



# 전자담배



부천성모병원 호흡기내과

강혜선

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Vaping cessation methods

Conventional cigarette  
E-cigarette  
Heated tobacco products

# Introduction

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## **Hon Lik invented the e-cigarette to quit smoking - but now he's a dual user**

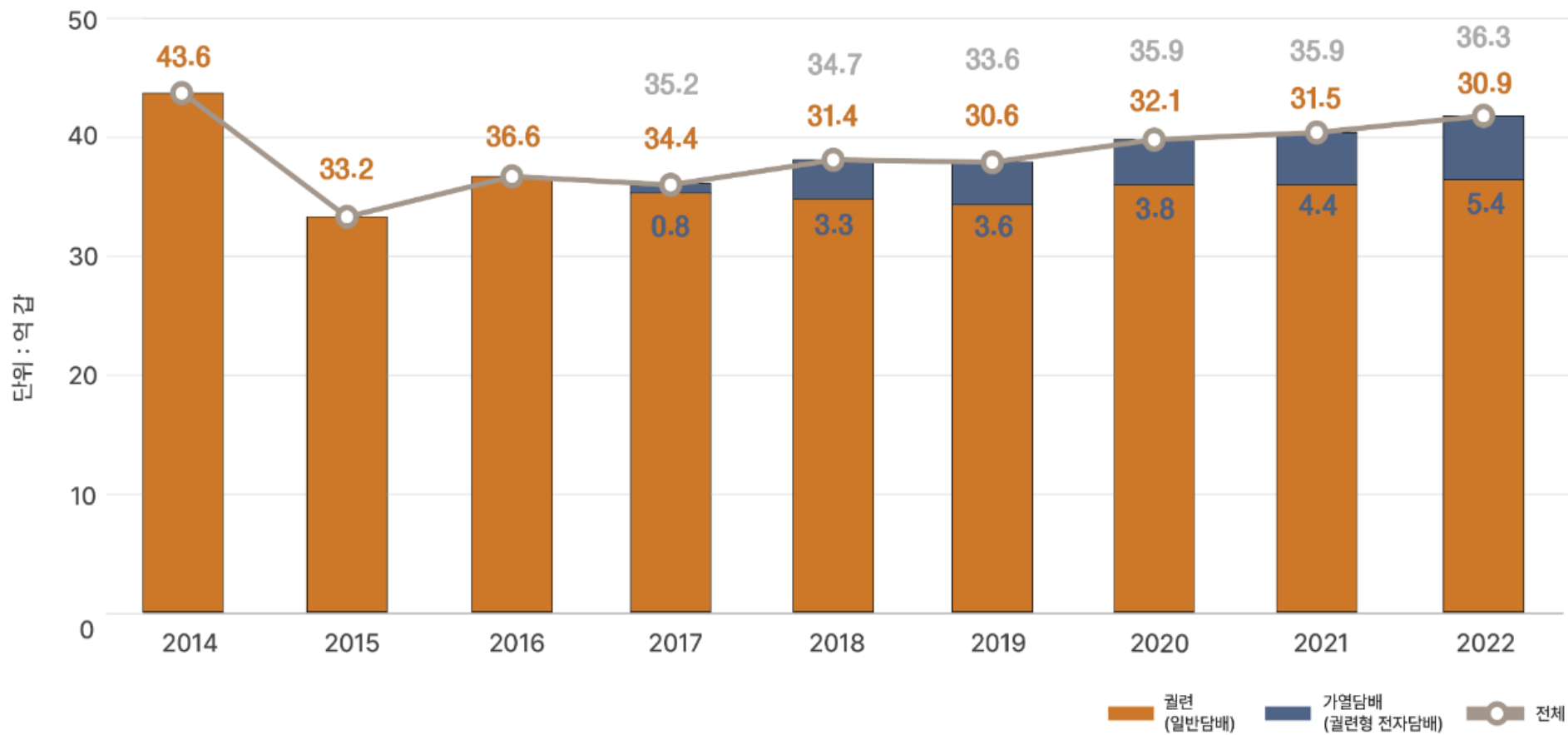
Chinese pharmacist says he only smokes cigarettes now to check flavours, and he sees no conflict with company he works for being owned by Imperial Tobacco



## 2014~2022 담배판매량 변화 추이



# 연도별 담배 판매량('14~'22)



**국내 판매 담배 여섯갑 중 한 갑은 전자담배**

## Smoking & Tobacco Use

Home > Basic Information > Electronic Cigarettes

 Home

Office on Smoking and Health (OSH) +

Quit Smoking +

**Basic Information** -

Health Effects +

**Electronic Cigarettes** -

About Electronic Cigarettes (E-Cigarettes)

Quick Facts on the Risks of E-cigarettes for Kids, Teens, and Young Adults

Menthol Tobacco Products +

Heated Tobacco Products

# About Electronic Cigarettes (E-Cigarettes)

[Spanish](#) [Print](#)

### What's the bottom line?

- E-cigarettes have the potential to benefit adults who smoke and who are not pregnant if used as a complete substitute for regular cigarettes and other smoked tobacco products.
- E-cigarettes are not safe for youth, young adults, pregnant adults, as well as adults who do not currently use tobacco products.
- While e-cigarettes have the potential to benefit some people and harm others, scientists still have a lot to learn about whether e-cigarettes are effective in helping adults quit smoking.
- If you've never smoked or used other tobacco products or e-cigarettes, don't start.
- Additional research can help understand long-term health effects.

### On This Page

[What are e-cigarettes?](#)

[What is in e-cigarette aerosol?](#)

[What are the health effects of using e-cigarettes?](#)

[What are the risks of e-cigarettes?](#)

[Are e-cigarettes less harmful than regular cigarettes?](#)

[Can e-cigarettes help adults quit smoking?](#)

# E-cigarettes (액상형 전자담배)

- E-cigs, e-hookahs, mods, vape pens, vapes, tank systems
- electronic nicotine delivery system (ENDS)



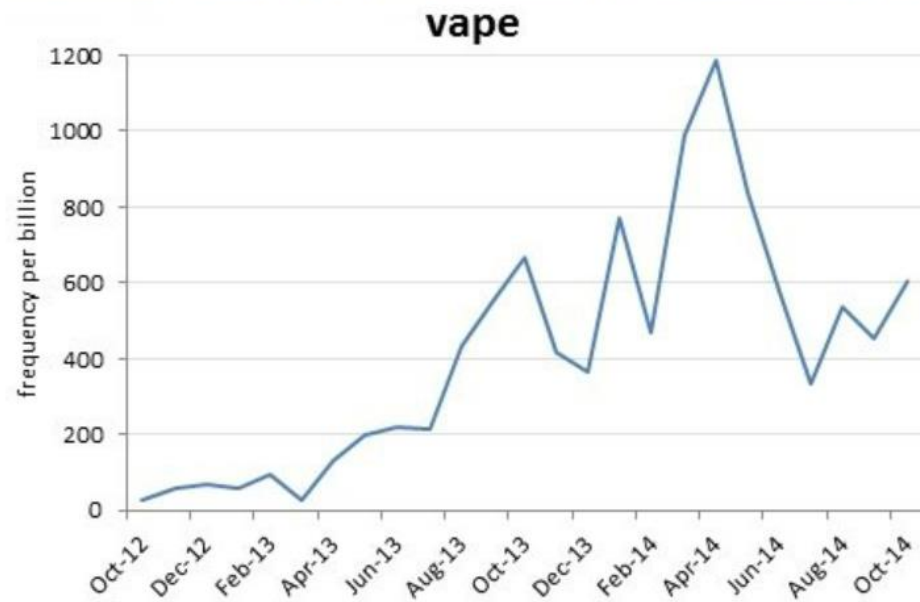
Some e-cigarettes are made to look like regular cigarettes, cigars, or pipes.  
Some resemble pens, USB sticks, and other everyday items.

# 옥스퍼드 선정 올해의 단어는 'vape'...무슨 뜻

## Vape

머니투데이 | 이슈팀 이영민 기자

2014.11.19 15:56



전자담배를 의미하는 단어 'vape'의 월별 사용 빈도./ 자료=옥스퍼드 사전 블로그

올해 8월 옥스퍼드 사전에 등재된 'vape'는 'vapour'(증기) 혹은 'vaporize'(증발하다)를 축약한 단어로 '전자 담배와 같은 기기에서 만들어진 증기를 들이쉬고 내쫓다'라는 뜻이다. 흡연기구나 흡연을 하는 행동 자체를 의미하기도 한다.

# Trends in Marijuana vaping among US adolescents, 2017-2019

Table. Prevalence of Reported Marijuana Vaping by Grade and Year

	2017	2018	2019	Increase From 2017 to 2018	P Value	Increase From 2018 to 2019	P Value	Increase From 2017 to 2019 <sup>a</sup>
<b>Past 30 d</b>								
No. of 8th graders <sup>b</sup>	4869	4465	8701					
Prevalence, % (95% CI)	1.6 (1.3-2.1)	2.6 (2.0-3.4)	3.9 (3.3-4.7)	1.0 (0.2-1.7)	.010	1.3 (0.4-2.2)	.006	2.3 (1.5-3.1)
No. of 10th graders <sup>b</sup>	4412	4666	9026					
Prevalence, % (95% CI)	4.3 (3.5-5.3)	7.0 (5.9-8.3)	12.6 (11.1-14.3)	2.7 (1.3-4.1)	<.001	5.6 (3.7-7.5) <sup>c</sup>	<.001	8.3 (6.5-10.1)
No. of 12th graders <sup>b</sup>	4073	4247	8314					
Prevalence, % (95% CI)	5.0 (4.1-6.0)	7.5 (6.2-8.9)	14.0 (12.6-15.5)	2.5 (1.0-4.0)	<.001	6.5 (4.7-8.4) <sup>c</sup>	<.001	9.0 (7.2-10.9)
<b>Past 12 mo</b>								
No. of 8th graders <sup>b</sup>	4878	4471	8701					
Prevalence, % (95% CI)	3.0 (2.5-3.7)	4.4 (3.6-5.4)	7.0 (6.0-8.2)	1.3 (0.3-2.3)	.009	2.6 (1.3-3.9)	<.001	4.0 (2.7-5.3)
No. of 10th graders <sup>b</sup>	4422	4671	9033					
Prevalence, % (95% CI)	8.1 (6.9-9.6)	12.4 (10.8-14.1)	19.4 (17.4-21.5)	4.2 (2.2-6.3)	<.001	7.0 (4.8-9.2)	<.001	11.3 (8.7-13.9)
No. of 12th graders <sup>b</sup>	4072	4253	8312					
Prevalence, % (95% CI)	9.5 (8.1-11.2)	13.1 (11.4-15.1)	20.8 (19.0-22.8)	3.6 (1.4-5.7)	<.001	7.7 (5.4-10.0) <sup>c</sup>	<.001	11.3 (8.7-13.9)
<b>Lifetime</b>								
No. of 8th graders <sup>b</sup>	4907	4507	8747					
Prevalence, % (95% CI)	4.0 (3.3-4.9)	5.5 (4.6-6.7)	9.0 (7.8-10.4)	1.5 (0.3-2.7)	.012	3.5 (2.0-5.0)	<.001	5.0 (3.5-6.5)
No. of 10th graders <sup>b</sup>	4449	4712	9068					
Prevalence, % (95% CI)	9.8 (8.5-11.4)	14.2 (12.6-16.0)	21.8 (19.8-24.0)	4.4 (2.3-6.5)	<.001	7.6 (5.3-9.9)	<.001	12.0 (9.4-14.6)
No. of 12th graders <sup>b</sup>	4104	4303	8365					
Prevalence, % (95% CI)	11.9 (10.2-13.8)	15.6 (13.9-17.6)	23.7 (21.7-25.9)	3.8 (1.5-6.0)	<.001	8.1 (5.7-10.5) <sup>c</sup>	<.001	11.8 (9.0-14.7)

- Miech, R.A.; Patrick, M.E.; O'Malley, P.M.; Johnston, L.D.; Bachman, J.G. Trends in Reported Marijuana Vaping Among US Adolescents, 2017-2019. *Jama* **2020**, **323**, 475-476.

# EVALI (e-cigarette or vaping use-associated lung injury)

## Outbreak of Lung Injury Associated with the Use of E-Cigarette, or Vaping, Products

[Español \(Spanish\)](#) | [Print](#)



CDC, the U.S. Food and Drug Administration (FDA), state and local health departments, and other clinical and public health partners are continuing to monitor e-cigarette, or vaping, product use-associated lung injury (EVALI).

[For Healthcare Providers](#)

[For Health Departments](#)

[Frequently Asked Questions](#)

[Resources](#)

[Digital Press Kit](#)

[Outbreak of Lung Injury Associated with the Use of E-Cigarette, or Vaping, Products | Electronic Cigarettes | Smoking & Tobacco Use | CDC](#)

# EVALI

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- **As of February 18, 2020**, a total of 2,807 [hospitalized EVALI cases or deaths](#) have been reported to CDC from all 50 states, the District of Columbia, and two U.S. territories (Puerto Rico and U.S. Virgin Islands).
  - Sixty-eight deaths have been confirmed in [29 states and the District of Columbia](#) (**as of February 18, 2020**).
- [Vitamin E acetate](#) is strongly linked to the EVALI outbreak. Vitamin E acetate has been found in product samples tested by FDA and state laboratories and in patient lung fluid samples tested by CDC from geographically diverse states. Vitamin E acetate has not been found in the lung fluid of people that do not have EVALI.
- Evidence is not sufficient to rule out the contribution of other chemicals of concern, including chemicals in either THC or non-THC products, in some of the reported EVALI cases.

*The* NEW ENGLAND  
JOURNAL *of* MEDICINE

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FEBRUARY 20, 2020

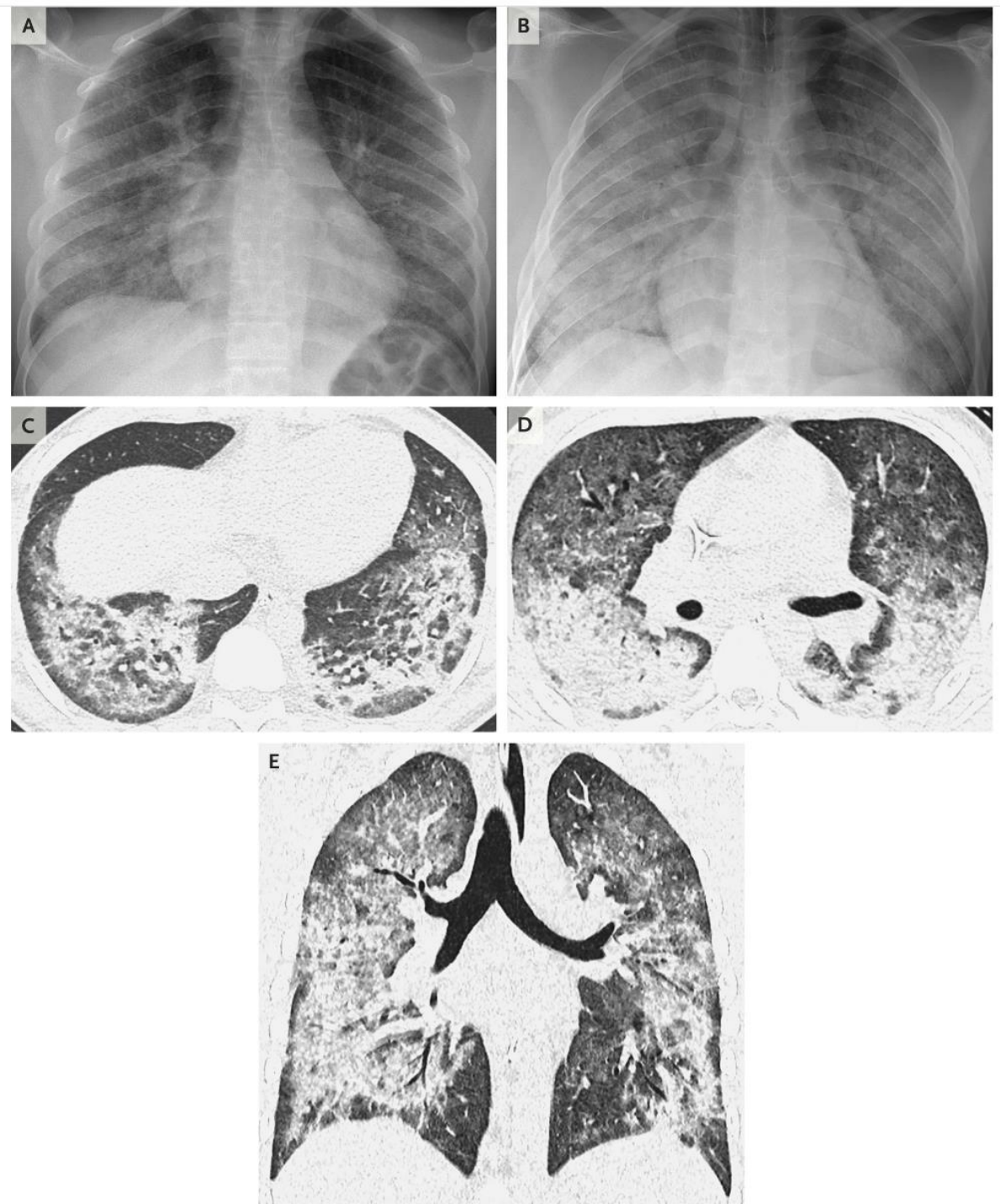
VOL. 382 NO. 8

Vitamin E Acetate in Bronchoalveolar-Lavage Fluid  
Associated with EVALI

B.C. Blount, M.P. Karwowski, P.G. Shields, M. Morel-Espinosa, L. Valentin-Blasini, M. Gardner, M. Braselton, C.R. Brosius, K.T. Caron, D. Chambers, J. Corstvet, E. Cowan, V.R. De Jesús, P. Espinosa, C. Fernandez, C. Holder, Z. Kuklennyik, J.D. Kusovschi, C. Newman, G.B. Reis, J. Rees, C. Reese, L. Silva, T. Seyler, M.-A. Song, C. Sosnoff, C.R. Spitzer, D. Tevis, L. Wang, C. Watson, M.D. Wewers, B. Xia, D.T. Heitkemper, I. Ghinai, J. Layden, P. Briss, B.A. King, L.J. Delaney, C.M. Jones, G.T. Baldwin, A. Patel, D. Meaney-Delman, D. Rose, V. Krishnasamy, J.R. Barr, J. Thomas, and J.L. Pirkle, for the Lung Injury Response Laboratory Working Group\*

# Chest image of EVALI

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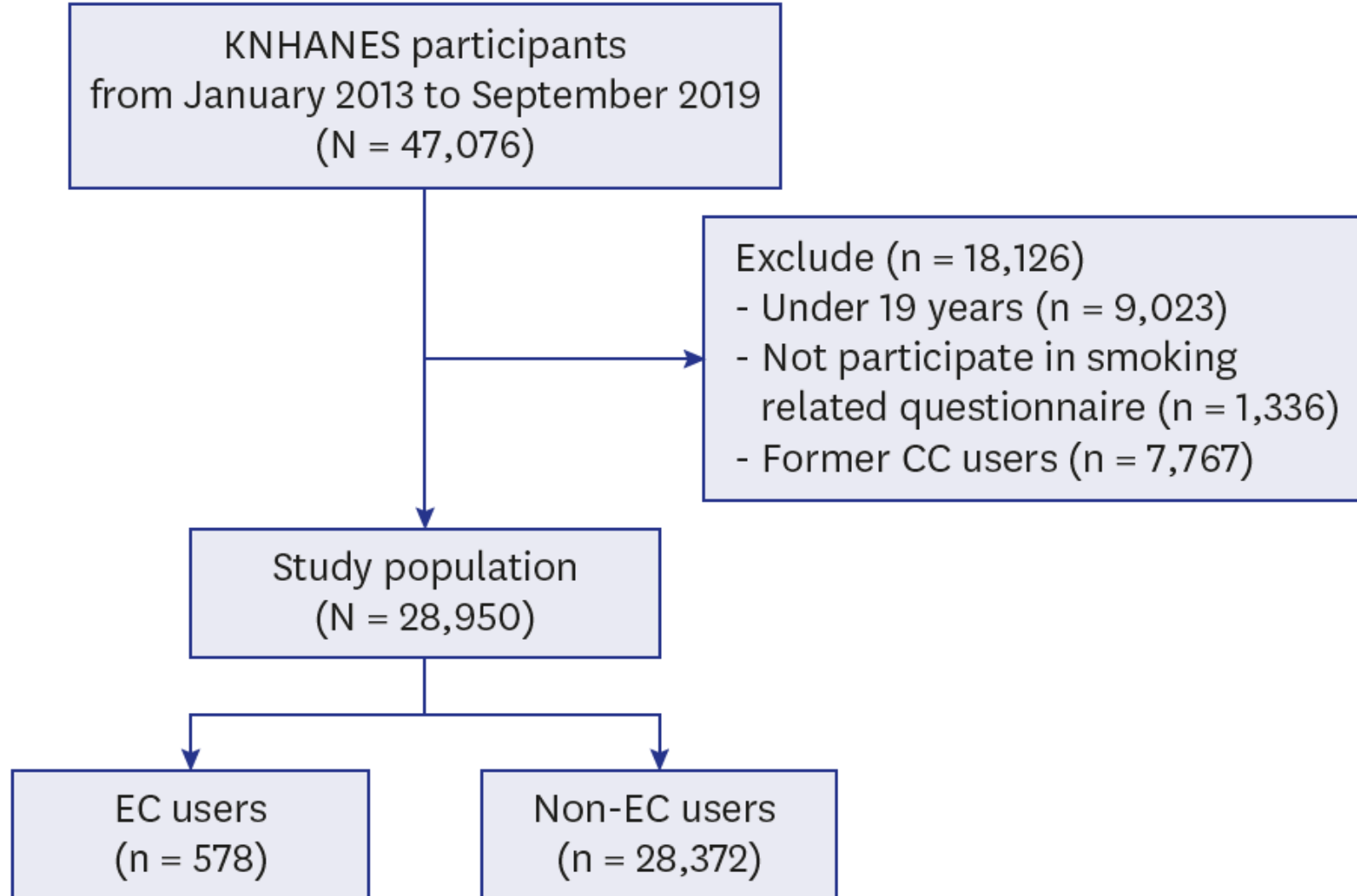


Original Article  
Respiratory Diseases



OPEN ACCESS

## **E-cigarette-associated Severe Pneumonia in Korea Using Data Linkage between the Korea National Health and Nutrition Examination Survey (KNHANES, 2013–2019) and the National Health Insurance Service (NHIS) Claims Database**



**Table 2.** Clinical characteristics of Korean adults ( $\geq 19$  years) according to EC use in KNHANES (n = 28,950)

Characteristics	EC user (n = 578, 2.0%)	Non-EC user (n = 28,372, 98.0%)	P value
Male	495 (85.6)	8,893 (31.3)	< 0.001
Mean age, yr	38.8	50.2	< 0.001
Mean BMI	24.7	23.8	< 0.001
Household income			< 0.001
Lowest quartile	46 (8.0)	4,779 (16.8)	
Lower-middle quartile	116 (20.1)	6,214 (21.9)	
Upper-middle quartile	181 (31.3)	6,901 (24.3)	
Highest quartile	183 (31.7)	7,186 (25.3)	
Level of education			< 0.001
$\leq$ Elementary school	25 (4.3)	6,081 (21.4)	
$\leq$ Middle school	37 (6.4)	2,657 (9.4)	
$\leq$ High school	256 (44.3)	9,096 (32.1)	
$\geq$ College	233 (40.3)	9,410 (33.2)	
Mean pack-years	15.2	4.4	< 0.001
Comorbidities			
Asthma	21 (3.6)	839 (3.0)	0.410
COPD	1 (0.2)	91 (0.3)	1.000
HTN	63 (10.9)	6,337 (22.3)	< 0.001
DM	29 (5.0)	2,533 (8.9)	< 0.005
Malignancies	8 (1.4)	1,262 (4.4)	< 0.001
Comorbidity index, %			0.004
Total	234	9,130	
0	138 (59.0)	4,559 (49.9)	
1-2	79 (33.8)	3,319 (36.4)	
$\geq 3$	17 (7.3)	1,252 (13.7)	

**Table 3.** Comparison of clinical outcomes according to EC use through linkage of the KNHANES and NHIS claims databases

Clinical variables	EC users (n = 578, 2.0%)	Non-EC users (n = 28,372, 98.0%)	P value
Admission due to pneumonia	0	37 (0.13)	1.000
Mean admission duration, days	-	8.5	
Mortality	0	0	
ICU admission	0	4 (10.8)	
Ventilator care	0	3 (8.1)	
Mean ICU admission duration, days	-	0.7	

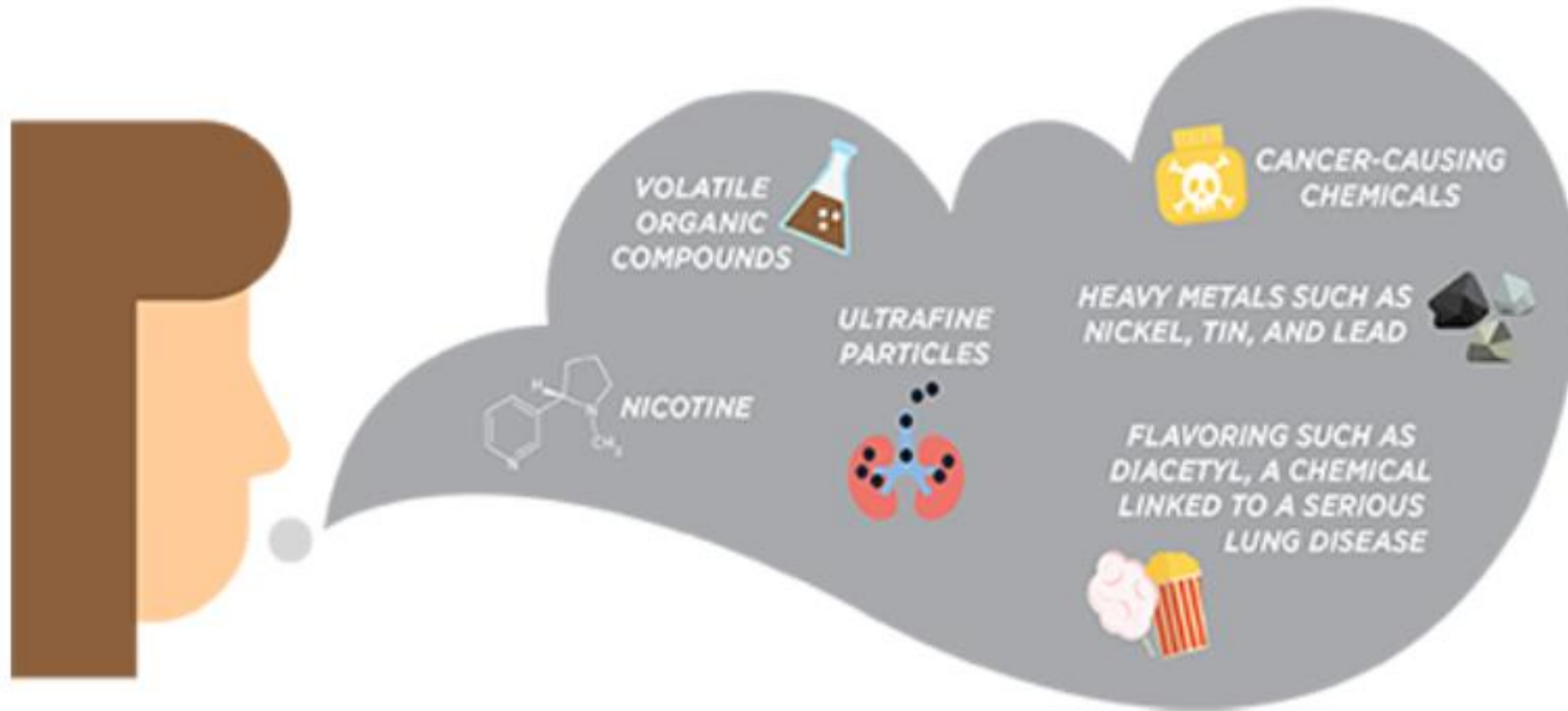
# E-cigarettes (액상형 전자담배) - 국내

- JUUL, SiiD



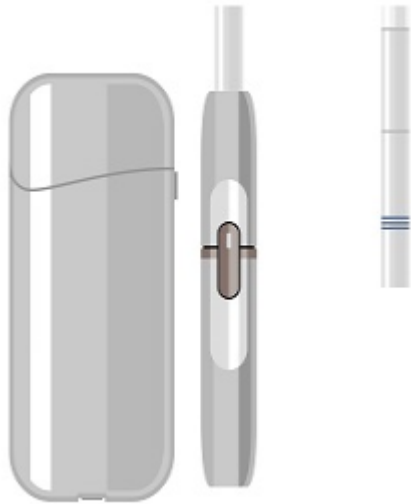
# What is in e-cigarette aerosol?

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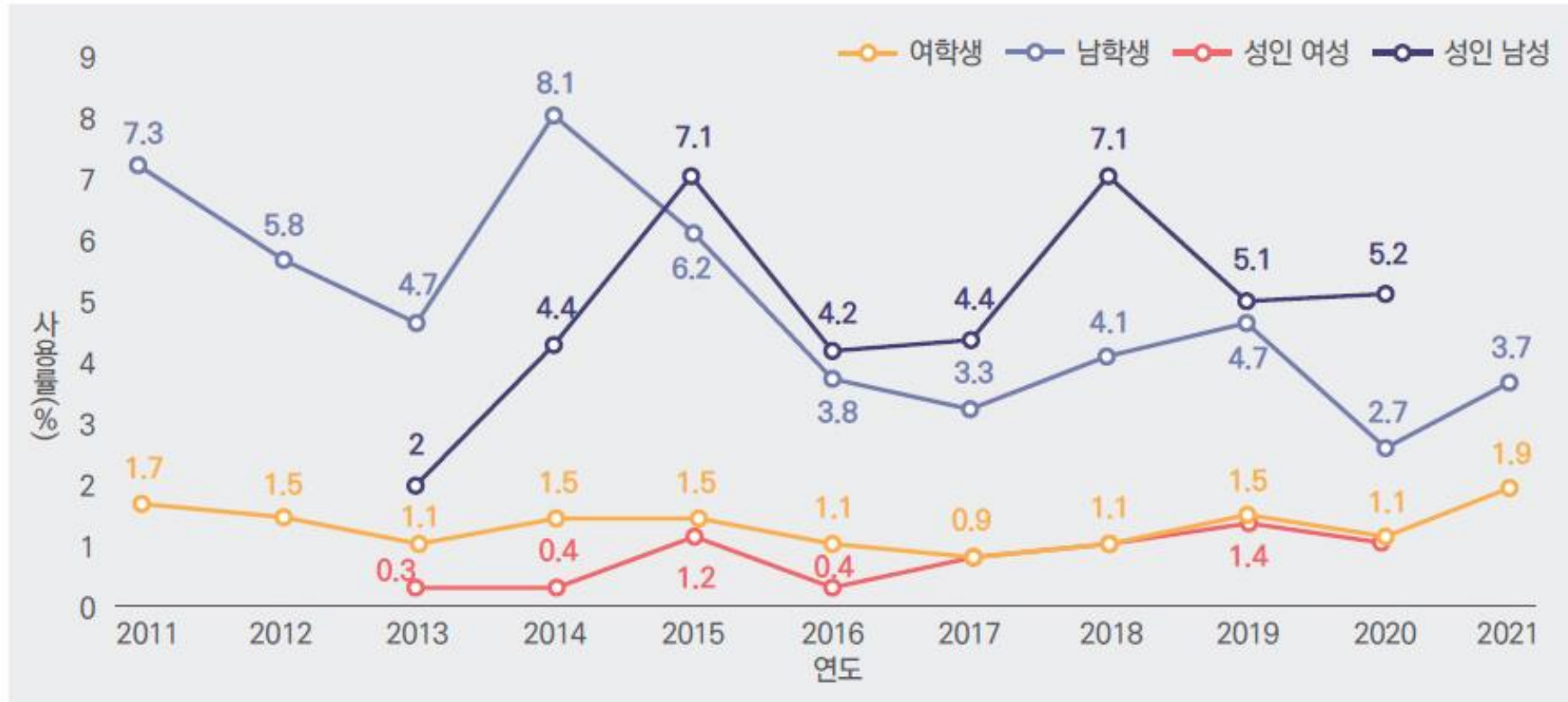


# Heated Tobacco Products (가열담배, 꺾련형 전자담배)

- Heat-not-burn products



# 성인, 청소년 액상형 전자담배 사용률 - 질병관리청



- **꺠련형 전자담배 (가열담배)**

- 2019: 6.2%
- 2020 5.1% (30-39세 8.4%, 남성 14.2%)

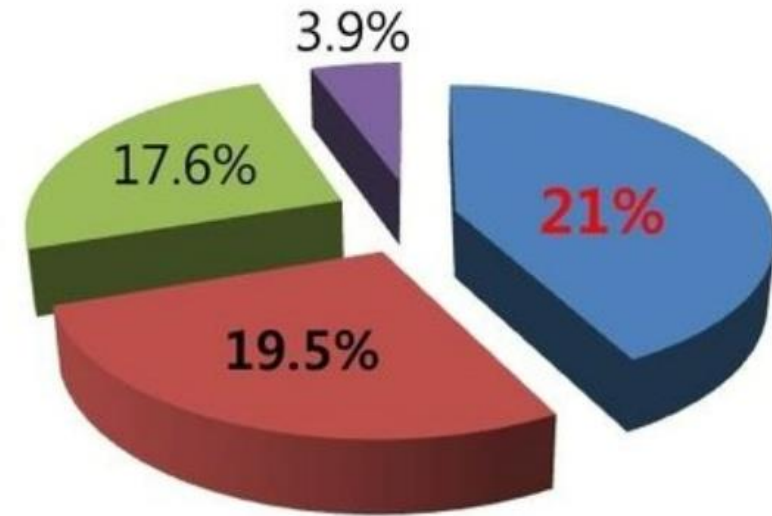
# 전자담배 사용 목적

Reason for E-Cigarette Use	Number of Days Used E-Cig		
	N (%) †	0-2	3-9
	<b>6656 (100)</b>	<b>4962 (73.7)</b>	<b>669 (10)</b>
Since they might be less harmful	1254 (18.9)	19.3 (18.0-20.7)	17.9 (15.1-)
For smoking cessation	851 (13.1)	10.6 (9.5-11.7)	18.7 (15.6-)
For indoor use	675 (10.7)	7.9 (7.2-8.7)	17.0 (14.0-)
Since they are easily obtained	94 (1.5)	0.6 (0.4-0.9)	5.2 (3.6-)
Since they have better taste	658 (9.6)	9.0 (8.1-10.0)	12.6 (10.2-)
Since they have good flavor	613 (9.3)	10.0 (9.1-10.9)	7.2 (5.4-)
Since they do not have the smoking smell	491 (7.5)	6.4 (5.7-7.2)	7.5 (5.5-)
Curiosity	1572 (22.9)	28.8 (27.3-30.4)	10.2 (7.8-)
Other	447 (6.6)	7.4 (6.6-8.2)	3.7 (2.4-)

\* The percentage and confidence interval denotes row %. † The number in parenthesis in parenthesis denotes column %. CI: Confidence interval.

## 전자담배 사용 목적(10회/월 이상 전자담배 사용)

- 금연하기 위해서
- 실내에서 담배 대신 피우기 위해서
- 담배보다 건강에 덜 해로울 것 같아서
- 호기심



[자료 서울아산병원]

ARTICLE IN PRESS

CLINICAL RESEARCH STUDY

THE AMERICAN  
JOURNAL of  
MEDICINE®

## Efficacy and Safety of E-Cigarette Use for Smoking Cessation: A Systematic Review and Meta-Analysis of Randomized Controlled Trials

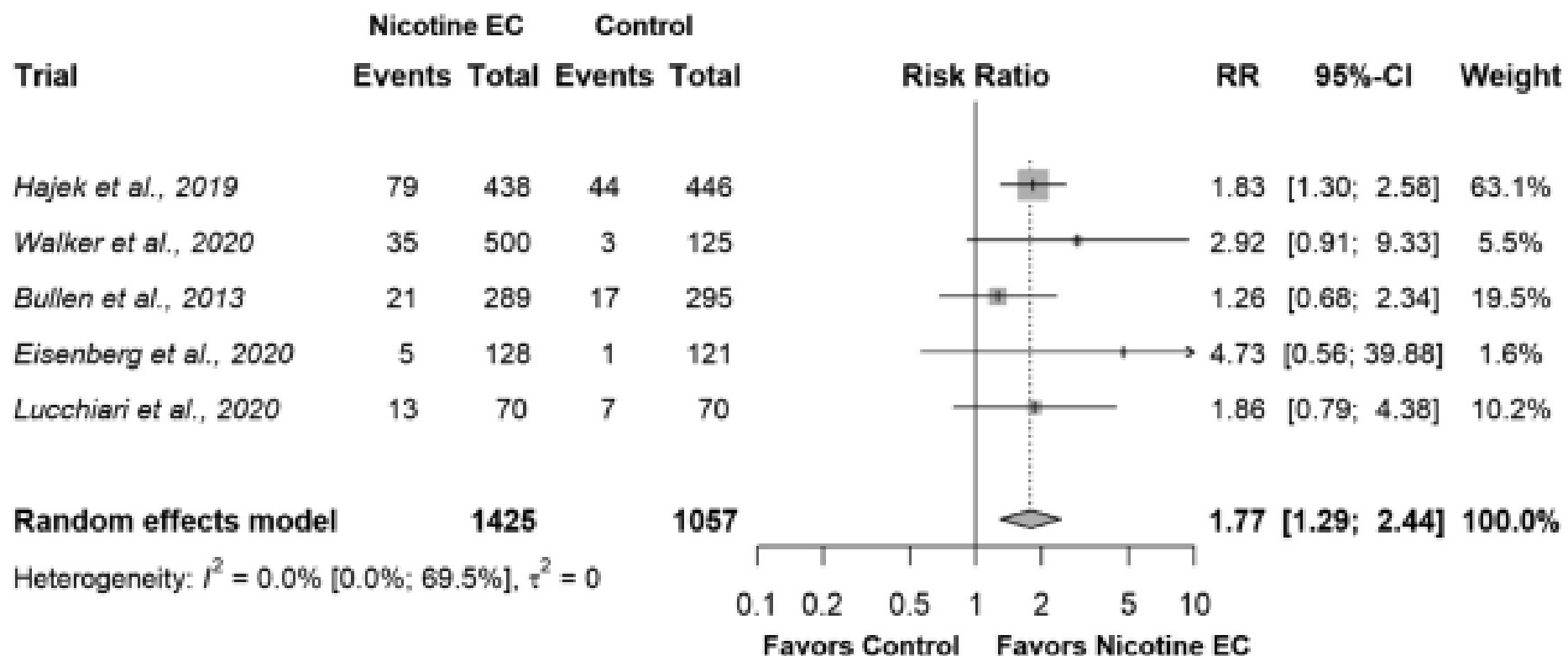
Jeremy Y. Levett, MD,<sup>a,b</sup> Kristian B. Filion, PhD,<sup>a,b,c,d</sup> Pauline Reynier, MSc,<sup>a</sup> Celine Prell, MD,<sup>a,b</sup>  
Mark J. Eisenberg, MD, MPH<sup>a,b,c,d,e</sup>

<sup>a</sup>Center for Clinical Epidemiology, Lady Davis Institute, Jewish General Hospital/McGill University, Montreal, QC, Canada; <sup>b</sup>Faculty of Medicine and Health Sciences, McGill University, Montreal, QC, Canada; <sup>c</sup>Department of Epidemiology, Biostatistics, and Occupational Health, McGill University, Montreal, QC, Canada; <sup>d</sup>Department of Medicine, McGill University, Montreal, QC, Canada; <sup>e</sup>Division of Cardiology, Jewish General Hospital/McGill University, Montreal, QC, Canada.

**Table 1** Study Design of Randomized Controlled Trials of E-Cigarette Use for Smoking Cessation

	Location	Population	Primary Outcome	Follow-Up Periods	Maximum Available Follow-Up	Method of Biochemical Validation (Device)
Eisenberg et al, 2020 <sup>16</sup>	Canada	≥18 Years of age, smoked a mean of ≥10 cigarettes per day, and had a moderate or strong desire and intention to attempt to quit (Motivation to Stop Scale level 5 or higher)	Point prevalence smoking abstinence at 12 wks following randomization, defined as self-reported abstinence in the past 7 d with biochemical validation	4, 12, 24, and 52 wks	24 wks	Exhaled carbon monoxide (CO) level of ≤10 ppm (Micro 3 and 4 Smokerlyzer, Bedfont Scientific Ltd, UK)
Lucchiari et al, 2020 <sup>12</sup>	Italy	≥55 Years of age, smoked a mean of ≥10 cigarettes per day for at least the past 10 years	Change in pulmonary health due to smoking reduction	3, 6, and 12 mos	6 mos	Exhaled CO level of ≤7 ppm (Micro+ Smokerlyzer, Bedfont Scientific Ltd, UK)
Walker et al, 2020 <sup>13</sup>	New Zealand	≥18 Years of age, smoked tobacco (amount not specified), motivated to quit in the next 2 wks	Continuous smoking abstinence 6 mos after the agreed quit date (self-reported abstinence since quit date, allowing 5 or fewer cigarettes in total)	1, 3, and 6 mos	6 mos	Exhaled CO level of ≤9 ppm (Bedfont Smokerlyzer, Bedfont Scientific Ltd, UK)
Hajek et al, 2019 <sup>15</sup>	United Kingdom	Adult smokers seeking help to quit smoking	Biochemically validated 1-year sustained abstinence calculated in accordance with the Russell Standard (self-report of smoking ≤5 cigarettes from 2 wks after the target quit date, and not contradicted by any previous self-report or validation result)	4, 26, and 52 wks	52 wks	Exhaled CO level of <8 ppm (NA)
Bullen et al, 2013 <sup>14</sup>	New Zealand	≥18 Years of age, smoked ≥10 cigarettes per day for the past year, and wanted to stop smoking	Biochemically validated continuous abstinence at 6 mos (self-reported abstinence over the whole follow-up period, allowing ≤5 cigarettes in total)	1, 3, and 6 mos	6 mos	Exhaled CO level of <10 ppm (Bedfont Micro Smokerlyzer, Bedfont Scientific, UK)

ppm = parts per million.



**Figure 2** Forest plot of the relative risks of the most rigorous criterion of biochemically validated abstinence in nicotine EC versus control.  
CI = confidence interval; EC = electronic cigarette; RR = relative risk.

# 금연을 위한 전

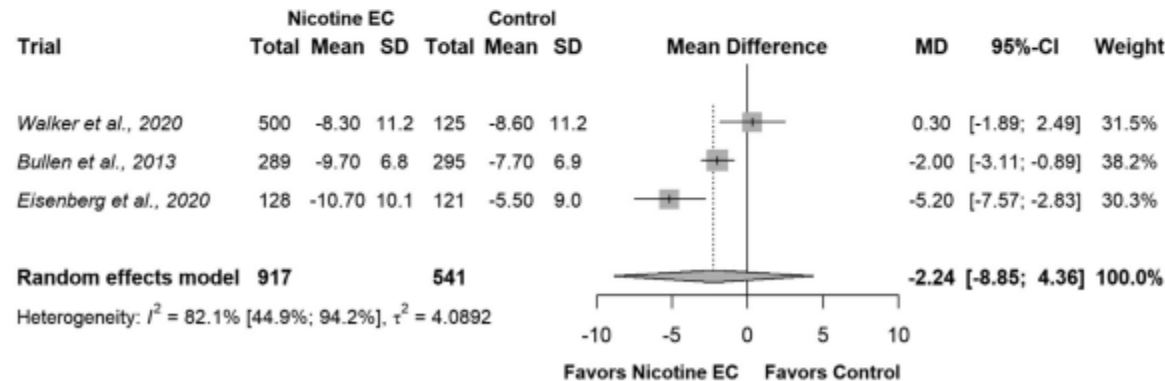
**Table 4** Pooled Relative Risks of Efficacy and Safety Outcomes in Cigarette Smokers Randomized to Nicotine E-Cigarettes, Non-Nicotine E-Cigarettes, or Conventional Smoking Cessation Therapy

Outcome	Relative Risk (95% Confidence Interval)		
	Nicotine EC vs Control	Nicotine EC vs Non-Nicotine EC	Non-Nicotine EC vs Control
<b>Efficacy</b>			
Most rigorous criterion of biochemically validated abstinence*	1.77 (1.29-2.44)	1.56 (1.13-2.15)	1.37 (0.66-2.85)
Continuous abstinence at 6 mos	1.45 (1.15-1.84)	1.56 (1.13-2.15)	1.37 (0.66-2.85)
Biochemically validated continuous abstinence at 6 mos	1.69 (0.85-3.35)	1.56 (1.13-2.15)	1.37 (0.66-2.85)
Continuous abstinence at maximum follow-up	1.77 (1.29-2.44)	1.56 (1.13-2.15)	1.37 (0.66-2.85)
Biochemically validated continuous abstinence at maximum follow-up	1.77 (1.29-1.44)	1.56 (1.13-2.15)	1.37 (0.66-2.85)
Point prevalence abstinence at 6 mos <sup>†</sup>	1.43 (1.10-1.85)	1.11 (0.54-2.28)	1.58 (0.98-2.54)
Point prevalence abstinence at maximum follow-up <sup>‡</sup>	1.51 (1.19-1.92)	1.11 (0.54-2.28)	1.58 (0.98-2.54)
Change in daily cigarette consumption at maximum follow-up	-2.24 (-8.85-4.36)	NA	NA
<b>Safety</b>			
Death at maximum follow-up	1.39 (0.56-3.48)	0.72 (0.07-7.64)	1.28 (0.41-3.99)
Cardiovascular serious adverse events at maximum follow-up	0.93 (0.09-9.65)	NA	NA
Respiratory serious adverse events at maximum follow-up	1.99 (0.08-48.55)	NA	NA
All serious adverse events at maximum follow-up	1.42 (0.83-2.43)	0.78 (0.18-3.35)	1.61 (1.17-2.20)

Control = non-e-cigarette conventional smoking cessation therapy; EC = electronic cigarette; NA = not available.

\*Based on the following ranking: continuous abstinence at 12 mos; continuous abstinence at 6 mos; point prevalence of abstinence at 12 mos; point prevalence of abstinence at 6 mos.

‡Defined as 7-d point prevalence abstinence.



**Figure 3** Forest plot of the mean difference in daily cigarette consumption at maximum follow-up in nicotine EC versus control.

CI = confidence interval; EC = electronic cigarette; MD = mean difference; SD = standard difference.

## Electronic cigarettes

Electronic cigarettes (e-cigarettes) are battery-powered devices that deliver nicotine in a vapour without tobacco or smoke. The device heats a liquid into an aerosol for inhalation, simulating the behavioural and sensory aspects of smoking. The liquid is usually made up of propylene glycol and glycerol, with or without nicotine and flavours, stored in disposable cartridges or refillable tanks. The nicotine content of e-cigarettes can vary from zero to 50 mg/mL. E-cigarette users are sometimes referred to as 'vapers' and e-cigarette use as 'vaping'.<sup>96</sup>

The use of nicotine-containing e-cigarettes to support cessation is controversial. As they have only been on the market for a short time, and are continually changing, their long-term safety is unknown.<sup>97-99</sup> Concerns about e-cigarettes include:<sup>100</sup>

- no tested and approved e-cigarette products are available
- a lack of high-level evidence for efficacy for smoking cessation
- a lack of evidence on health effects, particularly in the long term
- continued concurrent use with smoking (ie dual use)
- acting as a gateway to tobacco use
- the potential to promote nicotine use and renormalise smoking among those who do not smoke, especially young people.

*Panel discussion and conclusions.* The panel concluded 1) that varenicline showed an uncertain benefit compared with electronic cigarettes in abstinence or relapse and 2) that varenicline had fewer adverse events than electronic cigarettes. As a result, the panel recommended varenicline rather than electronic cigarettes for treatment of tobacco dependence. The

OPEN

# Dual use of electronic and conventional cigarettes is associated with higher cardiovascular risk factors in Korean men

Choon-Young Kim<sup>1</sup>, Yu-Jin Paek<sup>2</sup>, Hong Gwan Seo<sup>3,4</sup>, Yoo Seock Cheong<sup>5</sup>, Cheol Min Lee<sup>6</sup>, Sang Min Park<sup>7,8,9</sup>, Da Won Park<sup>7</sup> & Kiheon Lee<sup>1,8\*</sup>

# Smoking behaviours between dual users and cigarette-only users

	Dual users (n = 337)	Cigarette-only smokers (n = 4,079)	P-value
Age of cigarette smoking initiation (years)	18.2 ± 0.2	19.0 ± 0.1	0.001
<b>Frequency of cigarette smoking</b>			
Daily	302 (88.3)	3633 (88.6)	0.876
Occasional	35 (11.7)	446 (11.4)	
Cigarettes smoked per day	15.1 ± 0.4	14.8 ± 0.1	0.589
1–9 (light smoker)	47 (14.9)	771 (18.7)	
10–19 (moderate smoker)	170 (48.7)	1743 (43.5)	0.144
≥20 (heavy smoker)	120 (36.4)	1564 (37.9)	
Duration of cigarette smoking (years)	18.2 ± 0.8	24.9 ± 0.3	<0.001
Pack-years of cigarettes <sup>a</sup>	14.4 ± 0.9	18.6 ± 0.4	<0.001
<b>Poly-use of new tobacco products</b>			
Snus	6 (2.3)	21 (1.1)	
Water-pipe	6 (2.7)	6 (0.4)	<0.001
Cigar	10 (6.4)	65 (2.8)	
Quit attempts ≥ 1 days in the past year	116 (67.1)	1464 (56.4)	0.013
NRT use within 5 days	13 (2.9)	39 (0.8)	<0.001
<b>Preparation stage to quit smoking</b>			
Preparation (<1 month)	96 (29.9)	839 (20.6)	
Contemplation (<6 months)	64 (19.4)	595 (15.4)	<0.001
Pre-contemplation (no intention)	177 (50.7)	2643 (63.9)	
Urinary cotinine (µg/mL) <sup>b</sup>	1303.4 (850.2–1925.0)	1236.1 (677.7–1800.0)	0.011

RESEARCH

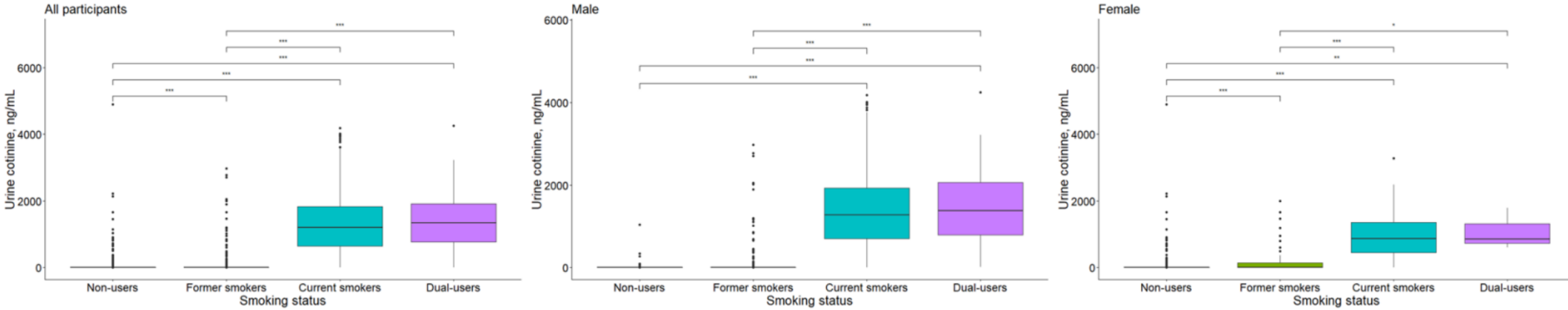
Open Access

# Association between dual use of e-cigarette and cigarette and chronic obstructive pulmonary disease: an analysis of a nationwide representative sample from 2013 to 2018



Taeyun Kim<sup>1</sup> and Jihun Kang<sup>2\*</sup>

# Urinary cotinine according to smoking status



# Pulmonary function according to smoking status

	FEV <sub>1</sub> , Liter/sec	Predicted FEV <sub>1</sub> , %	FVC, Liter/sec	Predicted FVC, %	FEV <sub>1</sub> /FVC, %
<i>Total (N = 12,919)</i>					
Non-users (n = 6924)	2.61 (2.58–2.63)	90.3 (89.6–91.0)	3.39 (3.36–3.42)	90.5 (89.9–91.2)	76.8 (76.4–77.2)
Former smokers (n = 3282)	2.58 (2.55–2.61)	88.7 (87.9–89.6)	3.44 (3.40–3.47)	90.5 (89.8–91.2)	75.3 (74.9–75.8)
Current smokers (n = 2549)	2.56 (2.53–2.59)	87.9 (87.1–88.8)	3.45 (3.42–3.49)	91.1 (90.4–91.9)	74.5 (74.1–75.0)
Dual users (n = 164)	2.55 (2.45–2.64)	86.4 (84.1–88.7)	3.45 (3.33–3.56)	90.0 (87.8–92.1)	74.2 (72.9–75.5)
<i>P</i> <sub>trend</sub>	< 0.001	< 0.001	0.007	0.215	< 0.001
<i>Men (n = 6596)</i>					
Non-users (n = 1165)	3.01 (2.96–3.06)	89.7 (88.4–91.0)	3.94 (3.89–4.00)	89.2 (88.2–90.3)	76.0 (75.3–76.7)
Former smokers (n = 3039)	2.98 (2.95–3.02)	87.8 (86.7–88.9)	3.99 (3.95–4.04)	89.1 (88.3–89.9)	74.4 (73.7–75.0)
Current smokers (n = 2237)	2.93 (2.89–2.97)	86.4 (85.2–87.6)	3.99 (3.94–4.03)	89.4 (88.5–90.3)	73.1 (72.5–73.8)
Dual users (n = 155)	2.90 (2.80–3.01)	85.1 (82.6–87.6)	3.97 (3.85–4.09)	88.2 (86.0–90.5)	72.8 (71.5–74.2)
<i>P</i> <sub>trend</sub>	< 0.001	< 0.001	0.250	0.927	< 0.001
<i>Women (n = 6323)</i>					
Non-users (n = 5759)	2.23 (2.21–2.26)	91.5 (90.6–92.4)	2.85 (2.82–2.88)	92.3 (91.5–93.1)	78.1 (77.7–78.5)
Former smokers (n = 243)	2.25 (2.19–2.31)	90.5 (88.4–92.6)	2.91 (2.84–2.98)	92.7 (90.8–94.6)	77.1 (76.1–78.0)
Current smokers (n = 312)	2.28 (2.23–2.33)	91.2 (89.6–92.9)	2.95 (2.88–3.02)	93.5 (91.9–95.1)	77.0 (76.3–77.8)
Dual users (n = 9)	2.14 (1.78–2.50)	88.0 (76.6–99.4)	2.85 (2.48–3.22)	92.4 (83.3–101.5)	74.7 (69.4–80.0)
<i>P</i> <sub>trend</sub>	0.144	0.420	0.003	0.153	< 0.001

# Prevalence and OR for COPD by smoking status

**Table 3** The prevalence and OR for COPD by smoking status in the Korean adults

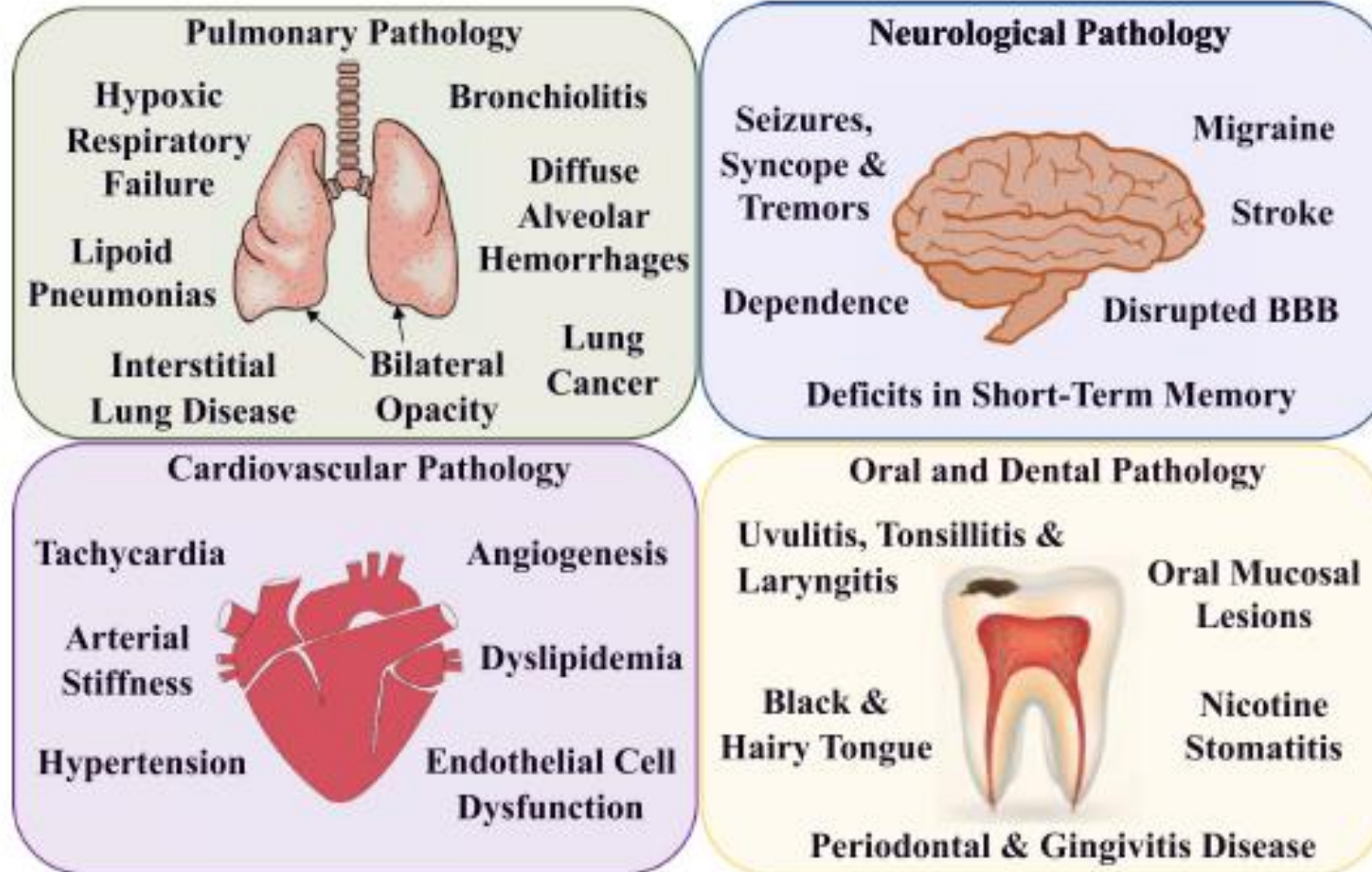
	Prevalence (% <i>, 95% CI)</i>	OR (95% CI)	P-value
Total (n = 12,919)	8.8 (8.3–9.4)		
Non-users (n = 6924)	6.0 (5.4–6.6)	1	
Former smokers (n = 3282)	10.7 (9.5–12.1)	1.67 (1.31–2.12)	< 0.001
Current smokers (n = 2549)	12.9 (11.4–14.6)	2.26 (1.77–2.88)	< 0.001
Dual users (n = 164)	13.8 (8.9–20.7)	2.83 (1.64–4.86)	< 0.001
<i>P</i> <sub>trend</sub>	< 0.001	< 0.001*	
Men (n = 6596)	10.8 (10.0–11.8)		
Non-users (n = 1165)	5.7 (4.4–7.5)	1	
Former smokers (n = 3039)	10.8 (9.5–12.2)	1.81 (1.31–2.49)	< 0.001
Current smokers (n = 2237)	13.2 (11.6–15.0)	2.69 (1.93–3.75)	< 0.001
Dual users (n = 155)	14.1 (9.0–21.3)	3.46 (1.89–6.34)	< 0.001
<i>P</i> <sub>trend</sub>	< 0.001	< 0.001*	
Women (n = 6323)	6.4 (5.7–7.1)		
Non-users (n = 5759)	6.0 (5.4–6.7)	1	
Former smokers (n = 243)	9.7 (6.1–15.0)	1.62 (0.96–2.74)	0.059
Current smokers (n = 312)	10.1 (6.9–14.5)	1.47 (0.93–2.34)	0.100
Dual users (n = 9)	7.8 (0.9–39.2)	1.09 (0.14–8.48)	0.950
<i>P</i> <sub>trend</sub>	< 0.001	0.038*	

## 전자담배의 구성 물질

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- Delivery solvents (PG & glycerol)
- Flavorings
- Carbonyl compounds
- Minor tobacco alkaloids
- Tobacco-specific nitrosamines (TSNAs)
- Free radicals and ROS

# 전자담배의 건강영향





Published in final edited form as:

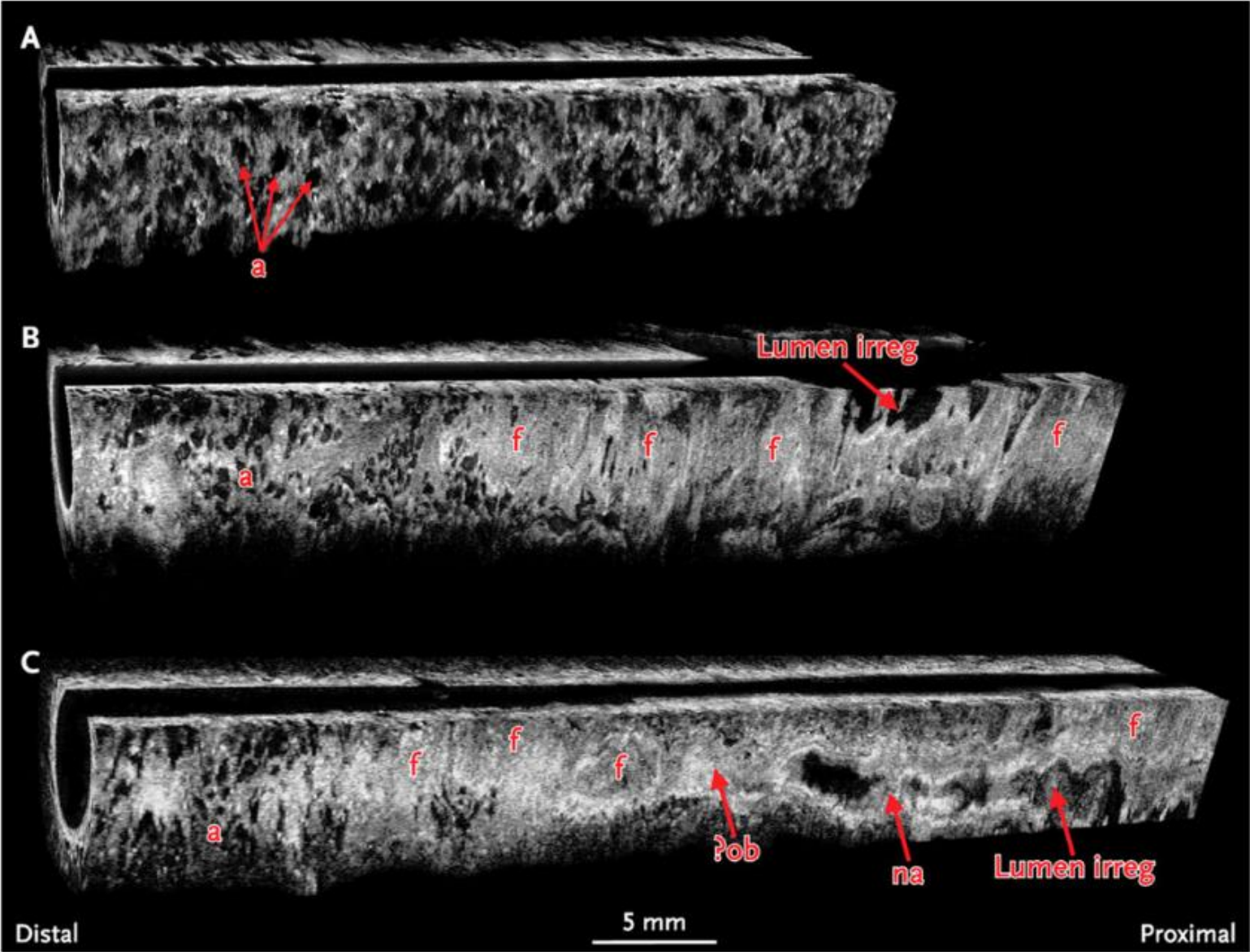
*NEJM Evid.* 2022 June ; 1(6) : . doi:10.1056/evidoa2100051.

### E-Cigarette Use, Small Airway Fibrosis, and Constrictive Bronchiolitis

Lida P. Hariri, M.D., Ph.D.<sup>1,2,3</sup>, Bess M. Flashner, M.D.<sup>2,3</sup>, David J. Kanarek, M.D.<sup>2,3</sup>, Walter J. O'Donnell, M.D.<sup>2,3</sup>, Alyssa Soskis, M.D.<sup>2,3,4</sup>, David R. Ziehr, M.D.<sup>2,3</sup>, Angela Frank, M.D.<sup>2,3</sup>, Sreyankar Nandy, Ph.D.<sup>2,3</sup>, Sarita R. Berigei, B.S.<sup>2,3</sup>, Amita Sharma, M.D.<sup>3,5</sup>, Douglas Mathisen, M.D.<sup>3,6</sup>, Colleen M. Keyes, M.D.<sup>2,3</sup>, Michael Lanuti, M.D.<sup>3,6</sup>, Ashok Muniappan, M.D.<sup>3,6</sup>, Jo-Anne O'Malley Shepard, M.D.<sup>3,5</sup>, Mari Mino-Kenudson, M.D.<sup>1,3</sup>, Amy Ly, M.D.<sup>1,3</sup>, Yin P. Hung, M.D., Ph.D.<sup>1,3</sup>, Flavia V. Castelino, M.D.<sup>3,7</sup>, Harald C. Ott, M.D.<sup>3,6</sup>, Benjamin D. Medoff, M.D.<sup>2,3</sup>, David C. Christiani, M.D.<sup>2,3,8</sup>

- 4 symptomatic patients with 3~8 year history of e-cigarette use

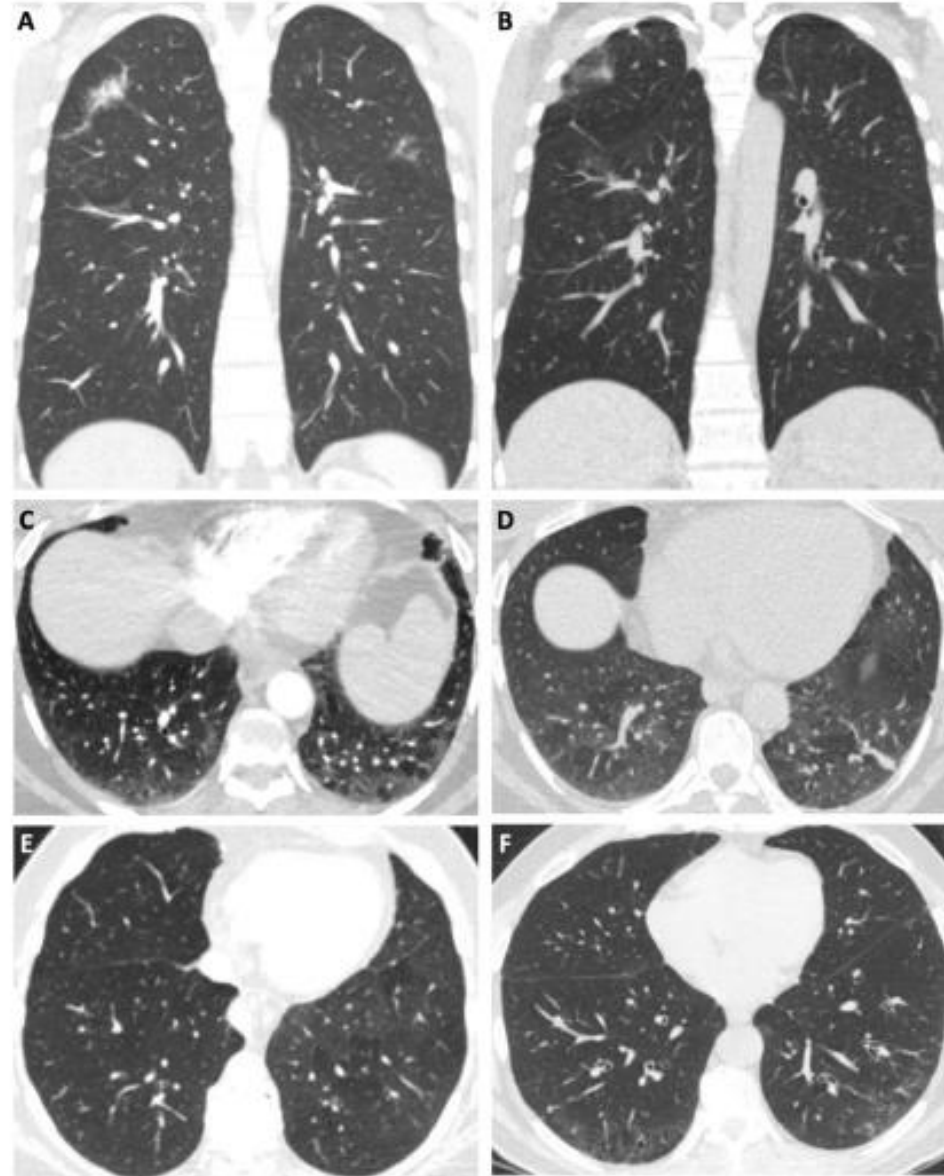
# Endobronchial optical coherence tomography



Hariri, L.P.; Flashner, B.M.; Kanarek, D.J.; O'Donnell, W.J.; Soskis, A.; Ziehr, D.R.; Frank, A.; Nandy, S.; Berigei, S.R.; Sharma, A., et al. E-Cigarette Use, Small Airway Fibrosis, and Constrictive Bronchiolitis. *NEJM Evid* **2022**, *1*,

# Chest CT

- Bronchial wall thickening, LL mosaic attenuation – airtrapping
- BLL GGN

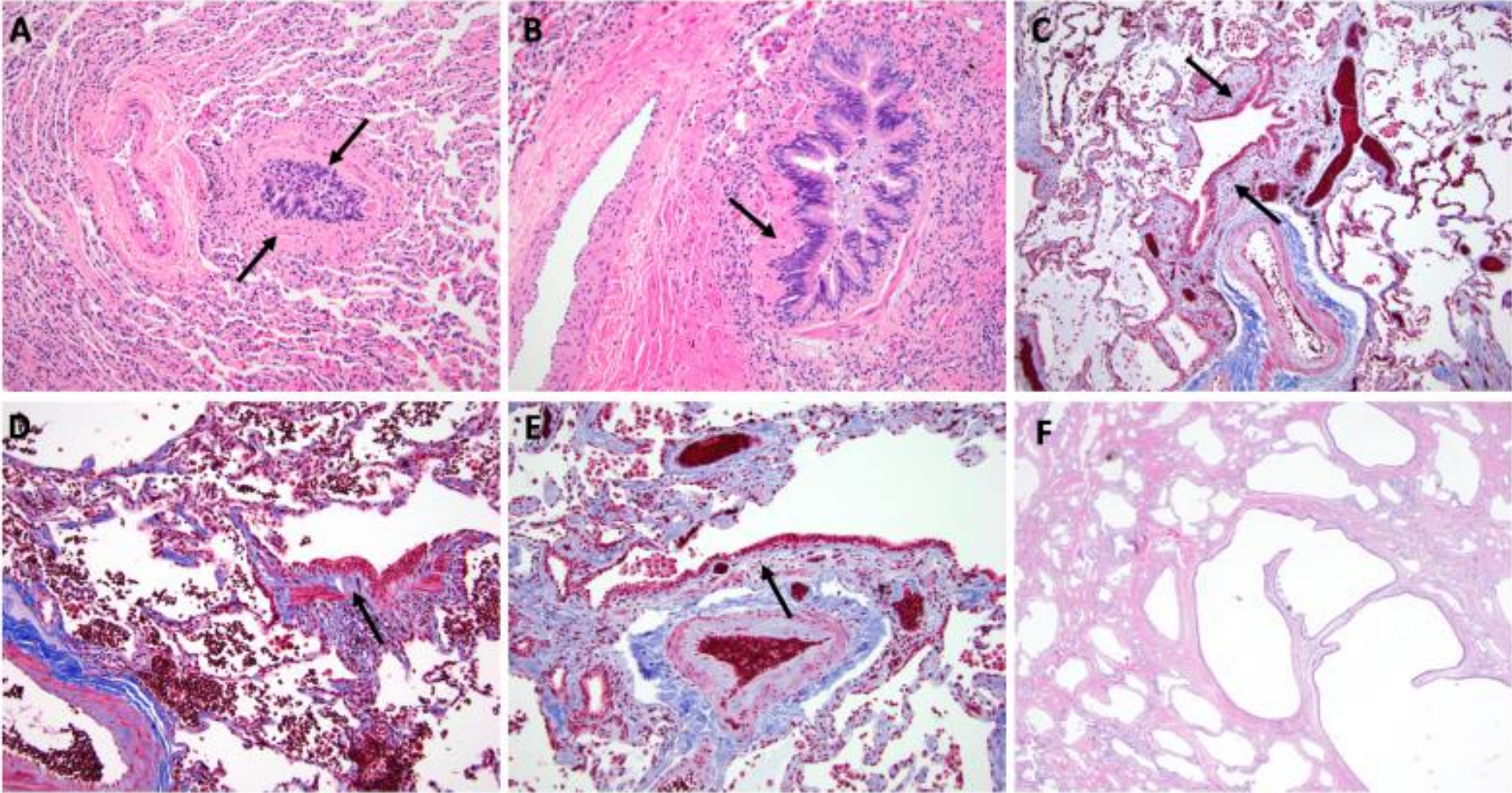


• 21 months

• 3 yrs

# histopathology

- 



Hariri, L.P.; Flashner, B.M.; Kanarek, D.J.; O'Donnell, W.J.; Soskis, A.; Ziehr, D.R.; Frank, A.; Nandy, S.; Berigei, S.R.; Sharma, A., et al. E-Cigarette Use, Small Airway Fibrosis, and Constrictive Bronchiolitis. *NEJM Evid* **2022**, *1*,

# PFT

Patient # Age/Sex	PFTs at presentation	PFTs prior to presentation	Follow-up PFTs
#1-25/F	At presentation: FEV1 3.44L (98%) FVC 4.14L (101%); FEV1/FVC 83% No bronchodilator response TLC 5.44L (99%) DLCO-Hgb 91% Rate of change in FEV1: No prior PFTs	None	9 month follow-up: FEV1 3.33L (95%) FVC 4.40L (108%); FEV1/FVC 75% No bronchodilator response TLC 5.44L (99%) DLCO-Hgb 91% Rate of change in FEV1 from presentation: -110 mL/9 months
			18 month follow up: FEV1 3.19L (92%) FVC 4.47L (110%); FEV1/FVC 71% No bronchodilator response No lung volumes or DLCO testing Rate of change in FEV1 from presentation: -167 mL/year
			4 year follow up: FEV1 2.83L (83%) FVC 3.85L (96%); FEV1/FVC 74% No bronchodilator response No lung volumes or DLCO testing Rate of change in FEV1 from presentation: -153 mL/year
#2-50/F	At presentation: FEV1 2.17L (85%) FVC 2.93L (92%) FEV1/FVC 74% 11% Positive post-bronchodilator response No lung volumes or DLCO testing Rate of change in FEV1: -40 mL/year	8 years prior: FEV1 2.52L (94%) FVC 3.28L (104%) FEV1/FVC 77% No bronchodilator response No lung volumes or DLCO testing	6 month follow-up: FEV1 2.03L (80%) FVC 2.61L (82%) FEV1/FVC 77% 5% Positive post-bronchodilator response No lung volumes or DLCO testing Rate of change in FEV1 from presentation: -140 mL/6 months
			7 month follow up: FEV1 2.35L (92%) FVC 2.89L (91%) FEV1/FVC 81% No bronchodilator response No lung volumes or DLCO testing Rate of change in FEV1 from presentation: +180 mL/7 months
			1 year follow-up: FEV1 2.18L (86%) FVC 2.92L (92%) FEV1/FVC 75% 7% Positive post-bronchodilator response No lung volumes or DLCO testing Rate of change in FEV1 from presentation: +10 mL/year
			2.5 years follow-up: FEV1 2.25L (90%) FVC 2.94L (94%) FEV1/FVC 77% 5% Positive post-bronchodilator response No lung volumes or DLCO testing Rate of change in FEV1 from presentation: +32 mL/year
#3-65/F	At presentation: FEV1 2.12L (91%) FVC 3.17L (106%) FEV1/FVC 67% TLC 6.32 (124%) DLCO 84% Rate of change in FEV1: -148 mL/year	4 years prior: FEV1 2.71L (116%) FVC 3.83L (130%) FEV1/FVC 71% TLC 5.94 (121%) DLCO 91%	8 month follow up: FEV1 2.08L (92%) FVC 3.03 (106%) FEV1/FVC 69% TLC 5.69 (116%) DLCO-Hgb 80% Rate of change in FEV1 from



Original article

## Adverse Experience Reports of Seizures in Youth and Young Adult Electronic Nicotine Delivery Systems Users



Lisa M. Faulcon, M.D. \*, Susan Rudy, M.S.N., C.R.N.P., Jean Limpert, M.D.,  
Baoguang Wang, M.D., Dr.P.H., and Iilun Murphy, M.D.

*Center for Tobacco Products, Food and Drug Administration, Beltsville, Maryland*

*Article history:* Received September 4, 2019; Accepted October 2, 2019

*Keywords:* Seizures; Electronic nicotine delivery systems (ENDS); Nicotine

- 122 voluntary reports (seizure 114, syncope 7, tremor 1) in 123 ENDS users from Dec 2020 to June 2019
- Rapid increase in plasma concentrations of nicotine

RESEARCH

Open Access



# The association between combustible/ electronic cigarette use and stroke based on national health and nutrition examination survey

Jing Shi<sup>1†</sup>, Lijun Xiong<sup>1†</sup>, Jun Guo<sup>1†</sup> and Yan Yang<sup>2\*</sup>

- 2017-2018 NHANES
- Stroke history and smoking histories by questionnaires
- 4022 participants

**Table 1** Participants' characteristics

	All partici- pants (n = 4022)	Stroke group (n = 201)	Normal group (n = 3821)	P value
Age (year)	55.0 (43.0, 65.0)	63.0 (55.0, 70.0)	55.0 (42.0, 64.0)	< 0.001
Gender (Male, %)	48.3	50.20	48.20	0.612
Race (%)				< 0.001
Non-Hispanic White	32.0	34.8	31.9	
Non-Hispanic Black	24.3	37.8	23.6	
Mexican American	13.5	8.0	13.7	
Other Hispanic	9.9	4.5	10.2	
Other races	20.3	14.9	20.6	
Education attainment (%)				< 0.001
Below high school	20.6	25.4	20.4	
High School	22.8	31.3	22.3	
Above high school	56.6	43.3	57.3	
Body mass index (kg/m <sup>2</sup> )	29.0 (25.4, 34.0)	30.3 (25.6, 35.1)	28.9 (25.4, 33.9)	0.253
Diabetes (Yes, %)	26.1	45.3	25.0	< 0.001
Fasting plasma glucose (mg/dL)	95.0 (88.0, 105.0)	97.0 (89.0, 118.0)	95.0 (88.0, 105.0)	0.029
Hemoglobin A1c (%)	5.7 (5.4, 6.1)	5.9 (5.5, 6.6)	5.7 (5.4, 6.1)	< 0.001
Hypertension (Yes, %)	42.3	76.6	40.5	< 0.001
Triglycerides (mg/dL)	123.0 (88.0, 178.0)	129.5 (91.2, 178.8)	123.0 (88.0, 178.0)	0.268
Total-to-HDL cholesterol	3.7 (2.9, 4.5)	3.5 (2.7, 4.3)	3.7 (3.0, 4.6)	0.010
eGFR (mL/min/1.73m <sup>2</sup> )	104.6 (81.2, 133.4)	80.4 (60.5, 105.5)	105.6 (82.4, 134.6)	< 0.001
Cigarette use (%)				< 0.001
Nonsmokers	74.9	63.7	75.5	
Sole e-cigarette use	5.8	6.0	5.8	
Sole combustible cigarette use	9.5	16.9	9.2	
Dual use	9.8	13.4	9.6	
Alcohol consumption (Yes, %)	83.8	83.6	83.8	1.000

eGFR: Estimated glomerular filtration rate

**Table 2** The association between cigarette use and the prevalence of stroke

	Crude model		Adjusted model	
	Odds ratio	P-value	Odds ratio	P-value
Nonsmokers	Reference		Reference	
Sole e-cigarette	1.23 (0.64–2.17)	0.505	2.07 (1.04–3.81)	0.027
Sole combustible cigarette	2.19 (1.46–3.21)	< 0.001	2.36 (1.52–3.59)	< 0.001
Dual use	1.66 (1.06–2.51)	0.02	2.34 (1.44–3.68)	< 0.001

Adjusted model: We adjusted for age, gender, education attainment, race, total-to-HDL cholesterol, diabetes, hypertension, and alcohol consumption

# Heated tobacco products 는 안전한가?

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## 가열담배 분석 결과 (2018.6.7. 식약처)

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- HTP

- Tobacco, water, glycerine, guar gum & cellular fibers

# 꺽련형 전자담배 유해성분 분석개요(1/2)

◆ 대상제품 : 꺽련형 전자담배(가열담배) 3개 제조사의 각 1개 모델

		
<p><b>아이코스(iQOS)</b> 앰버</p>	<p><b>글로(Glo)</b> 브라이트토바코</p>	<p><b>릴(Li)</b> 체인지</p>
<p>필립모리스(PM)</p>	<p>브리티쉬 아메리칸 토바코(BAT)</p>	<p>케이티엔지(KT&amp;G)</p>

# 꺁련형 전자담배 유해성분 분석개요(2/2)

## ◆ 분석항목 : 총 11개 성분(니코틴, 타르 및 WHO 저감화 권고 9개 유해성분)

일반 담배 의무표시 성분	WHO 저감화 권고 성분	
✓ 니코틴 ✓ 타르	✓ 벤조피렌 ✓ 니트로소노르니코틴(NNN) ✓ 니트로소메틸아미노피리딜 부타논(NNK)	✓ 포름알데히드 ✓ 아세트알데히드 ✓ 아크롤레인 ✓ 벤젠 ✓ 1,3-부타디엔 ✓ 일산화탄소

Carbonyl compounds

## ◆ 분석방법 : ISO법과 HC(Health Canada)법을 꺁련형 전자담배에 맞게 적용

# 꺽련형 전자담배 유해성분별 분석과정

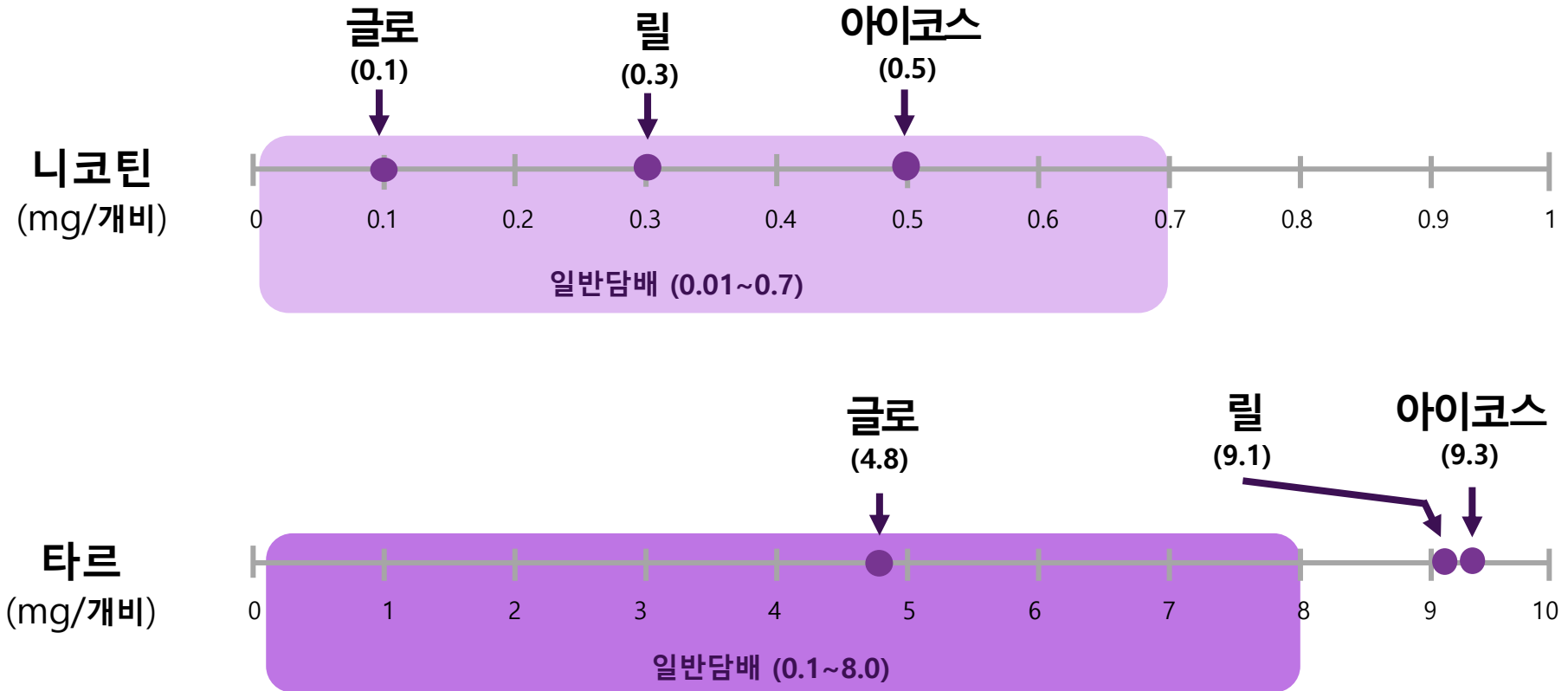


\* 유해성분의 특성에 따라 각각 캠브리지필터, 임핀저, 가스백으로 포집하여 분석

# 꺼련형 전자담배 유해성분 분석결과(1/2)

## ◆ 꺼련형 전자담배와 일반담배\* 니코틴·타르 함유량 비교(ISO 기준)

\* 시중 유통되는 100개 제품(전체 소비량의 95% 차지)에 표시된 함유량



# 궐련형 전자담배 유해성분 분석결과(2/2)

대상성분		포집법	궐련형 전자담배		
			필립모리스	브리티쉬 아메리칸토바코	KT&G
			아이코스 (엠버)	글로 (브라이트토바코)	릴 (체인지)
일반담배 의무 표시 성분	니코틴 (mg/개비)	ISO	0.5 ± 0.0	0.1 ± 0.0	0.3 ± 0.0
		HC	1.4 ± 0.1	0.8 ± 0.1	0.8 ± 0.1
	타르 (mg/개비)	ISO	9.3 ± 0.9	4.8 ± 0.5	9.1 ± 1.3
		HC	18.8 ± 2.1	20.2 ± 2.3	17.1 ± 2.2
WHO 저감화 권고 성분	벤조피렌 (ng/개비)	ISO	0.2 ± 0.1	NQ	0.1 ± 0.1
		HC	0.5 ± 0.1	0.1 ± 0.0	0.3 ± 0.2
	니트로소노르니코틴(NNN) (ng/개비)	ISO	6.5 ± 0.2	4.8 ± 0.7	0.6 ± 0.2
		HC	18.3 ± 0.6	8.8 ± 0.8	0.9 ± 0.2
	니트로소메틸아미노피리딜 부타논(NNK) (ng/개비)	ISO	4.5 ± 0.3	3.2 ± 1.5	0.8 ± 0.2
		HC	12.1 ± 0.4	7.2 ± 0.9	1.6 ± 0.2
	포름알데히드 (µg/개비)	ISO	2.6 ± 0.3	1.5 ± 0.2	2.0 ± 0.1
		HC	12.2 ± 1.8	4.0 ± 0.2	4.6 ± 0.0
	아세트알데히드 (µg/개비)	ISO	119.3 ± 3.0	43.4 ± 0.6	76.4 ± 3.1
		HC	193.6 ± 7.9	72.6 ± 1.3	103.6 ± 0.8
	아크롤레인 (µg/개비)	ISO	1.8 ± 0.3	0.7 ± 0.1	2.5 ± 0.2
		HC	7.9 ± 0.8	1.7 ± 0.3	3.8 ± 0.4
	벤젠 (µg/개비)	ISO	0.1 ± 0.0	0.03 ± 0.00	0.04 ± 0.01
		HC	0.2 ± 0.0	0.06 ± 0.00	0.07 ± 0.02
	1,3-부타디엔 (µg/개비)	ISO	NQ	NQ	NQ
		HC	NQ	NQ	NQ
일산화탄소 (mg/개비)	ISO	0.2 ± 0.0	NQ	0.2 ± 0.0	
	HC	0.5 ± 0.1	NQ	0.3 ± 0.1	

# 꺼련형 전자담배 유해성분 분석결과 의의

## ◆ 꺼련형 전자담배가 금연에 도움이 되는 것은 아님

- 니코틴 함유량이 일반담배와 유사한 수준

## ◆ 꺼련형 전자담배는 일반담배와 다른 유해물질을 포함할 수 있음

- 꺼련형 전자담배 2개 제품의 경우 타르의 함유량이 일반담배보다 높게 검출
- WHO 등 외국 연구자료 등을 종합적으로 고려할 때, 꺼련형 전자담배가 일반담배보다 덜 유해하다는 근거는 없음

## ◆ 꺼련형 전자담배도 암 등 각종 질병을 일으킬 수 있음

- 꺼련형 전자담배에도 벤조피렌, 벤젠 등 인체발암물질이 포함
- 담배 유해성은 흡연습관에 따라 달라질 수 있기 때문에, 유해성분 함유량 만으로 제품간 유해성을 비교하는 것은 적절하지 않음



Contents lists available at ScienceDirect

Journal of Hazardous Materials

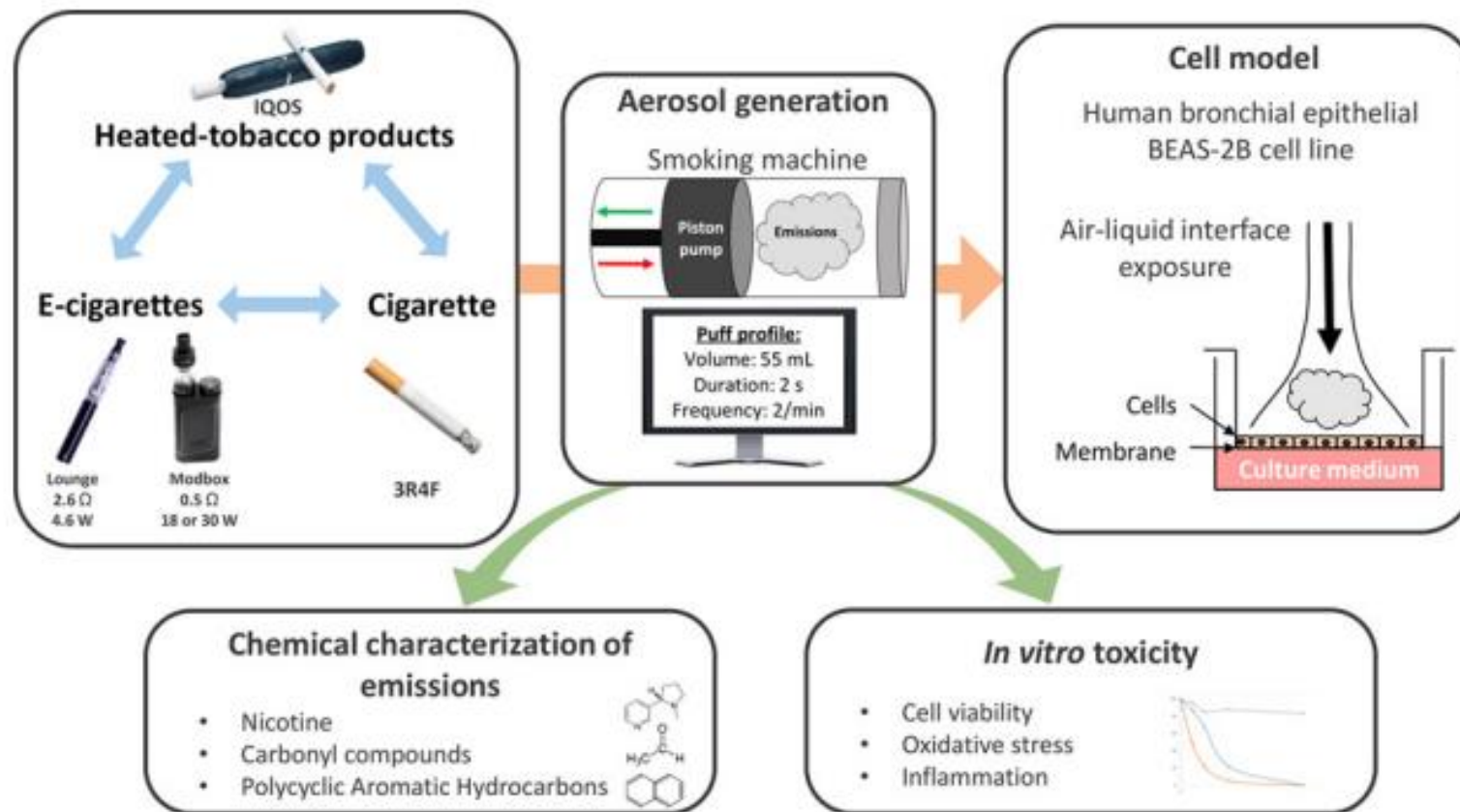
journal homepage: [www.elsevier.com/locate/jhazmat](http://www.elsevier.com/locate/jhazmat)

## Comparison of the chemical composition of aerosols from heated tobacco products, electronic cigarettes and tobacco cigarettes on the human bronchial epithelial BEAS-2B cells

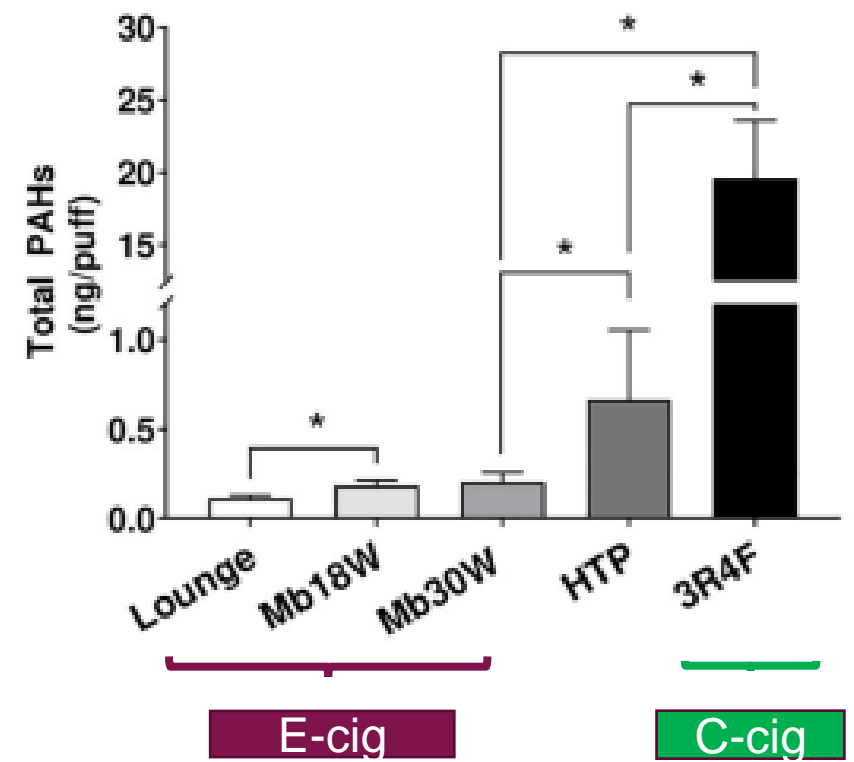
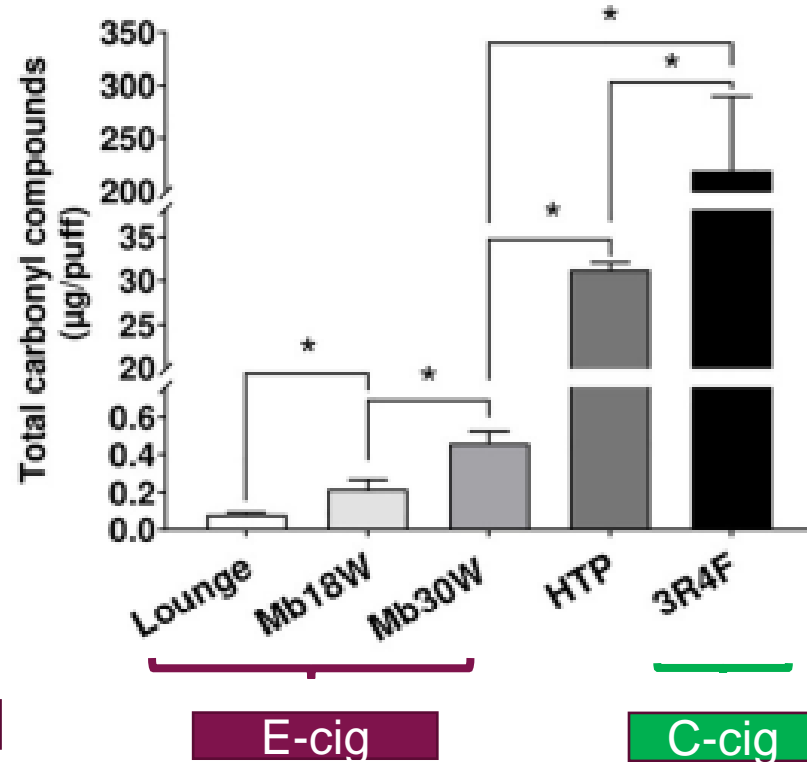
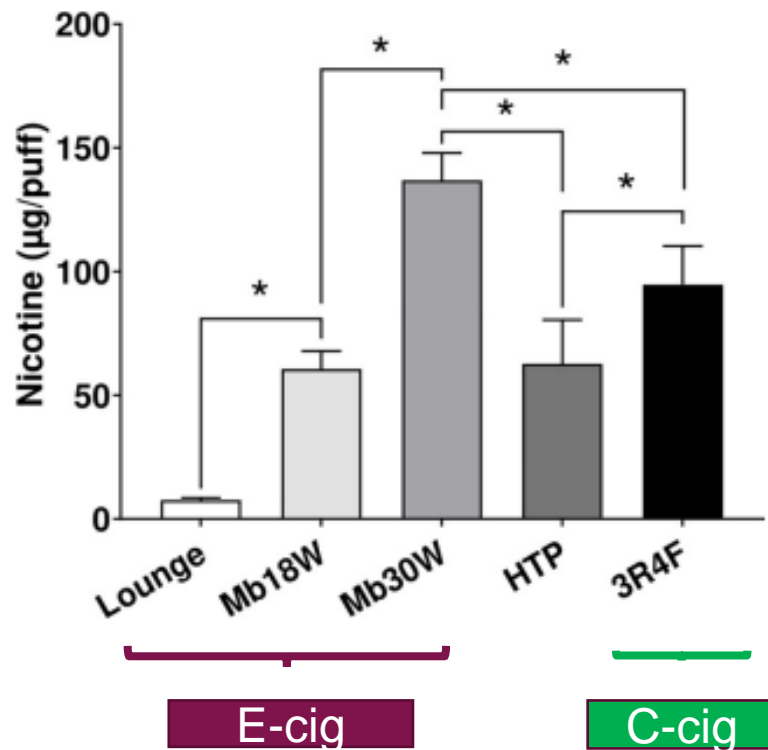
Romain Dusautoir<sup>a</sup>, Gianni Zarcone<sup>a</sup>, Marie Verrie<sup>a</sup>, Nicolas Beauval<sup>a</sup>, Delphine Allorge<sup>a</sup>, Véronique Riffault<sup>a</sup>, Jean-Marc Lo-Guidice<sup>a</sup>, Sébastien Anthérieu<sup>a,\*</sup>

<sup>a</sup> Univ. Lille, CHU Lille, Institut Pasteur de Lille, ULR 4483, IMPECS - IMPact de l'Environnement

<sup>b</sup> IMT Lille Douai, Univ. Lille, SAGE, F-59000, Lille, France



# Nicotine / carbonyl compounds / PAHs levels



Dusautoir, R.; Zarcone, G.; Verrielle, M.; Garçon, G.; Fronval, I.; Beauval, N.; Allorge, D.; Riffault, V.; Locoge, N.; Lo-Guidice, J.M., et al. Comparison of the chemical composition of aerosols from heated tobacco products, electronic cigarettes and tobacco cigarettes and their toxic impacts on the human bronchial epithelial BEAS-2B cells. *J Hazard Mater* **2021**, *401*, 123417.



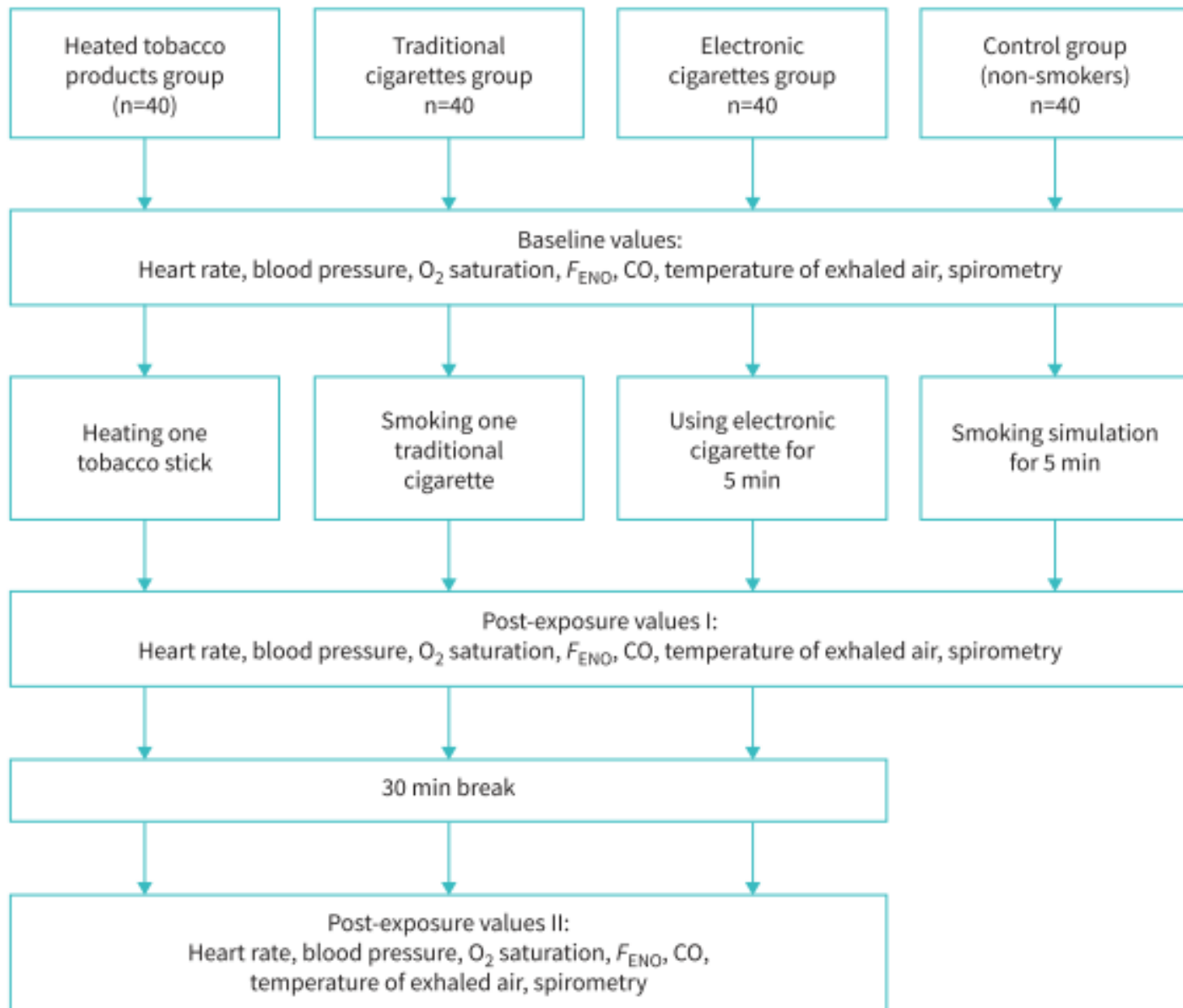
# Acute health effects of heated tobacco products: comparative analysis with traditional cigarettes and electronic cigarettes in young adults

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- T group : smoke with personal habits
- H group : IQOS
- E group : 12mg/mL of nicotine
- C group : control



**TABLE 2** Changes in exhaled nitric oxide fraction ( $F_{ENO}$ ), temperature of exhaled air, carbon monoxide in exhaled air, oxygen saturation, systolic and diastolic blood pressure and heart rate after exposure to traditional cigarettes, heated tobacco products, e-cigarettes and after exposure simulation

Group	A. Baseline values	B. Post-exposure values I	C. Post-exposure values II	p-value	p-value A vs B <sup>g</sup>	p-value A vs C <sup>h</sup>	p-value B vs C <sup>i</sup>
<b><math>F_{ENO}</math> (ppb)</b>							
H group	12.8±5.5	11.2±5.3	14.3±6.2	<0.01 <sup>a</sup>	<0.01	<0.01	<0.01
T group	10.3±5.7	9.5±6.3	12.7±7.8	<0.01 <sup>a</sup>	0.1	<0.01	<0.01
E group	16.9±6.5	14.2±6.8	17.3±7.1	<0.01 <sup>a</sup>	<0.01	0.4	<0.01
C group	13.2±5.9	13.1±5.8		0.7 <sup>+</sup>			
<b>Temperature of exhaled air (°C)</b>							
H group	34.1±0.7	34.2±0.5	34.2±0.5	0.1 <sup>a</sup>	0.09	0.1	0.9
T group	34.1 (33.6; 34.4)	34.3 (33.7; 34.5)	34.4 (34.1; 34.6)	0.03 <sup>b</sup>	0.05	0.02	0.7
E group	34.2 (33.9; 34.5)	34.3 (34.1; 34.6)	34.4 (33.8; 34.6)	<0.01 <sup>b</sup>	<0.01	<0.01	0.7
C group	34.0 (33.6; 34.4)	34.1 (33.7; 34.4)		0.3 <sup>f</sup>			
<b>Exhaled carbon monoxide (ppm)</b>							
H group	4 (3; 5)	4 (3; 5.5)	4 (3; 7)	0.07 <sup>b</sup>	0.1	0.2	0.9
T group	6 (4; 10)	11 (8; 15)	9 (7; 14)	<0.01 <sup>b</sup>	<0.01	<0.01	0.02
E group	3 (2; 4)	3 (2; 4)	3 (3; 4)	0.9 <sup>b</sup>	0.8	0.9	0.9
C group	3 (2; 5.5)	3 (2.5; 5)		0.4 <sup>f</sup>			
<b>Oxygen saturation (%)</b>							
H group	99 (98; 99)	98 (97; 99)	98 (97; 99)	0.049 <sup>b</sup>	0.1	0.05	0.8
T group	98 (98; 99)	98 (98; 99)	98 (97; 99)	0.1 <sup>b</sup>	0.4	0.08	0.3
E group	99 (98; 100)	98 (98; 99)	98 (97; 99)	0.1 <sup>b</sup>	0.4	0.08	0.3
C group	98.5 (98; 99)	99 (98; 99)		0.4 <sup>f</sup>			
<b>Heart rate (beats per min)</b>							
H group	74.9±12.0	87.5±12.6	73.9±9.6	<0.01 <sup>a</sup>	<0.01	0.8	<0.01
T group	79.3±12.2	93.7±15.1	80.5±11.9	<0.01 <sup>a</sup>	<0.01	0.7	<0.01
E group	79.6±11.6	89.9±13.9	80.4±12.0	<0.01 <sup>a</sup>	<0.01	0.5	<0.01
C group	76.9±10.2	72.7±10.5		<0.01 <sup>+</sup>			
<b>Systolic blood pressure (mmHg)</b>							
H group	120.3±13.4	129.3±17.2	120.7±14.5	<0.01 <sup>a</sup>	<0.01	0.8	<0.01
T group	125.4±13.0	133.0±13.2	123.7±12.0	<0.01 <sup>a</sup>	<0.01	0.3	<0.01
E group	126.1±14.2	134.3±13.2	128.4±12.4	<0.01 <sup>a</sup>	0.01	0.3	0.1
C group	122.5±11.0	117.4±13.8		0.01 <sup>+</sup>			
<b>Diastolic blood pressure (mmHg)</b>							
H group	76.3±10.9	81.7±10.4	76.3±11.0	<0.01 <sup>a</sup>	<0.01	0.9	<0.01
T group	80.5±8.5	84.8±8.9	79.0±8.6	<0.01 <sup>a</sup>	0.01	0.2	0.01
E group	74.6±10.6	80.4±8.0	77.1±8.6	0.01 <sup>a</sup>	0.01	0.1	0.09
C group	78.0±7.0	74.6±9.2		0.01 <sup>+</sup>			

**TABLE 3** Changes in the spirometry results after exposure to a traditional cigarette, heated tobacco product, e-cigarette and simulation of exposure

Variable	A. Baseline values	B. Post-exposure values I	C. Post-exposure values II	p-value	p-value A vs B <sup>†</sup>	p-value A vs C <sup>‡</sup>	p-value B vs C <sup>‡</sup>
<b>H group, n=40</b>							
FVC (L)	4.8±0.9	4.7±0.9	4.7±1.0	0.1 <sup>¶</sup>	0.6	0.1	0.5
FEV <sub>1</sub> (L)	3.9±0.7	3.9±0.7	3.8±0.8	0.3 <sup>¶</sup>	0.9	0.4	0.2
FEV <sub>1</sub> /FVC (%)	0.8±0.7	0.8±0.7	0.8±0.5	0.2 <sup>+</sup>	0.7	0.8	1.0
PEF (L·s <sup>-1</sup> )	7.9±1.8	7.7±1.8	7.7±2.0	0.3 <sup>¶</sup>	0.4	0.3	1.0
MEF <sub>75%</sub> (L·s <sup>-1</sup> )	6.9±1.6	6.7±1.3	6.7±1.7	0.5 <sup>¶</sup>	0.6	0.5	1.0
MEF <sub>50%</sub> (L·s <sup>-1</sup> )	4.6±1.1	4.6±1.1	4.5±1.3	0.8 <sup>¶</sup>	1.0	0.8	0.8
MEF <sub>25%</sub> (L·s <sup>-1</sup> )	1.8±0.6	2.0±0.6	2.0±0.7	0.05 <sup>¶</sup>	0.2	0.3	1.0
<b>T group, n=40</b>							
FVC (L)	5.1±1.1	5.0±1.2	4.9±1.1	0.2 <sup>¶</sup>	0.6	0.2	0.8
FEV <sub>1</sub> (L)	4.1±0.9	4.1±0.9	4.1±0.9	0.4 <sup>¶</sup>	0.5	0.4	1.0
FEV <sub>1</sub> /FVC (%)	0.8±0.1	0.8±0.1	0.8±0.1	0.7 <sup>¶</sup>	1.0	0.8	0.7
PEF (L·s <sup>-1</sup> )	7.7±2.0	7.9±2.1	8.0±2.2	0.5 <sup>¶</sup>	0.7	0.5	1.0
MEF <sub>75%</sub> (L·s <sup>-1</sup> )	7.0±1.9	7.0±1.8	7.1±2.1	0.5 <sup>¶</sup>	0.8	0.9	0.5
MEF <sub>50%</sub> (L·s <sup>-1</sup> )	4.8±1.4	4.8±1.3	4.7±1.3	0.3 <sup>¶</sup>	1.0	0.5	0.4
MEF <sub>25%</sub> (L·s <sup>-1</sup> )	2.1±0.7	2.0±0.6	2.1±0.7	0.4 <sup>¶</sup>	0.4	0.7	0.9
<b>E group, n=40</b>							
FVC (L)	4.8±1.1	4.7±1.1	4.7±1.2	0.02 <sup>¶</sup>	0.3	0.02	0.4
FEV <sub>1</sub> (L)	3.9±0.8	3.9±0.8	3.8±0.9	0.01 <sup>¶</sup>	0.5	0.01	0.2
FEV <sub>1</sub> /FVC (%)	0.8±0.1	0.8±0.1	0.8±0.1	0.5 <sup>¶</sup>	1.0	0.6	0.6
PEF (L·s <sup>-1</sup> )	7.7±1.9	7.7±1.8	7.6±1.9	0.6 <sup>¶</sup>	1.0	0.7	0.7
MEF <sub>75%</sub> (L·s <sup>-1</sup> )	6.7±1.5	6.9±1.6	6.7±1.7	0.7 <sup>¶</sup>	0.8	1.0	0.7
MEF <sub>50%</sub> (L·s <sup>-1</sup> )	5.0±1.3	4.7±1.2	4.7±1.2	0.04 <sup>¶</sup>	0.1	0.06	0.9
MEF <sub>25%</sub> (L·s <sup>-1</sup> )	2.2±0.6	2.1±0.6	2.1±0.9	0.1 <sup>¶</sup>	0.4	0.7	0.9
<b>C group, n=40</b>							
FVC (L)	4.7±1.1	4.7±1.0		0.4 <sup>§</sup>			
FEV <sub>1</sub> (L)	3.8±0.8	3.8±0.8		0.8 <sup>§</sup>			
FEV <sub>1</sub> /FVC (%)	0.8±0.1	0.8±0.1		0.1 <sup>f</sup>			
PEF (L·s <sup>-1</sup> )	8.0±2.2	8.1±2.1		0.3 <sup>§</sup>			
MEF <sub>75%</sub> (L·s <sup>-1</sup> )	6.8±1.9	6.8±1.8		0.9 <sup>§</sup>			
MEF <sub>50%</sub> (L·s <sup>-1</sup> )	4.4±1.3	4.4±1.3		1.0 <sup>§</sup>			
MEF <sub>25%</sub> (L·s <sup>-1</sup> )	1.9±0.7	1.8±0.8		1.0 <sup>§</sup>			

# 전자담배도 치료가 가능할까?

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# Scoping review of guidance on cessation interventions for electronic cigarettes and dual electronic and combustible cigarettes use

Anasua Kundu MBBS MScCH, Erika Kouzoukas MPH, Laurie Zawertailo PhD, Chantal Fougere MPH, Rosa Dragonetti MSc, Peter Selby MBBS MHSc, Robert Schwartz PhD

## Abstract

**Background:** Although evidence-based smoking cessation guidelines are available, the applicability of these guidelines for the cessation of electronic cigarette and dual e-cigarette and combustible cigarette use is not yet established. In this review, we aimed to identify current evidence or recommendations for cessation interventions for e-cigarette users and dual users tailored to adolescents, youth and adults, and to provide direction for future research.

**Methods:** We systematically searched MEDLINE, Embase, PsycINFO and grey literature for publications that provided evidence or recommendations on vaping cessation for e-cigarette users and complete cessation of cigarette and e-cigarette use for dual users. We excluded publications focused on smoking cessation, harm reduction by e-cigarettes, cannabis vaping, and management of lung injury associated with e-cigarette or vaping use. Data were extracted on general characteristics and recommendations made in the publications, and different critical appraisal tools were used for quality assessment.

**Results:** A total of 13 publications on vaping cessation interventions were included. Most articles were youth-focused, and behavioural counselling and nicotine replacement therapy were the most recommended interventions. Whereas 10 publications were appraised as “high quality” evidence, 5 articles adapted evidence from evaluation of smoking cessation. No study was found on complete cessation of cigarettes and e-cigarettes for dual users.

**Interpretation:** There is little evidence in support of effective vaping cessation interventions and no evidence for dual use cessation interventions. For an evidence-based cessation guideline, clinical trials should be rigorously designed to evaluate the effectiveness of behavioural interventions and medications for e-cigarette and dual use cessation among different subpopulations.

# Outcomes I

Table 1: Summary statistics of included papers		
Characteristic	No. of papers n = 13	Author and year
Country		
United States	11	Graham et al., 2020; <sup>48</sup> Graham et al., 2021; <sup>49</sup> Substance Abuse and Mental Health Services Administration, 2020; <sup>50</sup> Owens et al., 2020; <sup>51</sup> American Academy of Pediatrics, 2019; <sup>52</sup> Hadland and Chadi, 2020; <sup>53</sup> Gonzalvo et al., 2016; <sup>55</sup> Berg et al., 2021; <sup>56</sup> Sikka et al., 2021; <sup>57</sup> Sahr et al., 2020; <sup>58</sup> Silver et al., 2016 <sup>59</sup>
Canada	2	Chadi et al., 2021; <sup>54</sup> Health Canada, 2021 <sup>60</sup>
Target population (age in years)*		
Adolescent (10–19)	4	Graham et al., 2020; <sup>48</sup> Owens et al., 2020; <sup>51</sup> American Academy of Pediatrics, 2019; <sup>52</sup> Chadi et al., 2021 <sup>54</sup>
Youth (15–24)	11	Graham et al., 2020; <sup>48</sup> Graham et al., 2021; <sup>49</sup> Substance Abuse and Mental Health Services Administration, 2020; <sup>50</sup> American Academy of Pediatrics, 2019; <sup>52</sup> Hadland and Chadi, 2020; <sup>53</sup> Chadi et al., 2021; <sup>54</sup> Berg et al., 2021; <sup>56</sup> Sikka et al., 2021; <sup>57</sup> Sahr et al., 2020; <sup>58</sup> Silver et al., 2016; <sup>59</sup> Health Canada, 2021 <sup>60</sup>
Adult (25–64)	2	Gonzalvo et al., 2016; <sup>55</sup> Sikka et al., 2021 <sup>57</sup>
Study design		
RCT	1	Graham et al., 2021 <sup>49</sup>
Pretest–posttest experimental study	1	Graham et al., 2020 <sup>48</sup>
Guidance or recommendation	7	Substance Abuse and Mental Health Services Administration, 2020; <sup>50</sup> Owens et al., 2020; <sup>51</sup> American Academy of Pediatrics, 2019; <sup>52</sup> Hadland and Chadi, 2020; <sup>53</sup> Chadi et al., 2021; <sup>54</sup> Gonzalvo et al., 2016; <sup>55</sup> Berg et al., 2021 <sup>56</sup>
Case report or case series	3	Sikka et al., 2021; <sup>57</sup> Sahr et al., 2020; <sup>58</sup> Silver et al., 2016 <sup>59</sup>
Qualitative study	1	Health Canada, 2021 <sup>60</sup>
Type of intervention recommended		
Behavioural	10	Graham et al., 2020; <sup>48</sup> Graham et al., 2021; <sup>49</sup> Substance Abuse and Mental Health Services Administration, 2020; <sup>50</sup> Hadland and Chadi, 2020; <sup>53</sup> Chadi et al., 2021; <sup>54</sup> Berg et al., 2021; <sup>56</sup> Sikka et al., 2021; <sup>57</sup> Sahr et al., 2020; <sup>58</sup> Silver et al., 2016; <sup>59</sup> Health Canada, 2021 <sup>60</sup>
NRT	6	American Academy of Pediatrics, 2019; <sup>52</sup> Hadland and Chadi, 2020; <sup>53</sup> Chadi et al., 2021; <sup>54</sup> Gonzalvo et al., 2016; <sup>55</sup> Sikka et al., 2021; <sup>57</sup> Silver et al., 2016 <sup>59</sup>
Non-NRT	3	Hadland and Chadi, 2020; <sup>53</sup> Chadi et al., 2021; <sup>54</sup> Gonzalvo et al., 2016 <sup>55</sup>

Kundu, A.; Kouzoukas, E.; Zawertailo, L.; Fougere, C.; Dragonetti, R.; Selby, P.; Schwartz, R. Scoping review of guidance on cessation interventions for electronic cigarettes and dual electronic and combustible cigarettes use. *CMAJ Open* 2023, 11, E336-e344.

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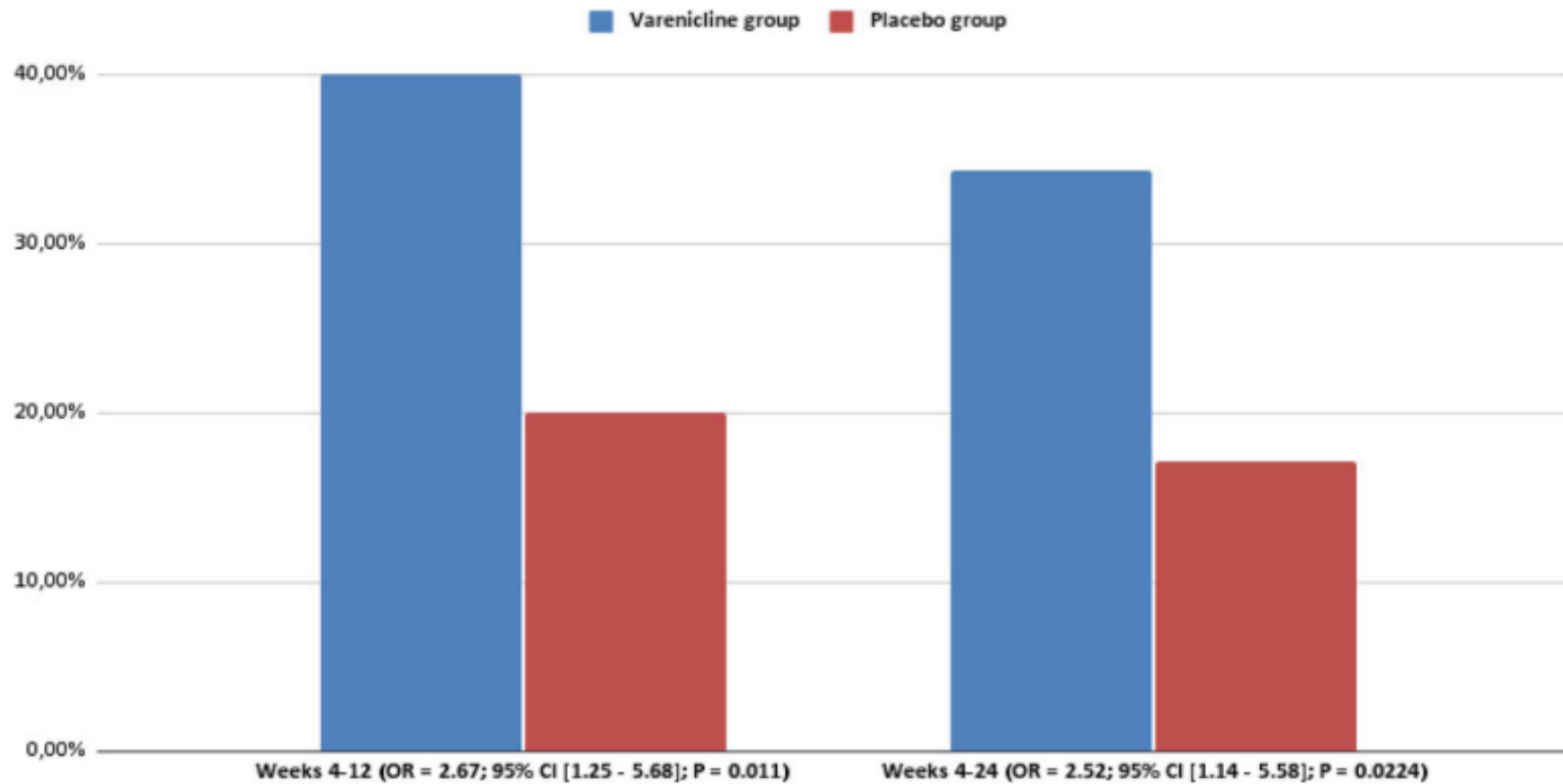


# Varenicline and counseling for vaping cessation: a double-blind, randomized, parallel-group, placebo-controlled trial

Pasquale Caponnetto<sup>1,2,3</sup>, Davide Campagna<sup>2,4,5</sup>, Jasjit S. Ahluwalia<sup>6</sup>, Christopher Russell<sup>7</sup>, Marilena Maglia<sup>1,8</sup>, Paolo Marco Riela<sup>9</sup>, Carmelo Fabio Longo<sup>9</sup>, Barbara Busa<sup>10</sup> and Riccardo Polosa<sup>1,2,5\*</sup>

- 140 subjects (exclusively ECs users)
- Varenicline+counseling vs. placebo+counseling
- Primary outcome: biochemically continuous abstinence rate (CAR) at 4-12 weeks
- Secondary outcome: CAR at 4-24 weeks and 7-day point prevalence at 12 and 24 weeks

# Efficacy CAR



Caponnetto, P.; Campagna, D.; Ahluwalia, J.S.; Russell, C.; Maglia, M.; Riela, P.M.; Longo, C.F.; Busa, B.; Polosa, R. Varenicline and counseling for vaping cessation: a double-blind, randomized, parallel-group, placebo-controlled trial. *BMC Med* **2023**, *21*, 220.

# CAR and 7-day point prevalence

	Varenicline group	Placebo group	OR	95% CI	p-value
<b>Continuous abstinence rate</b>					
CAR 4–12 weeks	40.0%	20.0%	2.67	[1.25–5.68]	<b>0.011</b>
CAR 4–24 weeks	34.3%	17.1%	2.52	[1.14–5.58]	<b>0.022</b>
<b>7-day point prevalence</b>					
Week-4	41.4%	22.9%	2.39	[1.15–4.97]	<b>0.020</b>
Week-5	41.4%	27.1%	1.86	[0.93–3.86]	0.076
Week-6	40.0%	25.7%	1.93	[0.94–3.95]	0.073
Week-7	40.0%	25.7%	1.93	[0.94–3.95]	0.073
Week-8	40.0%	20.0%	2.67	[1.25–5.68]	<b>0.011</b>
Week-12	40.0%	20.0%	2.67	[1.25–5.68]	<b>0.011</b>
Week-24	34.3%	17.1%	2.52	[1.14–5.58]	<b>0.022</b>



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# Addictive Behaviors

journal homepage: [www.elsevier.com/locate/addictbeh](http://www.elsevier.com/locate/addictbeh)



## Nicotine replacement therapy for vaping cessation among mono and dual users: A mixed methods preliminary study

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Nathaniel L. Baker<sup>a</sup>, Benjamin A. Toll<sup>a,c,d</sup>

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<sup>d</sup> Department of Psychiatry and Behavioral Sciences, Medical University of South Carolina, Charleston, SC, USA

Abstinence outcomes.

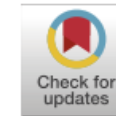
	Intervention (N = 18)			Control (N = 12)			Intervention vs Control <i>Fisher, p, <math>\phi</math></i>
	E-cigarette only (N = 10)	Dual Use (N = 8)	Overall	E-cigarette only (N = 5)	Dual User (N = 7)	Overall	
<i>End of Treatment (Day 28)</i>							
Completed survey	8 (80 %)	5 (62.5 %)	13 (72.2 %)	4 (90 %)	7 (100 %)	11 (91.6 %)	–
E-cigarette abstinence <sup>a</sup>	4 (40 %)	2 (25 %)	6 (33.33 %)	0	0	0	5.00, 0.057,
							-0.408
E-cigarette change							5.22, 0.087, 0.416
Reduced	2 (33.3 %)	3 (50 %)	5 (41.7 %)	1 (20 %)	3 (42.8 %)	4 (33.3 %)	
No change	4 (66.7 %)	3 (50 %)	7 (58.3 %)	4 (80 %)	4 (57.1 %)	8 (66.7 %)	
Increased	0	0	0	0	0	0	
Smoking abstinence <sup>a</sup>	–	0	0	–	0	0	–
Smoking change							1.85, 0.498, 0.237
Reduced	0	1 (12.5 %)	1 (6.6 %)	0	1 (14.2 %)	1 (6.7 %)	
No change	10 (100 %)	7 (87.5 %)	17 (94.4 %)	5 (100 %)	5 (71.4 %)	10 (83.3 %)	
Increased	0	0	0	0	1 (14.2 %)	1 (6.7 %)	



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# Preventive Medicine

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## E-cigarette and combusted tobacco abstinence among young adults: Secondary analyses from a U.S.-based randomized controlled trial of vaping cessation

Amanda L. Graham<sup>a,b,c,\*</sup>, Sarah Cha<sup>a</sup>, George D. Papandonatos<sup>d</sup>, Michael S. Amato<sup>a,b</sup>,  
Megan A. Jacobs<sup>a</sup>, Lorien C. Abroms<sup>e,f</sup>, Carla J. Berg<sup>e,f</sup>

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- Text message 가 abstinence rate 에 미치는 영향
- Exclusive e-cigarette users (1036, 56.6%) and dual users (793, 43.3%)

Graham, A.L.; Cha, S.; Papandonatos, G.D.; Amato, M.S.; Jacobs, M.A.; Abroms, L.C.; Berg, C.J. E-cigarette and combusted tobacco abstinence among young adults: Secondary analyses from a U.S.-based randomized controlled trial of vaping cessation. *Prev Med* 2022, 165, 107119.

# Tobacco use status at 7 months

Tobacco use status at 7 months by treatment assignment and baseline tobacco use among  $n = 1829$  young adults enrolled in a randomized trial of vaping cessation.

	Dual Abstinent	Exclusive E-cigarette users	Exclusive CTP Users	Dual Users
Full analytic sample	405 (22.1)	819 (44.8)	115 (6.3)	490 (26.8)
By treatment arm				
This is quitting ( $n = 904$ )	234 (25.9)	372 (41.1)	63 (7.0)	235 (26.0)
Control ( $n = 925$ )	171 (18.5)	447 (48.3)	52 (5.6)	255 (27.6)
By baseline tobacco use				
Exclusive E-cigarette users ( $n = 1036$ )	268 (25.9)	565 (54.5)	41 (4.0)	162 (15.6)
Dual users ( $n = 793$ )	137 (17.3)	254 (32.0)	74 (9.3)	328 (41.4)
Among exclusive E-cigarette users				
This is quitting ( $n = 511$ )	149 (29.2)	260 (50.9)	28 (5.5)	74 (14.5)
Control ( $n = 525$ )	119 (22.7)	305 (58.1)	13 (2.5)	88 (16.8)
Among dual users				
This is quitting ( $n = 393$ )	85 (21.6)	112 (28.5)	35 (8.9)	161 (41.0)
Control ( $n = 400$ )	52 (13.0)	142 (35.5)	39 (9.8)	167 (41.8)

Association of vaping cessation and CTP use at 7 months post-randomization among young adults enrolled in a vaping cessation trial.

Baseline exclusive E-cigarette users (n = 1036)

Past 30-day E-cig use at 7 months	Past 30-day CTP use at 7 months		
	No	Yes	% using CTPs (95% CI)
No	268	41	13.3 (9.9, 17.5) • 9%
Yes	565	162	22.3 (19.4, 25.5)

Baseline dual users (n = 793)

Past 30-day E-cig use at 7 months	Past 30-day CTP use at 7 months		
	No	Yes	% using CTPs (95% CI)
No	137	74	35.1 (28.9, 41.8) • 21.3%
Yes	254	328	56.4 (52.3, 60.3)



# HHS Public Access

Author manuscript

*Lancet Public Health*. Author manuscript; available in PMC 2021 July 15.

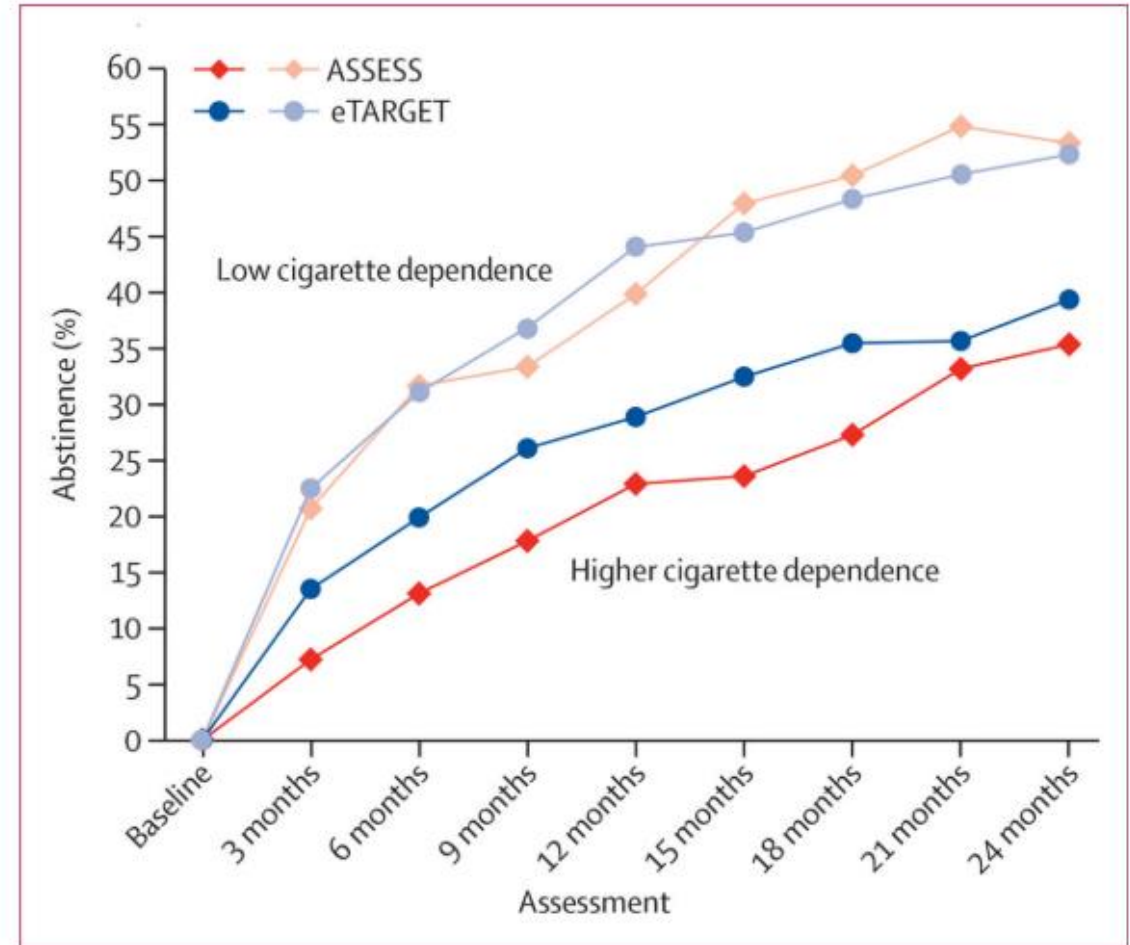
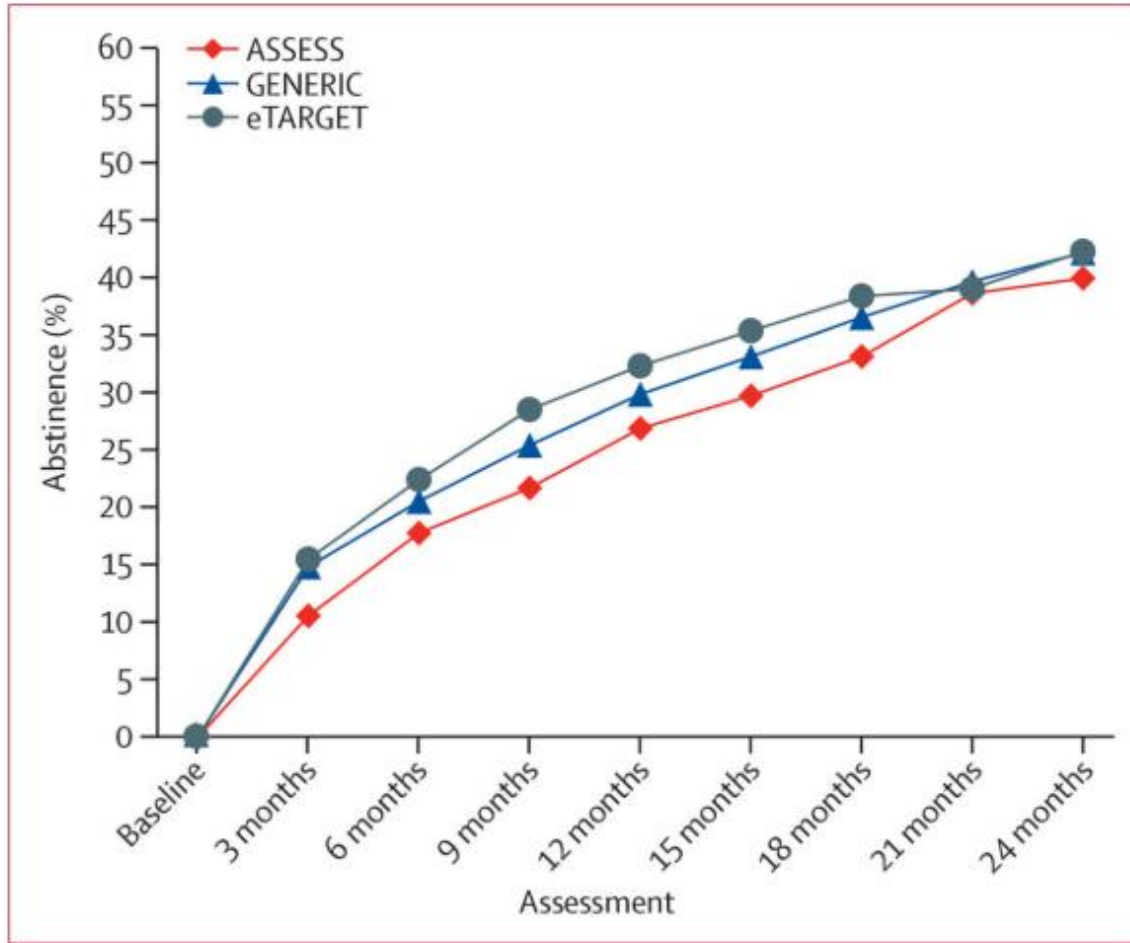
Published in final edited form as:

*Lancet Public Health*. 2021 July ; 6(7): e500–e509. doi:10.1016/S2468-2667(20)30307-8.

## Targeted smoking cessation for dual users of combustible and electronic cigarettes: a randomised controlled trial

- July 12 2016 – June 30, 2017
- 2896 dual users
  - Assess (control), generic intervention (self-help intervention), targeted self-help (dual users) behavioral therapy + NRT

# Abstinence rate by study group



# 7-day abstinence rates for smoking and vaping




7-day abstinence rates for smoking and vaping at 9, 18, and 24 months

	9 months			18 months			24 months		
	Smoking abstinent—all	Smoking abstinent— HCD	Vaping abstinent—all	Smoking abstinent—all	Smoking abstinent— HCD	Vaping abstinent—all	Smoking abstinent—all	Smoking abstinent— HCD	Vaping abstinent—all
ASSESS	21.7%	17.8%	22.9%	33.2%	27.3%	28.0%	40.0%	35.4%	32.4%
eTARGET	28.5%	26.1%	20.9%	38.4%	35.5%	30.9%	42.3%	39.4%	35.9%
GENERIC	25.4%	22.3%	21.8%	36.6%	34.0%	29.2%	42.2%	39.5%	34.0%
eTARGET vs ASSESS	1.44 (1.11– 1.86)*	1.64 (1.20– 2.23)*	0.89 (0.66–1.21)	1.26 (0.98–1.61)	1.47 (1.08– 1.98)*	1.15 (0.84–1.59)	1.10 (0.86–1.41)	1.18 (0.88–1.58)	1.17 (0.88–1.54)
eTARGET vs GENERIC	1.17 (0.96–1.43)	1.23 (0.97–1.55)	1.06 (0.74–1.21)	1.08 (0.88–1.32)	1.07 (0.84–1.35)	1.08 (0.85–1.38)	1.01 (0.81–1.24)	1.01 (0.79–1.25)	1.09 (0.88–1.35)
GENERIC vs ASSESS	1.23 (0.95–1.59)	1.33 (0.97–1.83)	0.94 (0.71–1.25)	1.16 (0.92–1.47)	1.38 (1.04–1.82)	1.07 (0.78–1.45)	1.10 (0.87–1.39)	1.19 (0.91–1.56)	1.07 (0.82–1.41)

# E-cigarette or conventional cigarette users

Review

## Does Aerobic Exercise Facilitate Vaping and Smoking Cessation: A Systematic Review of Randomized Controlled Trials with Meta-Analysis

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<sup>4</sup> Manchester Metropolitan University, Department of Sport and Exercise Sciences, Research Centre of Musculoskeletal Sciences and Sport Medicine, Manchester M15 6BH, UK

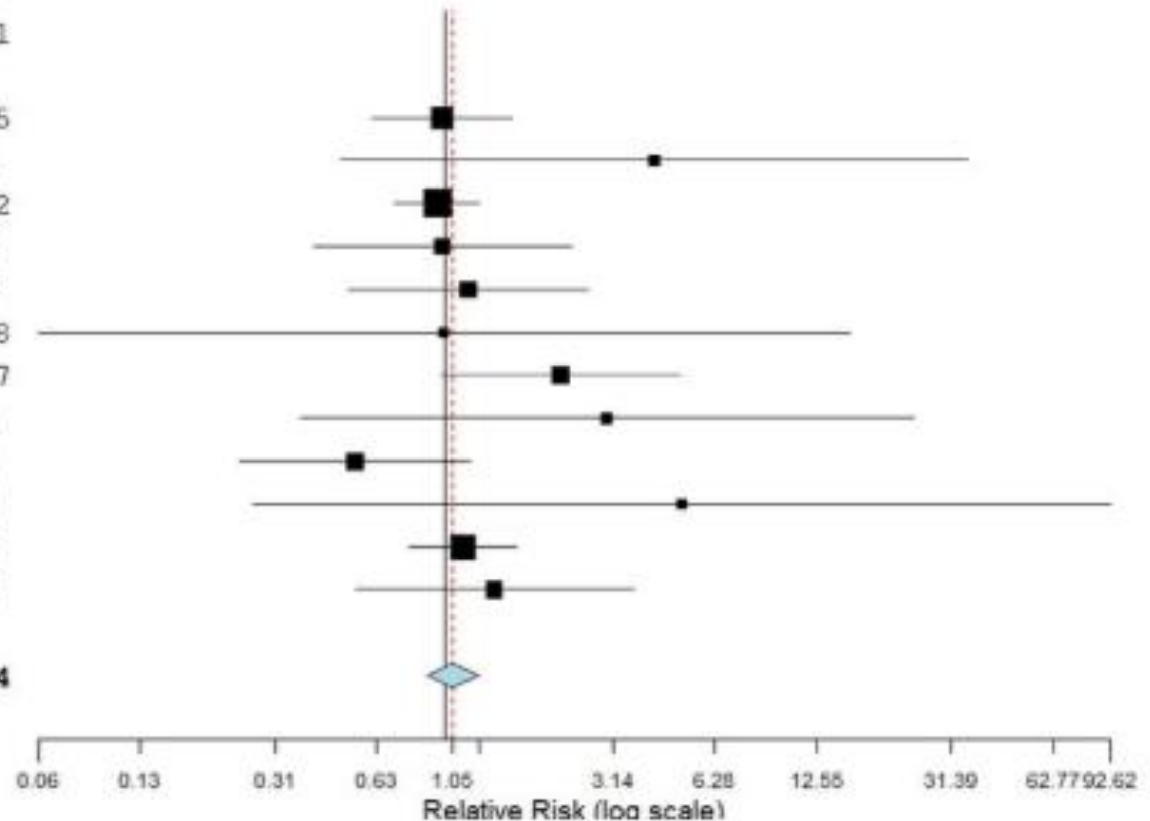
<sup>5</sup> Keele University, School of Allied Health Professions, Keele ST5 5BG, UK

<sup>6</sup> Lithuanian Sports University, Institute of Sport Science and Innovations, 44221 Kaunas, Lithuania

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# E-cigarette or conventional cigarette users

Studies	Estimate (95% C.I.)	Ev/Trt	Ev/Ctrl
Prapavessis. 2016	0.976 (0.606, 1.573)	30/214	28/195
Abrantes 2014	4.133 (0.490, 34.887)	4/30	1/31
Bize 2010	0.948 (0.710, 1.265)	62/229	72/252
Kinnunen 2008	0.978 (0.407, 2.352)	9/92	9/90
Prapavessis 2007	1.169 (0.515, 2.653)	12/68	8/53
Marcus 2005	0.991 (0.063, 15.639)	1/109	1/108
Marcus. 1999	2.194 (0.970, 4.960)	16/134	8/147
Marcus. 1995	3.000 (0.372, 24.171)	3/10	1/10
Hill et al 1993	0.540 (0.246, 1.185)	7/38	15/44
Marcus 1991	5.000 (0.270, 92.622)	2/10	0/10
Taylor 1988	1.122 (0.779, 1.617)	29/42	16/26
Hill 1985	1.400 (0.545, 3.597)	7/18	5/18
<b>Overall (I<sup>2</sup>=0 % , P=0.469)</b>	<b>1.053 (0.881, 1.258)</b>	<b>182/994</b>	<b>164/984</b>



# E-cigarette only users

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JAMA Internal Medicine | [Original Investigation](#)

## Effectiveness of a Vaping Cessation Text Message Program Among Young Adult e-Cigarette Users A Randomized Clinical Trial

Amanda L. Graham, PhD; Michael S. Amato, PhD; Sarah Cha, MSPH; Megan A. Jacobs, MPH; Mia M. Bottcher;  
George D. Papandonatos, PhD

- Dec 2019-Nov 2020
- 18-24 years old
- 2588 (1284 for control, 1304 for active intervention)
- Primary outcome : self-reported 30-day point prevalence abstinence at **7 months**

# Control

---

- Text message
  - 14 days post random
  - “checking in : have you cut down how much you vape nicotine in the past 2weeks?”
    - A: still use the same amount
    - B: I use less
    - C: I don’t use at all anymore
  - Monthly query
  - “How’s the quit going? When was the last time you vaped nicotine?”
    - A: in the past 7 days
    - B: 8-30 days ago
    - C: more than 30 days ago
- Compensated \$5 via digital gift card per response (maximum \$35)

# Active intervention : TIQ (This is quitting)

---

- 맞춤형 대화형 문자 메시지 프로그램
  - “Ashley 가 말했어, 너 할 수 있어, 우리는 함께 하는 거야. 금연에 대해 생각하는 것은 너뿐이 아니야“
  - 금연전략
    - “스트레스는 다른 방식으로 풀 수 있어“
    - “명상을 해보거나, 문제를 적어보고 해결책을 찾아봐“
    - “전자담배를 하기 전에도 어려운 일들을 해왔어, 금연 후에도 여전히 할 수 있어“
  - 행동능력 향상
    - “친구들이 금연에 도움이 돼?“
    - 만약 아니라면 거울 앞에서 큰 소리로 말해봐, 친구들이 JUUL을 주면 어떻게 대응할지”
- Active message : 8주간
- 니코틴 대체요법 설명, 키워드 입력 시 즉각적인 지원

# Vaping cessation outcomes

Table 2. Vaping Cessation Outcomes Under Intention-to-Treat and Complete-Case Analyses at 7 Months

Outcome variable	% (95% CI)		Rate difference (95% CI)	Rate ratio (95% CI)	Odds ratio (95% CI)	P value
	Control arm (n = 1284)	Intervention arm (n = 1304)				
7-d ppa						
No. of responses	994	973	NA	NA	NA	NA
No. abstinent	385	440	NA	NA	NA	NA
Intention to treat	30.0 (27.5-32.6)	33.7 (31.2-36.4)	3.8 (0.2-7.3)	1.13 (1.01-1.26)	1.19 (1.01-1.40)	.04
IPRW outcomes	40.0 (37.0-43.3)	45.8 (42.7-49.1)	5.8 (1.3-10.3)	1.14 (1.03-1.27)	1.27 (1.05-1.52)	.01
30-d ppa						
No. of responses	994	973	NA	NA	NA	NA
No. abstinent	239	314	NA	NA	NA	NA
Intention to treat	18.6 (16.7-20.8)	24.1 (21.8-26.5)	5.5 (2.3-8.6)	1.29 (1.11-1.50)	1.39 (1.15-1.68)	<.001
IPRW outcomes	24.0 (21.3-26.7)	32.3 (29.3-35.3)	8.2 (4.3-12.2)	1.35 (1.16-1.56)	1.51 (1.24-1.85)	<.001

Abbreviations: IPRW, inverse probability of retention weighting; NA, not applicable; ppa, point prevalence abstinence.

# This is quitting intervention satisfaction at 1-Mo F/U

Table 3. This is Quitting Intervention Satisfaction at 1-Mo Follow-up<sup>a</sup>

Survey item	Score, mean (SD) <sup>b</sup>		P value	SMD
	Control arm	Intervention arm		
They suggested quitting strategies that were new to me	2.63 (0.94)	2.03 (0.85)	<.001	0.668
They made me feel that I knew the right steps to take to quit	2.23 (0.94)	1.93 (0.78)	<.001	0.347
They made me feel less alone in quitting	2.08 (0.92)	1.78 (0.78)	<.001	0.344
They helped me feel more confident about quitting	1.99 (0.86)	1.81 (0.75)	<.001	0.224
They helped me stay on track with quitting	2.20 (0.80)	2.05 (0.71)	<.001	0.197
They were written personally for me	2.73 (0.88)	2.59 (0.86)	<.001	0.162
I liked being able to interact with the text messages	1.85 (0.80)	1.72 (0.75)	<.001	0.161

<sup>a</sup>Lower scores indicate more positive response.

# Active intervention : TIQ (This is quitting)



Home → This is Quitting

## THIS IS QUITTING

The first-of-its-kind program to help young people quit vaping, This is Quitting helps young adults on their journey to quit vaping. Learn more about how it works and for parents of young vapers and for adults who want to quit.

Teens and young adults can join for free by texting **DITCHVAPE** to **88709**



HOME / ABOUT TRUTH / COLLABORATION

## JOIN THIS IS QUITTING

Quitting vaping isn't easy. But you're not in it alone.



## What is This is Quitting?

### READY TO QUIT? JOIN THIS IS QUITTING TODAY

Mobile Phone \*

123.456.7890

Join

Graham, A.L.; Amato, M.S.; Cha, S.; Jacobs, M.A.; Bottcher, M.M.; Papandonatos, G.D. Effectiveness of a Vaping Cessation Text Message Program Among Young Adult e-Cigarette Users: A Randomized Clinical Trial. *JAMA Intern Med* 2021, 181, 923-930.

# E-cigarette only users



## HHS Public Access

Author manuscript

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## A pilot feasibility study of a behavioral intervention for nicotine vaping cessation among young adults delivered via telehealth

Amanda M. Palmer, PhD<sup>1,2</sup>, Rachel L. Tomko, PhD<sup>3</sup>, Lindsay M. Squeglia, PhD<sup>3</sup>, Kevin M. Gray, MD<sup>3</sup>, Matthew J. Carpenter, PhD<sup>1,3,4</sup>, Tracy T. Smith, PhD<sup>3,4</sup>, Jennifer Dahne, PhD<sup>3,4</sup>, Benjamin A. Toll, PhD<sup>1,3,4</sup>, Erin A. McClure, PhD<sup>3,4</sup>

<sup>1</sup>Department of Public Health Sciences, Medical University of South Carolina, Charleston SC USA

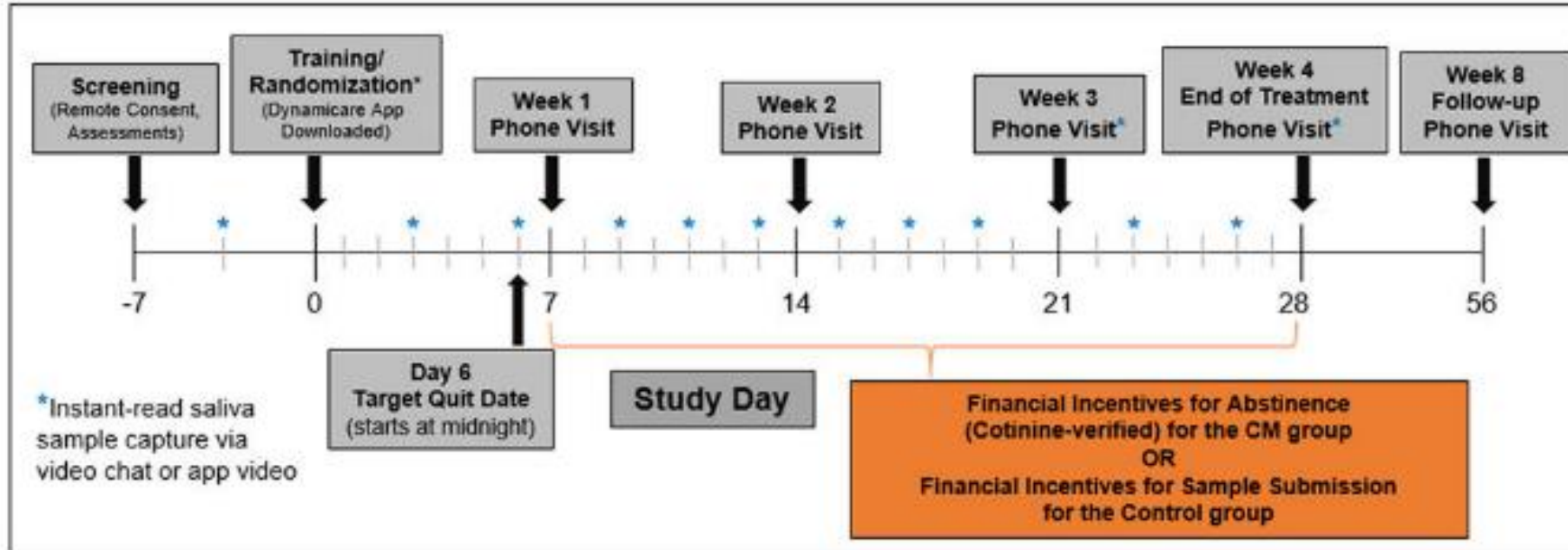
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<sup>3</sup>Department of Psychiatry and Behavioral Sciences, Medical University of South Carolina, Charleston, SC, USA

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Palmer, A.M.; Tomko, R.L.; Squeglia, L.M.; Gray, K.M.; Carpenter, M.J.; Smith, T.T.; Dahne, J.; Toll, B.A.; McClure, E.A. A pilot feasibility study of a behavioral intervention for nicotine vaping cessation among young adults delivered via telehealth. *Drug Alcohol Depend* **2022**, **232**, 109311.

# Study design



- Day 0, 3, 6 (각각 \$5, 총 \$15)
- Day 7-28 (3-4회/wk, 총 10회, 최대 \$200)
- CM : 금연 성공시
- Control group : 금연 여부와 관계 없이

# Outcomes by treatment condition

	CM (n=22)	Monitoring (n=5)	<i>P</i>	<i>d</i> or $\phi$
# Abstinent samples – Mean (SD) ( <i>out of 10 possible</i> )	5.5 (4.4)	0.8 (1.3)	<.001	-1.15
Abstinent sample submitted at EOT ( <i>Day 28</i> )	13/22 (59.1%)	2/5 (40%)	.438	.15
Endorsed quit attempt <sup>f</sup> – N (%)				
<i>Day 7</i>	20/22 (90.9)	3/5 (60)	.08	.34
<i>Day 14</i>	17/22 (78.3)	3/5 (60)	.43	.15
<i>Day 28 (EOT)</i>	14/22 (63.6)	3/5 (60)	.87	.03
<i>Day 56 (Follow-up)</i>	9/22 (40.9)	3/5 (60)	.44	-.15
Quit vaping at follow-up – N (%)	6/22 (27.3)	1/5 (20)	.74	-.06
Reduced vaping at follow-up – N (%)	10/22 (45.4)	4/5 (80)	.16	-.27
App Usability – Treatment Completers	n=20	n=5		
SUS <sup>2</sup> score at EOT ( <i>Day 28</i> )	86.8 (11.2)	69.0 (22.3)	.15	-.128

# Summary

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- 전자담배의 종류
  - E-cigarette / HTP
- 전자담배의 건강 영향
  - Nicotine / carbonyl compounds / PAH
  - Airway obstruction / fibrosis
  - Seizure / stroke / cardiovascular
- **Strategies for vaping cessation**
  - Varenicline
  - NRT
  - Behavioral intervention
    - Text message
    - Economic compensation
  - Dual user / e-cigarette / HTP

경청해 주셔서 고맙습니다.