FINAL REPORT

INVESTIGATION OF SEVERE PULMONARY ILLNESS AMONG PEOPLE WHO HAVE REPORTED VAPING, 2019-2021

TEXAS Health and Human Services
Texas Department of State Health Services

Contents

Summary

In August 2019, the first cases of electronic cigarette or vaping product use-associated lung injury (EVALI) were reported to the Centers for Disease Control and Prevention (CDC). The CDC collected EVALI case information from state health departments until February 2020. The Texas Department of State Health Services (DSHS) collected EVALI information from August 2019 to the end of December 2021. This report summarizes EVALI data collected in Texas.

Background

Vaping is the use of an electronic device (electronic cigarette, e-cigarette, vaporizer, vape[s], vape pen, dab pen, or other device) to inhale substances (nicotine, marijuana, tetrahydrocannabinol (THC), THC concentrations, cannabidiol (CBD), synthetic cannabinoids, flavorings, or other substances).[1] E-cigarettes have been for sale in the United States since 2007.

More than 566,000 Texas adults, 3.6 percent of the adult population, reported current e-cigarette use in 2019. Younger adults, 18-29 years of age, were more likely to use e-cigarettes compared with adults 45 years of age and older.[2]

In 2020, 11.1 percent of all Texas students reported current e-cigarette use.[2] E-cigarette use was twice as prevalent among high school students (14.3 percent) as middle school students (7.1 percent). Overall, youth use of e-cigarettes has almost quadrupled from 3 percent in 2012 to 11 percent in 2020.[2]

More information about vaping can be found on the **Department of State Health Services website**.

[1] Centers for Disease Control and Prevention. Quick Facts on the Risks of E-cigarettes for Kids, Teens, and Young Adults. Reviewed April 7, 2022. Accessed June 6, 2022. **https://www.cdc.gov/tobacco/basic_information/e-cigarettes/Quick-Facts-on-the-Risks-of-E-cigarettes-for-Kids-Teens-and-Young-Adults.html.**

[2] Texas Department of State Health Services. Electronic Nicotine Delivery Systems (E-Cigarette) Report. As Required by Texas Health and Safety Code, Section 161.0902. Published January 2021. Accessed June 6, 2022. **https://www.dshs.texas.gov/legislative/2021-Reports/Electronic-Nicotine-Delivery-Systems-(E-cigarette)-Report-2021.pdf**.

DSHS EVALI Outbreak Response

On August 14, 2019, a Texas clinician from the North Texas Poison Center notified the Texas Department of State Health Services (DSHS) of a suspected electronic cigarette or vaping product use-associated lung injury (EVALI) case in an adolescent who initially presented with complaints of shortness of breath, nausea, and vomiting. DSHS released a health alert on August 16, 2019, and an updated health alert on September 5, 2019, to notify the public and clinicians of the outbreak and provide recommendations. The health alerts requested suspected cases be reported to DSHS. DSHS collaborated with local health departments and clinicians to identify and investigate reported cases. Additionally, to assess previous trends and track the outbreak, DSHS queried the Texas Poison Center Network call records and used emergency department data from the statewide syndromic surveillance system.

DSHS coordinated the collection, shipping, and reporting of the results of patient's biological samples (lung tissue and bronco-alveolar lavage (BAL) fluid) and vaping-related samples (device, cartridges) between the submitter (patient, hospital, local health department) and the Food and Drug Administration (FDA) and the Centers for Disease Control and Prevention (CDC).

DSHS obtained patient medical records for all suspected cases. DSHS reviewed medical records and, using the CDC national surveillance case definition (**Appendix A**), classified cases as either confirmed or probable. DSHS created a state-specific interview tool to collect data on patient demographics, substance use history, e-cigarette or vaping product use, and other exposures potentially associated with acute pulmonary illness. DSHS and local health departments attempted to conduct telephone or in-person interviews with all patients meeting the confirmed and probable case definitions or their proxies (e.g., parents). DSHS completed 76 (57.6 percent) interviews of 134 confirmed or probable cases reported to DSHS between August 14, 2019, and October 10, 2019.

DSHS also requested technical assistance (CDC Epidemiologic Assistance or Epi-Aid) during September and October of 2019 because of a substantially high volume of daily case reports and arduous investigation process. Texas was one of the top two states with the most reported cases of EVALI in the country.[3]

[3] Outbreak of Lung Injury Associated with the Use of E-Cigarette, or Vaping, Products. CDC.gov. Reviewed August 3, 2021. Accessed May 26, 2022. **https://www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease.html**.

The process for deactivation of EVALI surveillance began on November 26, 2019, when CDC asked states to only report hospitalized EVALI cases to CDC. Further collection of data on non-hospitalized cases was left to the discretion of the individual states, tribal, local, and territorial health departments. Starting February 3, 2020, CDC no longer accepted clinical or product samples related to EVALI cases. As of February 18, 2020, CDC completely discontinued data collection due to a considerable decline in EVALI cases since September 2019 and the identification of vitamin E acetate as the primary cause of EVALI.

DSHS continued to conduct passive EVALI surveillance through December 31, 2021. This involved receiving EVALI case reports from health care providers and local health departments, requesting and reviewing medical records for case ascertainment, and maintaining an in-house database for EVALI cases.

In 2021, DSHS received a total of nine suspected EVALI cases and received the last report on August 10, 2021. DSHS discontinued EVALI surveillance and investigation efforts as of January 1, 2022, for several reasons, including, but not limited to:

- The CDC stopped collecting EVALI information in 2020,
- A decline in number of reported suspected cases,
- The lack of any case reported in the last 8 months, and
- EVALI is not a reportable/notifiable condition in Texas.[4]

[4] Texas Notifiable Conditions - 2022. DSHS.texas.gov. Reviewed February 3, 2022. Accessed May 26, 2022. **https://www.dshs.texas.gov/IDCU/investigation/Reporting-forms/Notifiable-Conditions-2022Color.pdf**.

Public Health Concern – Case Investigations

From August 1, 2019, to December 31, 2021, 359 possible electronic cigarette or vaping product use-associated lung injury (EVALI) cases were reported in Texas:

- 151 were classified as confirmed cases,
- 130 were classified as probable cases, and
- 78 determined not to be cases.

Of the confirmed and probable cases, four deaths were also reported.

Possible EVALI cases included the total number of EVALI-related reports received from health care providers, laboratories, medical examiners, other health departments, or any other reporter. DSHS investigated these reports and used the Centers for Disease Control and Prevention (CDC) 2019 Lung Injury Surveillance Case Definition for classifying a case as confirmed or probable EVALI.[5] Detailed criteria for case classification can be found in **Appendix B**.

Multiple states reported cases of EVALI, many of which resulted in hospitalization and death. As of February 18, 2020, the CDC's last data report indicated that 2,807 confirmed and probable cases of hospitalized lung illness associated with the use of e-cigarette products were reported from 50 states, the District of Columbia, and 2 U.S. territories. The CDC confirmed 68 deaths in 29 states and the District of Columbia.[6] The CDC did not identify any infectious diseases among cases, and the CDC concluded that lung illness was likely associated with a chemical exposure.

The CDC identified vitamin E acetate, an additive in some THC-containing e-cigarette, or vaping, products, as chemical of concern among people with EVALI.[3] The CDC tested bronco-alveolar lavage (BAL) fluid samples (fluid samples collected from the lungs) from 51 patients with EVALI from 16 states and found vitamin E acetate in 94 percent of the case samples. In comparison, the CDC did not find any vitamin E acetate in the 99 BAL samples from individuals not experiencing EVALI symptoms.

[5] Centers for Disease Control and Prevention. Outbreak of Lung Injury Associated with the Use of E-cigarette, or Vaping, Products. For State, Local, Territorial, and Tribal Health Departments. Reviewed October 1, 2020. Accessed June 6, 2022. **https://www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease/health-departments/index.html.**
[6] Centers for Disease Control and Prevention. Outbreak of Lung Injury Associated with the Use of E-cigarette, or Vaping, Products. Reviewed August 3, 2021. Accessed June 6, 2022. **https://www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease.html.**

Case Characteristics

The following statistics come from Department of State Health Services (DSHS) electronic cigarette or vaping product use-associated lung injury (EVALI) case surveillance conducted from August 1, 2019, to December 31, 2021.

Of the 281 confirmed or probable cases in Texas:

- 28 percent are under 18 years of age;
- Cases range in age from 13 through 75 years old (a median age of 21 years);
- 70 percent are male;
- 88 percent contained THC, the primary psychoactive ingredient in marijuana;[7]
- 20 percent reported using only THC and not nicotine products; and
- Hospital length of stay ranged from 1 through 87 days, with a mean length of stay of 8 days.

Case Status

Table 1. Severe Pulmonary Illness Among People Who Report Vaping: Case Status, 2019-2021

Case Status	Cases	Percentage
Confirmed	151	42
Probable	130	36
Not Case	78	22
Under Investigation	0	0
Total	**359**	**100**

[7] Based only on those cases with available substance information.

Case Geography

Table 2. Severe Pulmonary Illness Among People Who Report Vaping: Public Health Region, 2019-2021

Public Health Region	Cases	Percentage
Region 1	6	2
Region 2/3	153	54
Region 4/5 N	6	2
Region 6/5 S	43	15
Region 7	38	14
Region 8	14	5
Region 9/10	3	1
Region 11	14	5
Region Unknown	4	1
Total	**281**	**100**

Case Characteristics – Sex, Race, Ethnicity, and Age

Table 3. Severe Pulmonary Illness Among People Who Report Vaping: Sex, 2019-2021[i]

Sex	Cases	Percentage
Female	84	30
Male	197	70
Total	**281**	**10%**

[i] Contains data on confirmed and probable cases.

Table 4. Severe Pulmonary Illness Among People Who Report Vaping: Race, 2019-2021[i]

Race	Cases	Percentage
American Indian or Alaskan Native	2	1
Asian	3	1
Black or African American	5	2
Native Hawaiian or Other Pacific Islander	0	0
White	196	70
Other	6	2
Unknown	69	25
Total	**281**	**100**

[i] Contains data on confirmed and probable cases.

Table 5. Table 5. Severe Pulmonary Illness among People who Report Vaping: Ethnicity, 2019-2021[i]

Hispanic Ethnicity	Cases	Percentage
Yes	64	23
No	106	38
Unknown	111	40
Total	**281**	**100**

[i] Contains data on confirmed and probable cases

Table 6. Severe Pulmonary Illness among People who Report Vaping: Age Group, 2019-2021[i]

Age Group	Cases	Percentage
12 and under	0	0
13-17	80	28
18-23	89	32
24-44	99	35
45 and older	13	5
Age Category Unknown	0	0
Total	**281**	**100**

[i] Contains data on confirmed and probable cases

Case – Clinical Care Course

Table 7. Severe Pulmonary Illness among People who Report Vaping: Admission to Hospital, 2019-2021

Admission to Hospital	Cases	Percentage
Yes	275	98
No	5	2
Unknown	1	>0
Total	**281**	**100**

Table 8. Severe Pulmonary Illness among People who Report Vaping: Admission to Intensive Care Unit, 2019-2021

Admission to Intensive Care Unit	Cases	Percentage
Yes	100	36
No	123	45
Unknown	52	19
Total	**275**	**100**

Table 9. Severe Pulmonary Illness among People who Report Vaping: Requiring Medical Ventilation, 2019-2021

Requiring Medical Ventilation	Cases	Percentage
Yes	10	4
No	23	8
Unknown	242	88
Total	**275**	**100**

Table 10. Severe Pulmonary Illness among People who Report Vaping: Requiring Extracorporeal Membrane Oxygenation, 2019-2021

Requiring Extracorporeal Membrane Oxygenation	Cases	Percentage
Yes	6	2
No	124	45
Unknown	145	53
Total	**275**	**100**

Substances Vaped by Cases

Table 11. Severe Pulmonary Illness among People who Report Vaping: Vaped Nicotine, 2019-2021

Vaped Nicotine	Cases	Percentage
Yes	105	45
No	48	21
Unknown	79	34
Total	**232**	**100**

Table 12. Table 12. Severe Pulmonary Illness among People who Report Vaping: Vaped Tetrahydrocannabinol (THC), 2019-2021

Vaped THC	Cases	Percentage
Yes	204	88
No	10	4
Unknown	18	8
Total	**232**	**100**

List of Acronyms

Acronym	Full Name
BAL	Bronchoalveolar lavage
CBD	Cannabidiol
CDC	Centers for Disease Control and Prevention
CT	Computed tomography
DSHS	Department of State Health Services
Epi-Aid	CDC epidemiologic assistance
EVALI	E-cigarette and Vaping Associated Lung Injury
FDA	Food and Drug Administration
PCR	Polymerase chain reaction
THC	Tetrahydrocannabinol

Appendix A. Lung Injury Surveillance Case Definitions

The Centers for Disease Control and Prevention published case definitions for use in surveillance and reporting of lung injury.[8]

Confirmed Case

Using an e-cigarette ("vaping") or dabbing[9] 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:

1. A negative viral panel
   AND
2. A negative influenza PCR or rapid test, if local epidemiology supports influenza testing
   AND
3. All other clinically indicated respiratory infectious disease testing are negative

AND

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

Probable Case

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

AND

[8] 2019 Lung Injury Surveillance Primary Case Definitions, September 19, 2019. CDC.gov. Published October 16, 2019. Accessed May 26, 2022. **https://www.cdc.gov/tobacco/basic_information/e-cigarettes/assets/2019-Lung-Injury-Surveillance-Case-Definition-508.pdf**.

[9] Using an electronic device (e.g., electronic nicotine delivery system (ENDS), electronic cigarette, e-cigarette, vaporizer, vape(s), vape pen, dab pen, or other device) or dabbing to inhale substances (e.g., nicotine, marijuana, THC, THC concentrates, CBD, synthetic cannabinoids, flavorings, or other substances).

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[10] 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).

Notes

These case definitions are meant for surveillance and not clinical diagnosis. These case definitions are subject to change and will be updated as additional information becomes available if needed. For more information visit **CDC's Lung Injury response website**.

[10] Clinical team caring for the patient.

Appendix B. Links to Websites

Department of State Health Services (DSHS) Vaping Webpage

dshs.texas.gov/vaping

Official DSHS website for information on vaping as referenced in background.

Centers for Disease Control and Prevention (CDC) Lung Injury Response Website

cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease.html

CDC website with information of the severe pulmonary lung illness outbreak as referenced in **Appendix A**.

Environmental Surveillance and Toxicology Branch

dshs.texas.gov/ESTB