SEPTEMBER 3, 2019

HEALTH ADVISORY

Awareness of severe pulmonary disease among people who use Electronic Nicotine Delivery Systems (ENDS), such as e-cigarettes or vaping systems

Providers Asked to Report Cases

North Dakota Department of Health (NDDoH) received the first report of severe respiratory illness in a patient with a history of vaping or electronic nicotine delivery systems (ENDS) use. North Dakota joins 25 other states who have reported more than 200 potential cases of severe respiratory illness from e-cigarettes among teenagers and adults. See the CDC message below from August 30, 2019 for more information.

The NDDoH is asking providers who are treating patients who are/were hospitalized with severe pulmonary disease (see the updated case definition in Appendix A) AND have a history of ENDS use to report these cases to the NDDoH at 866-207-2880.

This is an official
CDC HEALTH ADVISORY

Distributed via the CDC Health Alert Network
August 30, 2019, 0935 ET (9:35 AM ET)
CDCHAN-00421

Severe Pulmonary Disease Associated with Using E-Cigarette Products

General Background
E-cigarettes typically contain nicotine, most also contain flavorings and other chemicals, and some may contain marijuana or other substances. They are known by many different names and come in many shapes, sizes and device types. Devices may be referred to as “e-cigs,” “vapes,” “e-hookahs,” “vape pens,” “mods,” “tank,” or electronic nicotine delivery systems (ENDS). Some e-cigarette devices resemble other tobacco products such as cigarettes; some resemble ordinary household items such as USB flash drives, pens, and flashlights; and others have unique shapes. Use of e-cigarettes is sometimes referred to as “vaping” or “juuling.” E-cigarettes used for dabbing are sometimes called “dab” pens.
E-cigarettes can contain harmful or potentially harmful substances, including nicotine, heavy metals (e.g., lead), volatile organic compounds, and cancer-causing chemicals. Additionally, some e-cigarette products are used to deliver illicit substances; may be acquired from unknown or unauthorized (i.e., “street”) sources; and may be modified for uses that could increase their potential for harm to the user. For example, some e-cigarette pods or cartridges marketed for single use can be refilled with illicit or unknown substances. In addition, some e-cigarette products are used for “dripping” or “dabbing.” Dripping involves dropping e-cigarette liquid directly onto the hot coils of an e-cigarette which can result in high concentrations of compounds (e.g., tetrahydrocannabinol [THC] and cannabinoid compounds). Dabbing involves superheating substances such as “budder”, butane hash oil (BHO), and “710” that contain high concentrations of THC and other plant compounds (e.g., cannabidiol [CBD]).

**Outbreak Background**

As of August 27, 2019, 215 possible cases have been reported from 25 states and additional reports of pulmonary illness are under investigation. One patient (in Illinois) with a history of recent e-cigarette use was hospitalized on July 29, 2019 with severe pulmonary disease and died on August 20, 2019. Although the etiology of e-cigarette-associated pulmonary disease is undetermined, epidemiologic investigations in affected states are ongoing to better characterize the exposures, demographic, clinical, and laboratory features and behaviors of patients. All patients have reported using e-cigarette products. The exact number is currently unknown, but many patients have reported using e-cigarettes containing cannabinoid products such as THC or CBD.

Based on reports from several states, patients have experienced respiratory symptoms (cough, shortness of breath, or chest pain), and some have also experienced gastrointestinal symptoms (nausea, vomiting, or diarrhea) or non-specific constitutional symptoms (fatigue, fever, or weight loss). Symptoms typically develop over a period of days but sometimes can manifest over several weeks. Gastrointestinal symptoms sometimes preceded respiratory symptoms. Fever, tachycardia, and elevated white blood cell count have been reported in the absence of an identifiable infectious disease. Many patients have sought initial care in ambulatory settings, some with several visits, before hospital admission.

Radiologic findings have varied and are not present in all patients upon initial presentation. Bilateral pulmonary infiltrates and diffuse ground-glass opacities have been reported. Many patients required supplemental oxygen, some required assisted ventilation and oxygenation, and some were intubated. Some patients have been treated with corticosteroids with demonstrated improvement. Antimicrobial therapy alone has not consistently been associated with clinical improvement. Assessment for infectious etiologies has been completed in many patients without an identified infectious cause. Several patients from one state have been diagnosed with lipoid
pneumonia based on clinical presentation and detection of lipids within bronchoalveolar lavage samples stained specifically to detect oil.

All patients have reported using e-cigarette products and the symptom onset has ranged from a few days to several weeks after e-cigarette use. Within two states, recent inhalation of cannabinoid products, THC or cannabidiol, have been reported in many of the patients. To date, no single substance or e-cigarette product has been consistently associated with illness. CDC is working closely with state health departments to facilitate collecting product specimens for testing at the U.S. FDA Forensic Chemistry Center.

**Recommendations for Clinicians**

1. Report cases of severe pulmonary disease of unclear etiology and a history of e-cigarette product use within the past 90 days to the state health department at 866-207-2880. Reporting of cases may help CDC and state health departments determine the cause or causes of these pulmonary illnesses.

2. Ask all patients who report e-cigarette product use within the last 90 days about signs and symptoms of pulmonary illness.

3. If e-cigarette product use is suspected as a possible etiology of a patient’s severe pulmonary disease, obtain detailed history regarding:
   - Substance(s) used: nicotine, cannabinoids (e.g., marijuana, THC, THC concentrates, CBD, CBD oil, synthetic cannabinoids [e.g., K2 or spice], hash oil, Dank vapes), flavors, or other substances
   - Substance source(s): commercially available liquids (i.e., bottles, cartridges, or pods), homemade liquids, and re-use of old cartridges or pods with homemade or commercially bought liquids
   - Device(s) used: manufacturer; brand name; product name; model; serial number of the product, device, or e-liquid; if the device can be customized by the user; and any product modifications by the user (e.g., exposure of the atomizer or heating coil)
   - Where the product(s) were purchased
   - Method of substance use: aerosolization, dabbing, or dripping
   - Other potential cases: sharing e-cigarette products (devices, liquids, refill pods, or cartridges) with others

4. Determine if any remaining product, including devices and liquids, are available for possible testing.

5. Consider all possible causes of illness in patients reporting respiratory and gastrointestinal symptoms and of e-cigarette product use. Evaluate and treat for other possible causes of illness (e.g., infectious, rheumatologic, neoplastic) as clinically indicated. Consider consultation with specialists (pulmonary, infectious disease, critical care, medical toxicology) as appropriate.

6. Clinical improvement of patients with severe pulmonary disease associated with e-cigarette use has been reported with the use of corticosteroids. The decision to use
corticosteroids should be made on a case-by-case basis based on risks and benefits and the likelihood of other etiologies.

7. Lipoid pneumonia associated with inhalation of lipids in aerosols generated by e-cigarettes has been reported based on the detection of lipid-laden alveolar macrophages obtained by bronchoalveolar lavage (BAL) and lipid staining (e.g., oil red O). The decision about whether to perform a BAL should be based on individual clinical circumstances.

8. Lung biopsies have been performed on some patients. If a lung biopsy is obtained, lipid staining may be considered during pathologic examination, and is best performed on fresh tissue. Routine pathology tissue processing (including formalin-fixation and paraffin-embedding) can remove lipids. Conducting routine tissue processing and histopathologic evaluation is still important. Consider consultation with specialists in pulmonary medicine and pathology to help inform any evaluation plan.

9. Patients who have received treatment for severe pulmonary disease related to e-cigarette product use should undergo follow-up evaluation as clinically indicated to monitor pulmonary function.

For More Information

- For assistance with managing patients suspected of illness related to recreational, illicit, or other drugs, call your local poison control center at: 1-800-222-1222.
- Information on electronic cigarettes and similar devices: https://www.cdc.gov/e-cigarettes
- CDC Clinical Outreach and Communication Activity announcement: https://emergency.cdc.gov/newsletters/coca/081619.htm
- CDC’s National Syndromic Surveillance Program’s BioSense/ESSENCE: https://www.cdc.gov/nssp/index.html
- For more information, visit CDC Info: https://www.cdc.gov/cdc-info/index.html
Appendix A – Case Definition

### Severe Pulmonary Disease Associated with E-cigarette Use Outbreak Case Definition (CDC) - August 26, 2019

| **Confirmed** | 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 include negative respiratory viral panel, influenza PCR or rapid test if local epidemiology supports testing. 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) must be negative AND No evidence in medical record of alternative plausible diagnoses (e.g., cardiac, rheumatologic or neoplastic process). |
| **Probable** | 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 is not the sole cause of the underlying respiratory disease process OR Minimum criteria to rule out pulmonary infection not met (testing not performed) and clinical team** believes this is not the sole cause of the underlying respiratory disease process AND No evidence in medical record of alternative plausible diagnoses (e.g., cardiac, rheumatologic or neoplastic process). |

### Footnotes
* 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).
**Clinical team caring for the patient.

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**Categories of Health Alert messages:**
- **Health Alert** conveys the highest level of importance; warrants immediate action or attention.
- **Health Advisory** provides important information for a specific incident or situation; may not require immediate action.
- **Health Update** provides updated information regarding an incident or situation; no immediate action necessary.
- **Health Information** provides general information that is not necessarily considered to be of an emergent nature.

This message is being sent to local public health units, clinics, hospitals, physicians, tribal health, North Dakota Nurses Association, North Dakota Long Term Care Association, North Dakota Healthcare Association, North Dakota Medical Association, and hospital public information officers.