several cases of lung injury in previously healthy persons
  - Reported electronic cigarette (e-cigarette) use, or vaping
- 86 interviewed patients
  - Reported 234 unique e-cigarette, or vaping, products
  - Labeled with 87 different brand names
- Among 112 THC-containing products for which the source was reported
  - 100 (89%) were acquired from informal sources
    - Friends, family, school, dealers, or off the street)
  - Remaining 12 were bought at an out-of-state cannabis dispensary (six), online (five), or from a vape or tobacco shop (one)

\*MMWR Morb Mortal Wkly Rep. ePub: 27 September 2019. DOI: <http://dx.doi.org/10.15585/mmwr.mm6839e2>

## Number of Lung Injury Cases reported to CDC as of October 8, 2019



Territories

AS

GU

MH

FM

PW

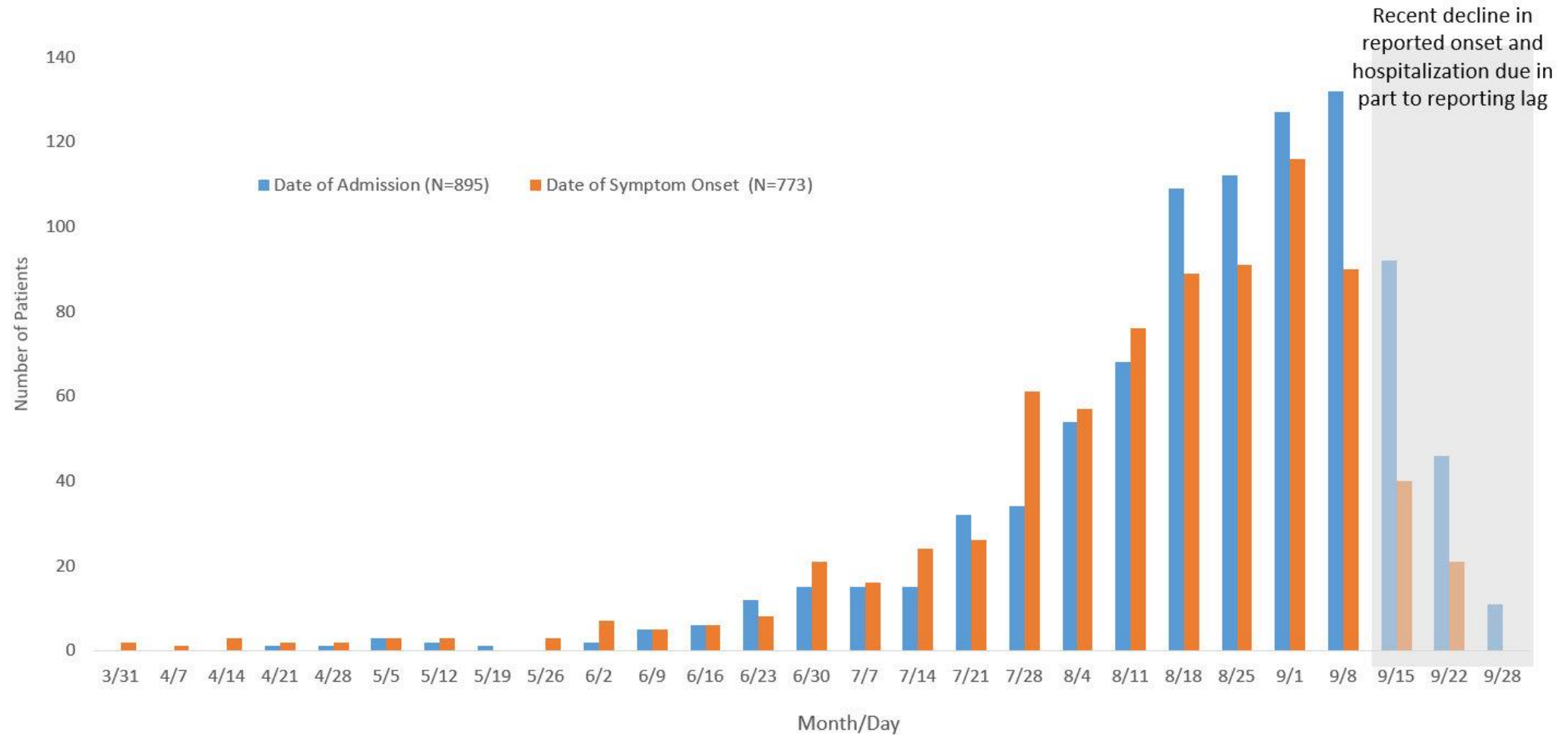
PR

VI



1,299 cases in District of Columbia, U.S. Virgin Islands and all states except Alaska (Oct. 8, 2019)

# Dates of Symptom Onset and Hospital Admission United States, March 31-October 5, 2019



# National Statistics

- 26 deaths (21 states) – Alabama, California (3), Connecticut, Delaware, Florida, Georgia (2), Illinois, Indiana, Kansas (2), Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Jersey, New York, Oregon (2), Pennsylvania, Texas and Virginia.
- Median age of deceased patients was 49 years and ranged from 17 to 75 years.

Based on 1,043 patients:

- 70% male
- 80% are under 35 years old
  - 15% of patients are under 18 years old
  - 21% of patients are 18 to 20 years old
  - 18% of patients are 21 to 24 years old
  - 26% of patients are 25 to 34 years old
  - 20% of patients are 35 years or older

# Exposure History

- E-cigarette substances reported in 30 days prior to onset:
  - 573 patients reported:
  - Using THC\*-containing products – 76%
  - Exclusive use of THC-containing products – 32%
  - Using nicotine-containing products – 58%
  - Exclusive use of nicotine-containing products – 13%
- No single product or substance has been linked to all cases
- The specific chemical exposure(s) causing lung injury is unknown

\*delta-9-tetrahydrocannabinol – THC is the psychoactive ingredient in marijuana

# Kentucky Cases (October 11, 2019)

Cases reported for investigation: 28

**Confirmed cases: 1**

**Probable cases: 6**

**Ruled out cases: 3**

Ruled out cases were reported but during investigation were determined not to include a documented history of vaping or otherwise do not meet case definition.





HEALTH PROMOTIONS BRANCH

## Severe Lung Injury and Vaping

### What It Is

The Kentucky Department for Public Health (DPH) is investigating a growing number of cases of severe lung injury related to e-cigarette use, also known as vaping.

While this investigation is ongoing, the Centers for Disease Control and Prevention (CDC) recommends that you consider refraining from using e-cigarette, or vaping, products, particularly those containing THC. If you recently have used an e-cigarette or vaping product and you have [symptoms](#) like those reported in this outbreak, see a healthcare provider.

DPH is working closely with healthcare providers, local health departments, the CDC, the Food and Drug Administration and other states to gather information about this outbreak.

#### Severe Lung Injury Associated with Vaping

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Updated: Friday, Oct. 11, 2019, 1 p.m.

<https://chfs.ky.gov/agencies/dph/dmch/hpb/Pages/pdinfo.aspx>

# Frequent Clinical Symptoms

- Most patients have been young and otherwise healthy
- Report gradual onset of various symptoms over days to weeks
  - Respiratory (cough, chest pain, shortness of breath)
  - Gastrointestinal (GI) (abdominal pain, nausea, vomiting, diarrhea)
  - Systemic symptoms (fatigue, fever, weight loss)
- GI symptoms sometimes precede respiratory symptoms
  - Tend to resolve quickly after admission
  - Evaluation for GI-related illness unrevealing
- Almost all published cases have been hospitalized
  - Many with  $\geq 1$  antecedent evaluation in ambulatory settings

# Frequent Presenting Signs upon Hospital Admission

- Fever
- Respiratory symptoms:
  - Shortness of breath
  - Cough
  - Chest pain
- Tachycardia – abnormally rapid heart rate
- Tachypnea – abnormally rapid breathing
- Hypoxemia – abnormally low blood/oxygen concentration
  - Even in patients without respiratory symptoms upon presentation
  - One of 53 patients in the recently published 53-case series in *New England Journal of Medicine*\* did not report respiratory symptoms, but had oxygen saturation of 91% on room air on admission

\*DOI: 10.1056/NEJMoa1911614

# Frequent Laboratory and Radiographic Findings

- Laboratory
  - Serum leukocytosis with neutrophil predominance
  - Elevated serum markers of inflammation (e.g., ESR, CRP)
  - Transient, mild elevation in serum transaminases
- Chest imaging
  - Abnormal findings may or may not be present on initial imaging, but develop eventually
  - Bilateral opacities on plain radiograph or ground-glass opacities on chest computed tomography (CT), often with sub-pleural sparing
- Imaging of abdomen/pelvis usually unremarkable except for bilateral opacities in cuts of lower lung fields included on CT

# Spectrum of Clinical and Pathologic Diagnoses

- Acute lung injury and adult respiratory distress syndrome (ARDS)
- Diffuse alveolar damage
- Lipoid pneumonia
- Acute necrotizing pneumonitis
- Organizing pneumonia with lipid-laden macrophages
- Non-specific inflammation
- Hypersensitivity pneumonitis
- Eosinophilic pneumonia

# CDC Confirmed Case Definition (September 18, 2019)

- Using an e-cigarette ("vaping") or dabbing in 90 days prior to symptom onset

**AND**

- Pulmonary infiltrate, such as opacities, on plain film chest radiograph or ground-glass opacities on chest CT

**AND**

- Absence of pulmonary infection on initial work-up. **Minimum criteria** are
  - A negative respiratory viral panel **and**
  - A negative influenza PCR or rapid test, if local epidemiology supports influenza testing; **and**
  - All other clinically-indicated respiratory ID testing (e.g., urine Antigen for *Streptococcus pneumoniae* and *Legionella*, sputum culture if productive cough, bronchoalveolar lavage (BAL) culture if done, blood culture, HIV-related opportunistic respiratory infections if appropriate) are negative

**AND**

- No evidence in medical record of alternative plausible diagnoses (e.g., cardiac, rheumatologic, or neoplastic process)

# CDC Probable Case Definition (September 18, 2019)

- Using an e-cigarette ("vaping") or dabbing\* in 90 days prior to symptom onset

**AND**

- Pulmonary infiltrate, such as opacities, on plain film chest radiograph or ground-glass opacities on chest CT

**AND**

- Infection identified via culture or PCR, but clinical team\*\* believes this infection is not the sole cause of the underlying lung injury **OR Minimum criteria** to rule out pulmonary infection not met (testing not performed) and clinical team\*\* believes infection is not the sole cause of the underlying lung injury

**AND**

- No evidence in medical record of alternative plausible diagnoses (e.g., cardiac, rheumatologic, or neoplastic process)

\*\*Clinical team caring for the patient.

# Report Suspect Cases

- Use EPID 200 Report Form
- Illness name listed as “Vaping – Lung Injury”
- Report via secure fax at: 502-696-3803
- For questions on reporting, contact Mel Grissom at [George.Grissom@ky.gov](mailto:George.Grissom@ky.gov)
- For general information, go to <https://chfs.ky.gov/agencies/dph/dmch/hpb/Pages/pdinfo.aspx>



# Resources for Clinicians

- CDC Website ([https://www.cdc.gov/tobacco/basic\\_information/e-cigarettes/severe-lung-disease.html](https://www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease.html))
  - Click on: “For Healthcare Providers”
    - Includes Recommendations, Resources, Publications
- KDPH Clinical Specimen Submission Guidance
  - Available on Kentucky Department for Public Health’s Division of Laboratory Services website:
    - <https://chfs.ky.gov/agencies/dph/dls/Pages/default.aspx>
- KDPH Vaping Material Submission Guidance
  - Available on Kentucky Department for Public Health’s Division of Laboratory Services website:
    - <https://chfs.ky.gov/agencies/dph/dls/Pages/default.aspx>
- KDPH Tobacco Prevention and Cessation Program website:
  - <https://chfs.ky.gov/agencies/dph/dmch/hpb/Pages/tobcessation.aspx>

# Treatment

- Initial therapies focused on presumed infectious etiologies
  - Empiric antibiotics with or without steroids
  - Observation with supportive therapy other than antibiotics or steroids
- Many patients have experienced sub-acute or acute hypoxemic respiratory failure requiring supplemental oxygenation and at times ventilatory support, including with intubation and mechanical ventilation or extracorporeal membrane oxygenation
- Patients have tended to respond to systemic corticosteroids (either alone or concurrent with antibiotics)
- During influenza season, health care providers should consider influenza in all patients suspected of having vaping associated lung injury. Antivirals should be considered in patients suspected of having influenza in accordance with established guidelines.

# Outcomes

- Specialists in pulmonary medicine, critical care, infectious diseases, pathology, or toxicology frequently involved in patients' care
- Despite illness severity, most patients have survived to hospital discharge
  - Most patients have been young and healthy pre-illness
  - Some patients who have not recovered to pre-illness pulmonary function at time of discharge, demonstrated improvement during post-hospitalization evaluation
  - Other patients still had reduced pulmonary function during post-hospitalization evaluation
- Patients discharged from the hospital after inpatient treatment should have a follow-up visit no later than 1-2 weeks after discharge

# What to Tell Patients

- Regardless of the ongoing investigation, e-cigarette products should not be used by
  - Youth and young adults
  - Pregnant women
  - Adults who do not currently use tobacco products
- Regardless of the ongoing investigation, anyone who uses e-cigarette products should
  - Not buy these products off the street (e.g., e-cigarette products with THC, other cannabinoids)
  - Not modify e-cigarette products or add any substances to these products that are not intended by the manufacturer
  - Monitor yourself for symptoms (e.g., abdominal pain, nausea, vomiting, diarrhea, cough, shortness of breath, chest pain)
  - Promptly seek medical attention if you have concerns about your health

# What to Tell Patients

- For adults trying to quit tobacco product use, including e-cigarettes
  - Use evidence-based treatments, including counseling from a healthcare provider and FDA-approved medications
- During the current investigation of lung injury associated with e-cigarettes, or vaping, if you are concerned about these specific health risks
  - Consider refraining from using e-cigarette or vaping products
  - If you are an adult who uses e-cigarettes because you have quit cigarette smoking, do not return to smoking cigarettes
  - If you continue to use e-cigarettes, carefully monitor yourself for symptoms and see a healthcare provider right away if you have symptoms like those reported in this outbreak

# Nicotine Treatment



"QUITKY" to 797979

[www.quitnowkentucky.org](http://www.quitnowkentucky.org)

# Marijuana Treatment



Text “HOPE” to 96714  
Call 1-833-8KY-HELP

- Behavioral interventions such as cognitive-behavioral therapy, contingency management, motivational enhancement therapy, and multidimensional family therapy have demonstrated efficacy in the treatment of individuals who report problematic use of THC- or nicotine-containing products and should be considered in consultation with a behavioral health professional.

# Thank you!

Elizabeth Anderson-Hoagland, MPH  
502-564-9358 ext. 4018

[ElizabethA.Hoagland@ky.gov](mailto:ElizabethA.Hoagland@ky.gov)



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