

EVALUATING AND CARING FOR PATIENTS WITH SUSPECTED E-CIGARETTE, OR VAPING, PRODUCT USE ASSOCIATED LUNG INJURY (EVALI)



EVALI is considered a diagnosis of exclusion because, at present, no specific test or marker exists for its diagnosis. CDC's updated interim guidance provides a framework for health care providers in their initial assessment, evaluation, management, and follow-up of persons with symptoms of EVALI, but is not intended to substitute clinical judgment. Health care providers should consider multiple etiologies, including the possibility of EVALI and concomitant infection. For more information reference the updated interim guidance published on 10/11/2019, (<https://go.usa.gov/xpajC>).

CLINICAL EVALUATION

HISTORY

- Ask about respiratory (e.g. cough, chest pain and shortness of breath), gastrointestinal (e.g. abdominal pain, nausea, vomiting and diarrhea), and constitutional symptoms (fever, chills and weight loss) for patients who report a history of using e-cigarette, or vaping, products. Gastrointestinal symptoms preceded respiratory symptoms in some patients.
- Ask patients about recent use of e-cigarette, or vaping, products, including types of substances used (e.g., tetrahydrocannabinol [THC], cannabis [oil, dabs], nicotine, modified products or the addition of substances not intended by the manufacturer).

PHYSICAL EXAM

- Assess vital signs and oxygen saturation via pulse oximetry.
- Pulmonary findings on auscultation exam have often been unremarkable.

LABORATORY TESTING

- Initial laboratory evaluation should be guided by clinical findings.
 - » Consider complete blood count with differential, liver transaminases, and inflammatory markers (e.g., erythrocyte sedimentation rate and C-reactive protein), which may be elevated (Layden JE, 2019).
 - » Consider conducting urine toxicology testing, with informed consent, including testing for THC.
- Infectious disease evaluation to rule out other etiologies might include
 - » Respiratory viral panel including influenza testing during flu season, *Streptococcus pneumoniae*, *Legionella pneumophila*, *Mycoplasma pneumoniae*, endemic mycoses, and opportunistic infections.

IMAGING

- Chest radiograph (CXR).
- Consider chest computed tomography (CT) scan for evaluation of severe or worsening disease, complications, other illnesses, or when CXR results do not correlate with clinical findings.
- Radiographic findings consistent with EVALI include pulmonary infiltrates on CXR and opacities on CT scan (Henry TS, 2019; Schier JG, 2019).

OTHER CONSIDERATIONS

- Further evaluation of patients meeting inpatient admission criteria might include:
 - » Consultation with pulmonary, critical care, medical toxicology, infectious disease, psychology, psychiatry, and addiction medicine specialists.
 - » Additional testing with bronchoalveolar lavage or lung biopsy as clinically indicated, in consultation with pulmonary specialists.



ADMISSION CRITERIA AND OUTPATIENT MANAGEMENT

- Strongly consider admitting patients with potential lung injury, especially if patients have respiratory distress, comorbidities that compromise pulmonary reserve, or decreased (<95%) O₂ saturation.
- Outpatient management for patients with suspected lung injury who have less severe injury might be considered on a case-by-case basis, in particular for patients with less severe injury, lack of comorbidities, and for whom follow-up within 24–48 hours of initial evaluation can be assured.
- Outpatients should have normal oxygen saturation, reliable access to care and social support systems, and be instructed to promptly seek medical care if respiratory symptoms worsen.

MEDICAL TREATMENT

- Consider initiation of corticosteroids except for patients with possible fungal pneumonia, that might worsen with corticosteroid treatment. Among 140 cases reported nationally to CDC that received corticosteroids, 82% of patients improved.
- Consider influenza antiviral treatment in accordance with established guidelines.
- Early initiation of antibiotics for community-acquired pneumonia should be strongly considered in accordance with established guidelines.

PATIENTS NOT ADMITTED TO HOSPITAL

- Follow-up within 24–48 hours to re-assess and manage possible worsening lung injury.
- Consider empiric use of antimicrobials including antivirals.

POST-HOSPITAL DISCHARGE FOLLOW-UP

- Schedule follow-up visit no later than 1–2 weeks after discharge that includes pulse-oximetry testing.
- Consider additional follow-up testing including spirometry and diffusion capacity testing, and consider repeat CXR in 1–2 months.
- Consider endocrinology consultation for patients treated with high-dose corticosteroids.

CESSATION SERVICES AND PREVENTIVE CARE

- Strongly advise patients to discontinue use of e-cigarette, or vaping, products.
- Provide education and cessation assistance for patients to aid nicotine addiction and treatment or referral for patients with marijuana use disorder.
- Advise adult patients using e-cigarettes, or vaping, products, to quit smoking, to not return to smoking cigarettes.
- Adult patients addicted to nicotine should be provided with evidence-based interventions, including behavioral counseling and FDA-approved medications.
- Emphasize the importance of routine influenza vaccination and consider pneumococcal vaccination in accordance with established guidelines.

Reporting cases with suspected EVALI to state, local, territorial, or tribal health departments is critical for accurate surveillance of EVALI.

Determine whether any remaining product, including devices and liquids, is available for testing. Consider submission of any collected specimens, including bronchoalveolar lavage, blood, urine, biopsy, or autopsy specimens, to CDC for evaluation. Testing can be coordinated with [health departments](#).

CDC recently developed [International Classification of Diseases, Tenth Edition, Clinical Modification coding guidance](#) for health care encounters related to EVALI.

Recommendations for clinicians regarding the [Outbreak of EVALI](#) will be updated at www.cdc.gov/lunginjury.