cluster is novel, pulmonary illness associated with e-cigarette use is not new: there are at least seven published case reports from 2012 to 2018 describing similar conditions in e-cigarette users, with no identifiable infectious etiology (i.e., acute lung injury, atypical pneumonia, eosinophilic pneumonia, hypersensitivity pneumonia, or lipid pneumonia). Interestingly, of these seven reported cases, lung cell samples obtained via lavage or biopsy were available for five (3–7), and all five exhibited abnormally lipid-laden macrophages. Lipid-laden macrophages were also a prominent feature (>50%) in BAL of more recent case series from Utah (8). Such macrophages can trigger an inflammatory immune response (9) leading to lipid pneumonia and other pneumonia-like reactions. One report suggested that residual lipids in vegetable glycerin derived from incompletely processed vegetable oil might be the exogenous source of lipid in an e-cigarette user diagnosed with lipid pneumonia (5). However, most of the publications related to this new entity focused on tetrahydrocannabinol, and a recent pneumonia (5). However, most of the publications related to source of lipid in an e-cigarette user diagnosed with lipoid pneumonia and other pneumonitis-like reactions. One report suggested that residual lipids in vegetable glycerin derived from incompletely processed vegetable oil might be the exogenous source of lipid in an e-cigarette user diagnosed with lipid pneumonia (5). However, most of the publications related to this new entity focused on tetrahydrocannabinol, and a recent case series from the Mayo Clinic suggests chemical pneumonitis as a more probable etiopathology (10). The fact that not all e-cigarette–related lung injury cases were associated with tetrahydrocannabinol use, and that tetrahydrocannabinol vaping usually involves an oil vehicle (e.g., butane hash oils), does not rule out an important role for lipid-mediated lung injury in this clinical entity. This is particularly important to keep in mind given that most e-cigarette liquids contain vegetable glycerin as an essential component (helps make the e-cigarette aerosol visible). The implication is that many e-cigarette users who are currently asymptomatic (or experiencing milder symptoms for which they do not seek medical attention) may be undergoing lipid deposition in their airway, with concomitant inflammatory changes induced by lipid-laden macrophages and other immune cells. Therefore, we urge clinicians treating patients with acute and unexplained pulmonary complaints to identify whether the patient is an e-cigarette user and, if so, to obtain detailed history about their use and, when possible, to collect cell samples to determine whether evidence of lipid exposure is present. Similarly, we urge researchers to investigate lipid exposure and inhaled toxic substances in e-cigarette users systematically. Most important, we call for regulators to implement immediately strict regulation that prevents lipid and inhaled toxics emissions from all e-cigarettes sold in the United States.

**References**


Copyright © 2020 by the American Thoracic Society

*Corresponding author (e-mail: wmaziak@fiu.edu).

**Author disclosures** are available with the text of this letter at www.atsjournals.org.

Thomas Eissenberg, Ph.D.
*Virginia Commonwealth University*
Richmond, Virginia

Wasim Maziak, M.D., Ph.D.*
*Florida International University*
Miami, Florida

*Corresponding author (e-mail: wmaziak@fiu.edu).

**References**

the most common brand (3, 4). CDC laboratory test results of BAL fluid samples from 29 patients submitted to the CDC from 10 states found vitamin E acetate in all the samples (1). Vitamin E acetate is an oil used to thicken e-cigarette liquid. Although all the CDC BAL analyses were of THC-containing vape liquids, a recent report from South Korea showed vitamin E acetate present in nicotine-containing products, including JUUL pods (5). Eissenberg and Mazia suggest that lipid materials in e-cigarette liquids, particularly vegetable glycerin, are the likely cause of EVALI in patients who only used nicotine-containing products. Whether the lipid is vitamin E acetate or vegetable glycerin or another agent, inhaling lipid-containing aerosol generated by high heat can lead to the generation of lipid-laden macrophages, recently reported by Maddock and colleagues in cases of EVALI from Utah (6). Electronic nicotine delivery systems can play a beneficial role in tobacco smoking cessation, but only if the e-cigarette liquid is properly and safely prepared. I fully agree with Eissenberg and Mazia’s call for strict regulation of e-cigarette liquid contents.

References


Copyright © 2020 by the American Thoracic Society