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# Vaping and Lung Inflammation and Injury

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# Introduction

ABDALROUF



# Introduction

Electronic cigarettes are a popular tobacco product, but their effects on health remain poorly understood. Chronic use of e-cigarettes may lead to serious health issues. E-cigarette use-associated lung injury (EVALI) is a recent epidemiologic outbreak linked to vitamin E acetate (VEA) in some vaping products.

E-cigarette aerosols, also known as electronic nicotine delivery systems (ENDS), can cause acute and chronic pulmonary toxicities.

# Aim

In this comprehensive review, we discuss the diverse spectrum of vaping exposures, epidemiological and clinical reports, and experimental findings to provide a better understanding of EVALI and the adverse health effects of chronic e-cigarette exposure.

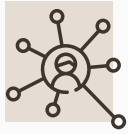


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Method

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# Method

## 1 *In Vitro* Models:

- Researchers exposed mammalian cells directly to e-cigarette aerosols to mimic real-life exposures.
- Previous studies exposed cells to e-liquids, which do not replicate the chemical composition of aerosols generated by e-cigarettes.
- *In vitro* models provided mechanistic insights into the molecular and cellular pathways impacted by specific chemicals in e-cigarette aerosols.
- Transcriptomic profiles in airway epithelial cells from e-cigarette users and cultured NHBE cells exposed to e-cigarette aerosols were compared.



# Method



## **2 *In Vivo* Models:**

- Primarily conducted in rodents, with early models using e-liquids instead of aerosols.
- Transitioned to nose-only or whole-body exposures of animals to freshly generated e-cigarette aerosols.
- Commercially available e-cigarettes were used to increase the translatability of the studies to the general population.
- Researchers focused on popular vaping flavors to enhance the relevance of the results to e-cigarette users.
- Some studies concentrated on core components of e-liquids (propylene glycol, vegetable glycerin, and nicotine)..

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**Result**

**ABDLWAHED & ABDEL NASER**







In **2019**, there were several outbreaks of acute respiratory failure of mysterious cause in persons who vape THC, nicotine, or both.

AN AUTOPSY WAS PERFORMED ON  
23 SUSPECTED CASES.


23

THE PRESENCE OF ACUTE TO SUB-  
ACUTE LUNG INJURY,

21

THERE IS NO LUNG INJURY,

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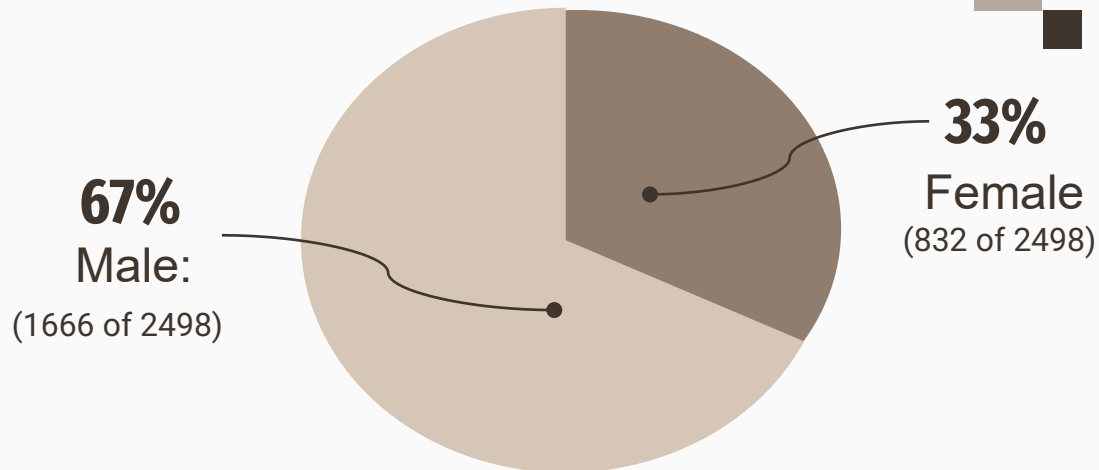


**Transbronchial and surgical lung biopsies from eight men aged 19–61 years with respiratory symptoms following e-cigarette use showed acute lung injury.**

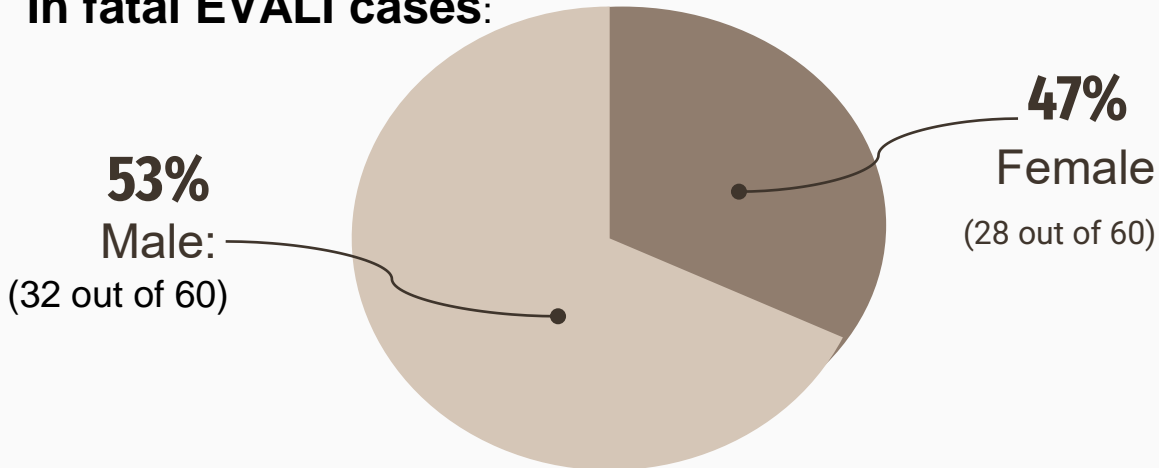


A study conducted by Werner *et al.* in 2020 included a large series of EVALI patients (n = 2,558). Among the EVALI patients who were hospitalized, the majority were male.

### In cases of EVALI who were hospitalized:



### In fatal EVALI cases:

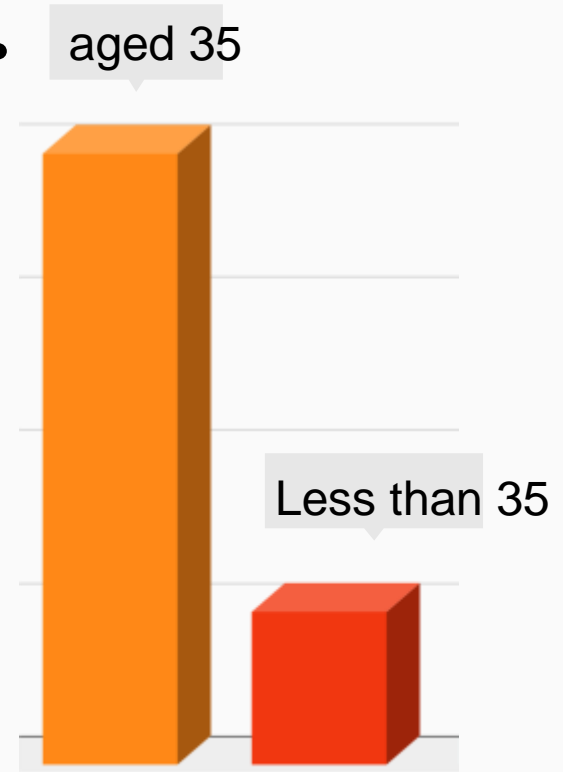


The proportion of EVALI patients was higher among those 35 years of age or older in fatal cases

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**Proportion of EVALI patients among those aged 35 or older in fatal cases:**

**73% (44 out of 60)**



**In a national online survey of adolescents and young adults aged 13-24 (n=4,351), the relationship between COVID-19-related symptoms, testing, and diagnosis was examined, along with various factors including e-cigarette use, sociodemographic factors, obesity, and compliance with shelter-in-place orders.**



**Individuals who had ever used e-cigarettes: They had a five-fold higher risk of COVID-19 diagnosis compared to non-users.**

**5 ×**

**used e-cigarettes:**



**Ever-dual-users (those who used both e-cigarettes and traditional cigarettes): They had a seven-fold higher risk of COVID-19 diagnosis**

**7 ×**

**dual-users**



**Significant increase  
in self-reported  
respiratory  
symptoms.**

**Higher risk of wheezing and  
other respiratory symptoms  
compared to non-users.  
Lower risk compared to  
smokers.**

**A study analyzed data from the PATH study  
Wave 4, which included 33,606 US adults  
who reported ever using e-cigarettes.**

**Furthermore, the study compared adults  
who vaped without marijuana to those who  
vaped with marijuana**



**Individuals who used e-  
cigarettes and marijuana  
together:**

**Individuals who had ever  
used e-cigarettes:**

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# Discussion

**AYAT**





## Discussion

**Premorbid Chronic Conditions: The study found that hospitalized patients with EVALI (e-cigarette or vaping product use-associated lung injury) commonly had pre-existing chronic conditions, including cardiac and respiratory diseases, as well as mental health conditions.**

**Increased Risk of COVID-19 in Youth: Although COVID-19 is less common in youth, this study showed that the use of e-cigarettes only or dual use of e-cigarettes and cigarettes increases the risk of COVID-19 in this age group.**

## Discussion

**Association Between E-cigarette Use with Marijuana and Respiratory Symptoms: The study revealed that adults who reported lifetime use of e-cigarettes with marijuana had a higher likelihood of experiencing self-reported respiratory symptoms over the past 12 months.**

Noel et al., (2020)

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# Conclusion

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## Conclusion

**Chronic use of e-cigarettes can lead to serious health issues. Prolonged use of e-cigarettes has been associated with various health problems. These may include respiratory issues, such as chronic bronchitis and increased risk of asthma exacerbations.**

**EVALI (e-cigarette or vaping product use-associated lung injury) has been linked to e-cigarette use. EVALI is a condition characterized by severe lung injury associated with the use of e-cigarettes or vaping products.**

**Vitamin E acetate is a chemical found in some vaping products and has been implicated in lung damage. Vitamin E acetate is a thickening agent that was found in some vaping products.**

## Conclusion

**The use of e-cigarettes alongside traditional cigarettes increases the risk of COVID-19 diagnosis: Emerging evidence suggests that individuals who use both e-cigarettes and traditional cigarettes may have an increased risk of COVID-19 diagnosis compared to non-users.**

**Individuals who use both e-cigarettes and marijuana together may face higher risks of respiratory symptoms.**

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## References



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**THANK YOU FOR YOUR ATTENTION !**