Supplementary Online Content

Heinzerling A, Armatas C, Karmarkar E, et al. Severe lung injury associated with use of e-cigarette, or vaping, products—California, 2019. Published online March 6, 2020. *JAMA Intern Med*. doi:10.1001/jamainternmed.2020.0664

This supplementary material has been provided by the authors to give readers additional information about their work.

eFigure 1: California Department of Public Health case definition for e-cigarette, or vaping, product use-associated lung injury (EVALI)

Confirmed	Respiratory illness requiring hospitalization. **AND** 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 AND influenza PCR or rapid test, if local epidemiology supports testing AND all other clinically indicated respiratory infectious disease testing (e.g., urine antigen for *Streptococcus pneumoniae* and *Legionella*, sputum culture if productive cough, bronchoalveolar lavage 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	Respiratory illness requiring hospitalization. **AND** 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--** No evidence of pulmonary infection, but minimum criteria to rule out pulmonary infection not met (testing not performed). **AND** No evidence in medical record of alternative plausible diagnoses (e.g., cardiac, rheumatologic or neoplastic process).
Footnotes	* Includes using an electronic device (e.g., electronic nicotine delivery system (ENDS), electronic cigarette, e-cigarette, vaporizer, vape(s), vape pen, dab pen, or other) 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.

eMethods: Detailed laboratory methods for analysis of case-patient vaping materials

Gas chromatography-mass spectrometry (GC-MS) performed by CDPH Laboratory

Samples were diluted and ran on Agilent 7890B/5977B GC-MS system in full scan mode to measure THC, CBD and other cannabinoids, nicotine, propylene glycol, vitamin E and vitamin E acetate, and other non-targeted compounds. Working standard mixtures containing known toxins were run with the samples to ensure proper performance of the instrument as specified by CDPH's unknown toxin screen method. In addition, a set of vitamin E acetate and vitamin E standard mixtures were run with samples for quantifications. Compound identifications were based on a comparison of electron impact mass spectrum with the Wiley/NIST 2017 Mass Spectral Database compiled by the National Institute of Standards and Technology. All reported compounds possessed a 95% or greater match to the database.

Liquid chromatography-mass spectrometry (LC-MS) and GC-MS performed by Partner State Public Health Laboratory

A subset of 27 samples were received as 3-µL aliquots and diluted to 300 µL with acetonitrile. Quantitative analyses were performed for vitamin E acetate, 10 cannabinoids and nicotine, and untargeted compounds using LC-high-resolution-MS/MS with triple-Time of Flight (TOF) and orbitrap detectors, as well as GC-MS. Database queries were also performed for synthetic cannabinoids, opioids (natural and synthetic), and other controlled substances and pesticides.

Total Reflection X-ray fluorescence (TXRF) performed by CDPH Laboratory

A Bruker S2 Picofox TXRF was used to analyze 7 µL sample aliquots on acrylic discs. Acquisition times of 5-10 minutes were used for all samples.

eTable 1. Number of patients with product types identified by laboratory testing.

Product types	Number of Patients
Tetrahydrocannabinol (THC) products only	16 (67%)
THC products + nicotine products	4 (17%)
Nicotine products only	4 (17%)
Total number of patients with tested products	**24**

eTable 2. Patient product types and diluents identified by laboratory testing.

Findings represent products obtained from 24/160 (15%) of case patients.

Vaping product active ingredient	# of Products	Diluent*	# of Products
Tetrahydrocannabinol (THC)	49 (56%)		
		VEA + VE	32 (65%)
		VEA only	2 (4%)
		VE only	7 (14%)
		None	8 (16%)
Nicotine	38 (44%)		
		PG	34 (89%)
		None	4 (11%)
All tested products	87		

*Diluent types: vitamin E acetate (VEA), vitamin E (VE), propylene glycol (PG)