Intermountain Healthcare
E-Cigarette, or Vaping, Associated Lung Injury (E-VALI) Guideline

**History & Physical**
Symptom duration prior to presentation? ________________________________

### VAPING HISTORY

1. History of:
   - Vaping
   - Juuling
   - Dabbing
   - Date when last vaped? ___________________________
   - Quit due to symptoms?

2. Type of device(s) Used:
   - Bottles
   - Cartridges
   - Pods
   - Dry Vape
   - Pax
   - Other _______________________________

3. Specific type(s) of liquids used:
   - Nicotine
   - THC Products
   - Oils
   - Flavored Fluids
   - Other _______________________________

4. Were devices, liquids, refill pods and/or cartridges shared with other people?  Yes / No

5. Were old cartridges or pods reused with other homemade or commercial products?  Yes / No

6. Were devices used to inhale drugs that were concentrated by heating prior to vaping (i.e. dabbing?)  Yes / No

7. Details of vaping behavior: cloud volume __________________ frequency of puffs ________________
   - 'Zero or Stealth' vaping
   - Valsalva at end of inhalation

### OBTAIN PERTINENT ACUTE LUNG INJURY EXPOSURE HISTORY

- Smoking history
- Occupational exposures
- Mold, humidifiers, birds, hot tubs, etc.
- Essential oil diffusers, other exposures
- Medications (e.g. nitrofurantoin, amiodarone, other)

### SIGNS

- Hypoxemia, respiratory failure
- Abnormal CXR and/or CT with variable findings: commonly bilateral GGO, but also patchy consolidation, and unilateral findings
- Pneumothorax and/or pneumomediastinum occasionally present
- LFT abnormalities (200-300 alk phos, AST and ALT)
- Leukocytosis (mild)
- Inflammatory markers (ESR even over 100's CRP 20-30's)
- Urine tox screen +THC
- No other specific diagnosis to explain findings

### SYMPTOMS

- Constitutional (fevers, weight loss, myalgias)
- GI (nausea, vomiting, abdominal pain, diarrhea)
- Note: GI symptoms may be severe and may be the presenting symptom initially
- Respiratory (shortness of breath, cough, pleuritic chest pain, other)

### DIFFERENTIAL DIAGNOSIS

Maintain high index of suspicion — in many cases vaping history was obtained far into the presenting illness even with persistent attempts to elicit the history

- Viral pneumonitis (influenza, other)
- Atypical pneumonia (Mycoplasma, Legionella, Chlamydia, etc)
- Bacterial pneumonia
- Acute eosinophilic pneumonia
- Acute hypersensitivity to pneumonitis due to other cause (e.g. medications, birds, mold, etc.)
- Cardiogenic pulmonary edema
- Vasculitis

---

Clinical Diagnosis of E-VALI

See Other Side for: Treatment recommendations

---

**KEY**:  
- ALI: Acute Lung Injury;  
- ALT: Alanine Aminotransferase;  
- AST: Aspartate Aminotransferase;  
- BAL: Bronchoalveolar Lavage;  
- CDC: Center for Disease Control;  
- CT: Computerized Tomography;  
- CXR: Chest X-ray;  
- DAH: diffuse alveolar hemorrhage;  
- DCO: Diffusing Lung Capacity for Carbon Monoxide;  
- ESR: Erythrocyte Sedimentation Rate;  
- GGO: Ground Glass Opacities;  
- GI: Gastrointestinal;  
- ICU: Intensive Care Unit;  
- IV: Intravenous;  
- kg: kilogram;  
- mg: milligram;  
- LFT: Liver Function Test;  
- PFT: Pulmonary Function Test;  
- PO: by mouth;  
- THC: Tetrahydrocannabinol (active ingredient in cannabis);  
- Synonyms: VAPI: Vaping Associated Pulmonary Injury;  
- VALI: Vaping Associated Acute Lung Injury;  
- E-VALI: e-cigarette, or vaping, Associated Acute Lung Injury;

E-Cigarette, or VAPING, ASSOCIATED LUNG INJURY (E-VALI) GUIDELINE

Updated December 3, 2019
Disposition Based on Patient Clinical Presentation

Outpatient Treatment
- Rapid initiation of short course of empiric steroids (e.g. Prednisone PO daily 40-60mg/day for 5-10 days)
- Monitor for treatment response and complications (e.g. pneumonia, infection, relapse of vaping)

Admit to Ward
- Consider consult to Pulmonary Service
- Steroids for vaping lung injury (short course) and expect improvement over 1-3 days
- May start IV methylprednisolone 0.5 mg/kg per day x 1-2 days then transition to po prednisone depending on clinical course
- If not improving or worsening, reconsider differential diagnosis and consider step up to more invasive work up (e.g. bronchoscopy, biopsy, other)

Admit to ICU
- Routine ICU care, ALI evaluation and treatment as indicated based on clinical judgement
- Rapid early steroids (e.g. methylprednisolone 1mg/kg IV per day in divided doses; within 1-2 days should see improvement)
- Consider early steroids and obtain Urine Toxicology screen for THC
- Consider bronchoscopy w/ BAL if lack of improvement or diagnostic uncertainty to eval infection, DAH, etc. [Please note, lipid laden macrophage Oil red O stain on BAL is a marker for lipid and oil inhalation – it is not specific for vaping associated lung injury. Expect ORO positive with vaping history, essential oils, or other oil inhalation.]
- Hospital Course: Attention to weaning steroids (some patients relapse with rapid wean), infectious complications (some patients with secondary infections after initial improvement), and pneumothorax/pneumomediastinum

Post Discharge Follow-up
- Reassess symptoms (usually improved)
- Reassess pulmonary exposures and vaping, nicotine, THC use, and relapse
- Reassess oxygenation (should be able to wean down/off oxygen within days-weeks)
- Consider PFT’s (Spirometry and DLCO) though caution if history of pneumothorax or pneumomediastinum
- Consider CXR in 4-6 weeks to assess for resolution
- If persistent abnormalities – consider chest CT or other imaging at further follow-up
- Other testing as clinically indicated

KEY: ALI: Acute Lung Injury; ALT: Alanine Aminotransferase; AST: Aspartate Aminotransferase; BAL: Bronchoalveolar Lavage; CDC: Center for Disease Control; CT: Computerized Tomography; C XR: Chest X-ray; DAH: diffuse alveolar hemorrhage; DLCO: Diffusing Lung Capacity for Carbon Monoxide; ESR: Erythrocyte Sedimentation Rate; GGO: Ground Glass Opacities; GI: Gastrointestinal; ICU: Intensive Care Unit; IV: Intravenous; kg: kilogram; mg: milligram; LFT: Liver Function Test; PFT: Pulmonary Function Test; PO: by mouth; THC: Tetrahydrocannabinol (active ingredient in cannabis); Synonyms: VAPI: Vaping Associated Pulmonary Injury; VALI: Vaping Associated Acute Lung Injury; E-VALI: e-cigarette, or vaping, Associated Acute Lung Injury;

AUTHORS: The Intermountain EVALI Taskforce: Denitza P. Blagev MD, Dixie Harris MD, Michael J. Lanspa MD, Colin K. Grissom MD, and David W. Guidry MD

E-Cigarette, or VAPING, ASSOCIATED LUNG INJURY (E-VALI) GUIDELINE

Updated December 3, 2019