

E-cigarette, or vaping, product use-associated lung injury (EVALI) and effects on health status

경희의료원

호흡기내과

최혜숙

강의 순서

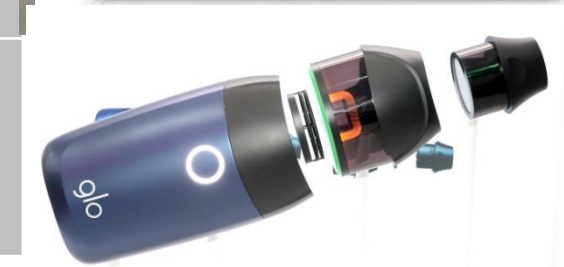
- E-cigarette, or vaping, product
- E-cigarette, or vaping, product use-associated lung injury (EVALI)
- Current status of E-cigarette, or vaping, product use in Korea
- E-cigarette, or vaping, product use-associated effects on health status

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담배의 종류

| | 흡입방식 | 가열온도 |
|-------------|--|------------|
| 연초담배 | 직접연소를 통해 배출물 흡입 Burn | 650~850 °C |
| 궤련형 전자담배 | 전자기기를 통해 전용스틱을 고열로 가열하여 배출물 흡입 Heat-not-burn | 250~350 °C |
| 액상형 전자담배 | 니코틴이 함유되거나 혹은 특정한 향을 갖춘 액체를 가열 하여 배출물 흡입 | 250~350 °C |
| 연초 고형물 전자담배 | 기화된 액상을 연초 고형물에 통과시켜 흡입하는 방식의 전자담배 | 30~160 |



E-CIGARETTE, OR VAPING, PRODUCTS VISUAL DICTIONARY



QUESTION 1: Is the e-liquid contained in a disposable e-cigarette, cartridge, tank, or pod?

Disposable e-cigarette (no cartridge, tank or pod)

→ **1st GENERATION** (Cigalike)





Cartridge (Prefilled or refillable)

QUESTION 2: Is the cartridge also called a pod cartridge or contains nicotine salts?

NO → **2nd GENERATION** (Battery Pen)

YES → **3rd GENERATION** (Modifiable—allows variable voltage/watts)



Tank/ Sub-Ohm (Refillable)

→ **3rd GENERATION** (Modifiable—allows variable voltage/watts)





Pod (Prefilled or refillable)

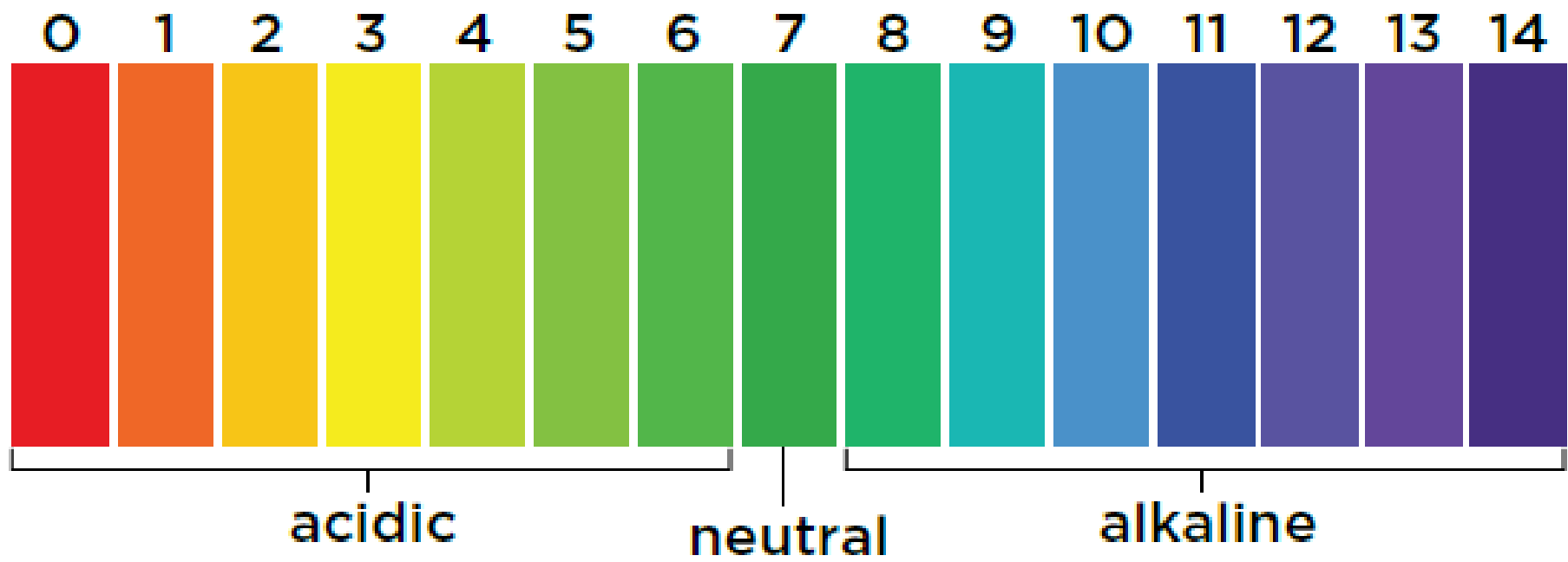
→ **4th GENERATION** (Pod Mod)



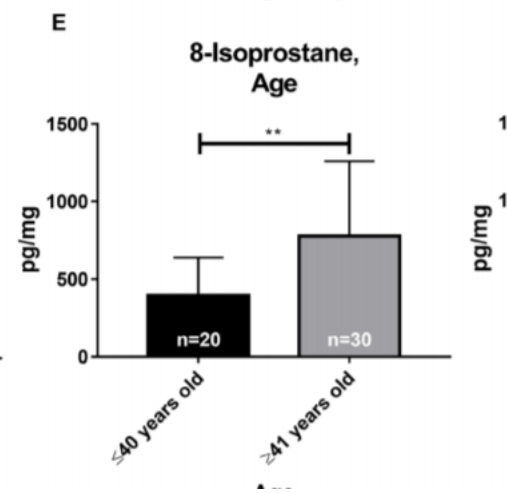
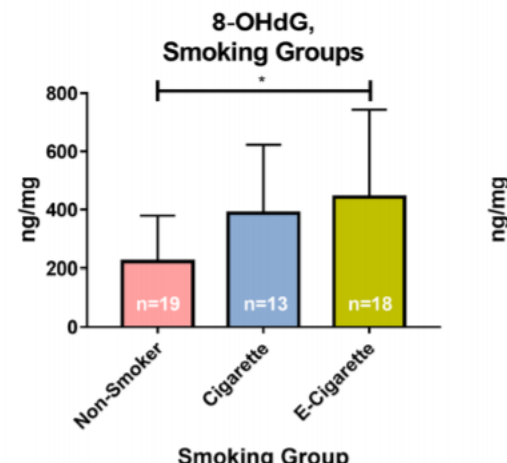
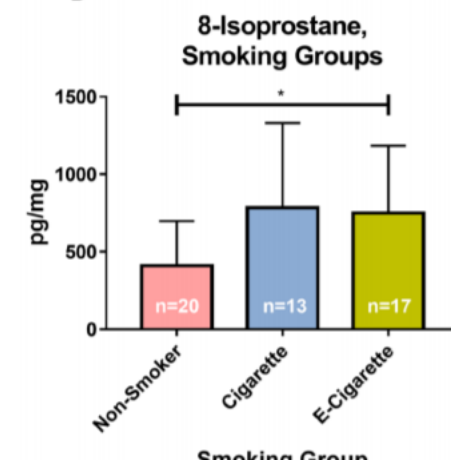
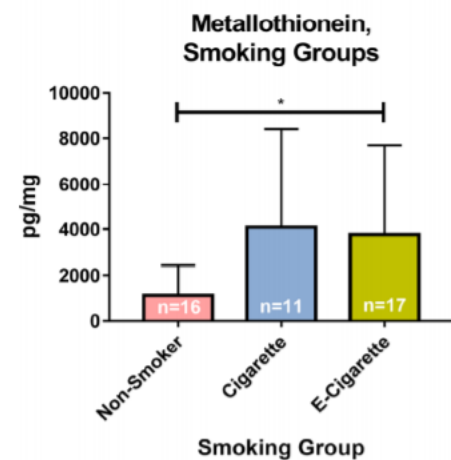
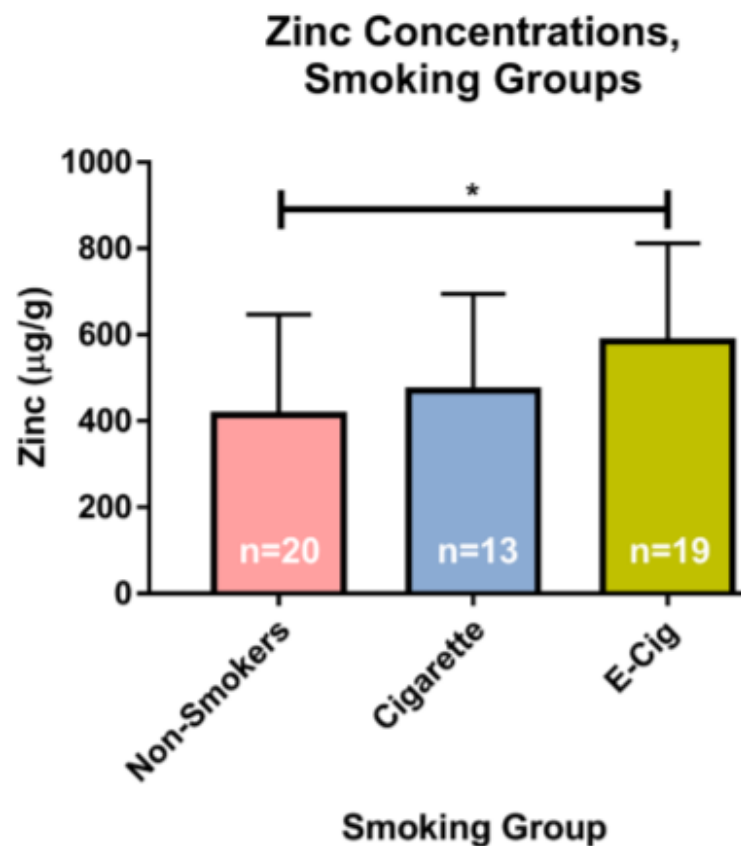
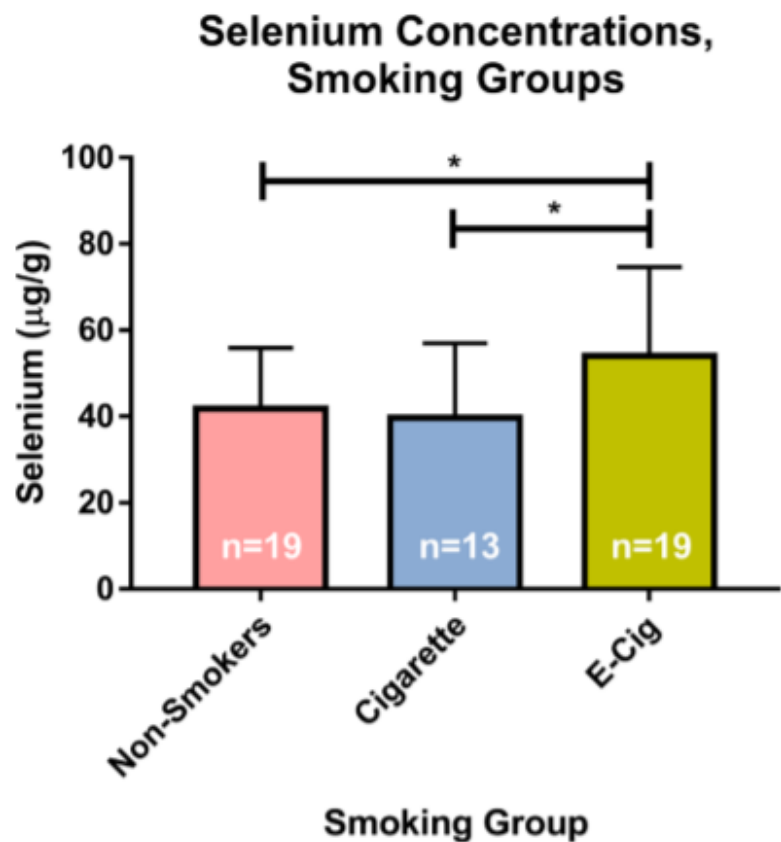
Marijuana herb, oil, dab wax

→ **Vaporizer, Dab rig, Dab pen**





Correlation between biomarkers of exposure, effect and potential harm in the urine of electronic cigarette users



Urinary selenium ($\mu\text{g/g}$ of creatinine) and zinc ($\mu\text{g/g}$ of creatinine) concentrations are significantly in-

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수시 3호, 2019. 9. 20.

“미국 내 전자담배(액상형) 관련 중증 폐질환 발생에 대한 정부 대책 안내”

□ 미국 발생 현황 및 관리

○ 미국 질병통제센터(CDC)는 2019년 9월 24일 기준으로 미국 전역에서 액상형

EC use associate ALI

Hypersensitivity Pneumonitis and Acute Respiratory Distress Syndrome From E-Cigarette Use

Casey G. Sommerfeld, MD, Daniel J. Weiner, MD, Andrew Nowalk, MD, PhD, Allyson Larkin, MD

18-year-old woman → live

Pediatrics 2018; 141(6): e20163927

Organizing pneumonia related to electronic cigarette use: A case report and review of literature

40-year-old female → live

Clin Respir J 2018; 12:1295



A

Case report

Acute eosinophilic pneumonia following electronic cigarette use

18-year-old female → live

Respir Med Case Rep 2019; 27: 100825.

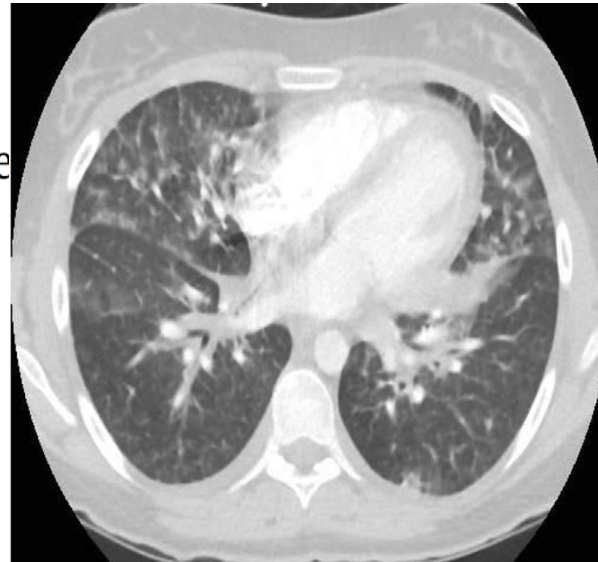


TABLE 1 Case reports of pulmonary toxicity caused by e cigarettes

| Age/sex | Preexisting medical conditions | Smoking history | Duration of e cigarette use before diagnosis | Presentation/sign and symptoms | Diagnosis | Treatment/outcome |
|--------------------|--|-----------------------|--|---------------------------------------|---|---|
| 42/F ¹¹ | Asthma, Rheumatoid arthritis, Fibromyalgia, Schizoaffective disorder, Hypertension | Not specified | 7 months | Dyspnoea, cough, fever | Exogenous lipoid pneumonia | Recovery with abstinence from e cigarette |
| 20/M ¹⁴ | None | Not specified | 3 days | Dyspnoea and cough | Acute eosinophilic pneumonia | Recovery with abstinence from e cigarette and systemic steroids |
| 43/M ¹³ | Lung adenocarcinoma with isolated brain metastasis | Smoker, 45 pack year | 4 weeks | Dyspnoea and cough | Subacute bronchial toxicity | Recovery with abstinence from e cigarette |
| 31/F ¹² | Not specified | Smoker, unspecified | 3 months | Dyspnoea and cough | Exogenous lipoid pneumonia | Recovery with abstinence from e cigarette and systemic steroids |
| 43/M ¹⁵ | Hypertension | Smoker, unspecified | 3 days | Dyspnoea and pleuritic chest pain | Pneumonia and bilateral pleural effusions | Recovery with abstinence from e cigarette |
| 60/M ¹⁶ | Not specified | Smoker, unspecified | Not specified | Weakness and cough | Suspected acute hypersensitivity pneumonitis | Recovery with abstinence from e cigarette |
| 33/M ¹⁷ | Mixed Germ cell tumour with multiple pulmonary metastasis | Smoker, 10 pack years | 3 months | Dyspnoea | Respiratory bronchiolitis interstitial lung disease | Recovery with abstinence from e cigarette |
| 27/M ¹⁸ | None | Smoker, unspecified | 7 months | Dyspnoea, cough, fever and hemoptysis | Bronchiolitis obliterans organizing pneumonia | Recovery with abstinence from e cigarette and systemic steroids |
| 70/M ¹⁹ | Lung cancer with left upper lobectomy and COPD | Not specified | 4 weeks | Dyspnoea and cough | Diffuse alveolar damage | Death |

Morbidity and Mortality Weekly Report (*MMWR*)

CDC



Outbreak of Electronic-Cigarette–Associated Acute Lipoid Pneumonia — North Carolina, July–August 2019

Weekly / September 13, 2019 / 68(36);784–786

On September 6, 2019, this report was posted online as an MMWR Early Release.

Kevin Davidson, MD¹; Alison Brancato, MS¹; Peter Heetderks, MD¹; Wissam Mansour, MD¹; Edward Matheis, MD¹; Myra Nario, MS¹; Shrinivas Rajagopalan, MD, PhD²; Bailey Underhill, MS¹; Jeremy Winger, MS¹; Daniel Fox, MD¹ ([View author affiliations](#))

[View suggested citation](#)

Electronic cigarettes (e-cigarettes) produce an aerosol by heating a liquid that usually contains nicotine, flavorings, and other chemicals that users inhale, a behavior commonly referred to as “vaping.” E-cigarettes can also be used to deliver marijuana and other drugs. In recent months, more than 200 possible cases of acute lung injury potentially associated with vaping were reported from 25 states (1). During July and August 2019, five patients were identified at two hospitals in North Carolina with

Article Metrics

Altmetric:



https://www.cdc.gov/mmwr/volumes/68/wr/mm6836e1.htm?s_cid=mm6836e1_w#suggestedcitation

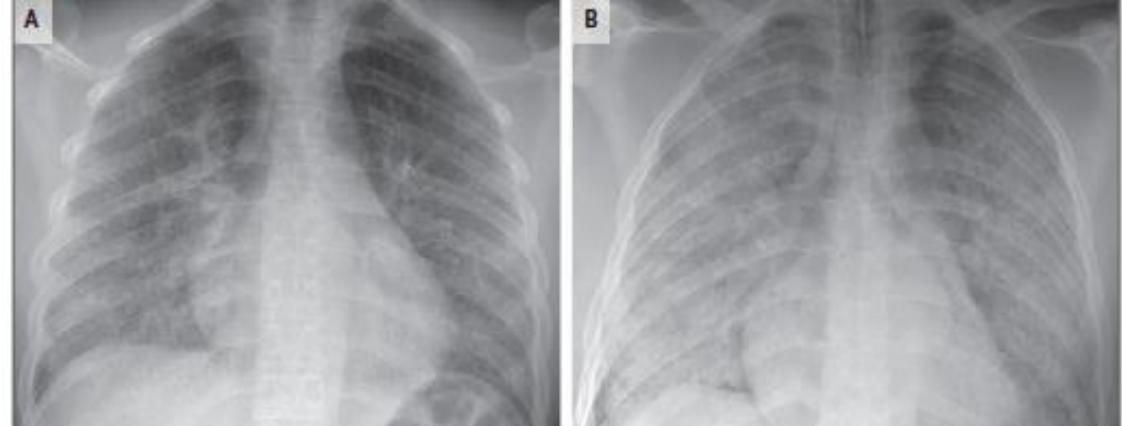


Table 2. Demographic Characteristics, Symptoms, Evaluation, and Clinical Course of 53 Case Patients.^a

| Characteristic | Values |
|---|------------|
| Median age (range) — yr | 19 (16–53) |
| Male sex — no./total no. (%) | 44/53 (83) |
| Race or ethnic group — no./total no. (%)† | |
| White | 37/45 (82) |

| | |
|---|------------|
| <u>Receipt of noninvasive positive-pressure ventilation</u> — no./total no. (%) | 19/53 (36) |
| <u>Intubation and mechanical ventilation</u> — no./total no. (%) | 17/53 (32) |
| <u>Admission to intensive care unit</u> — no./total no. (%) | 31/53 (58) |
| <u>Death</u> — no./total no. (%) | 1/53 (2) |

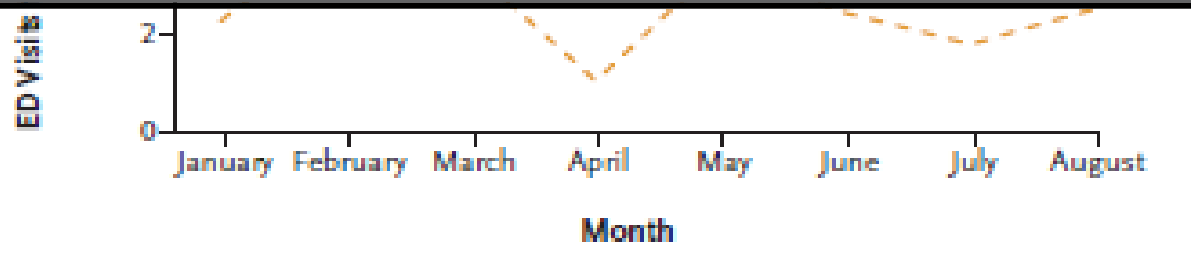
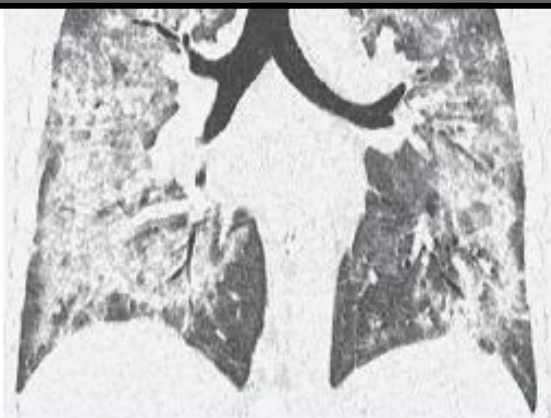
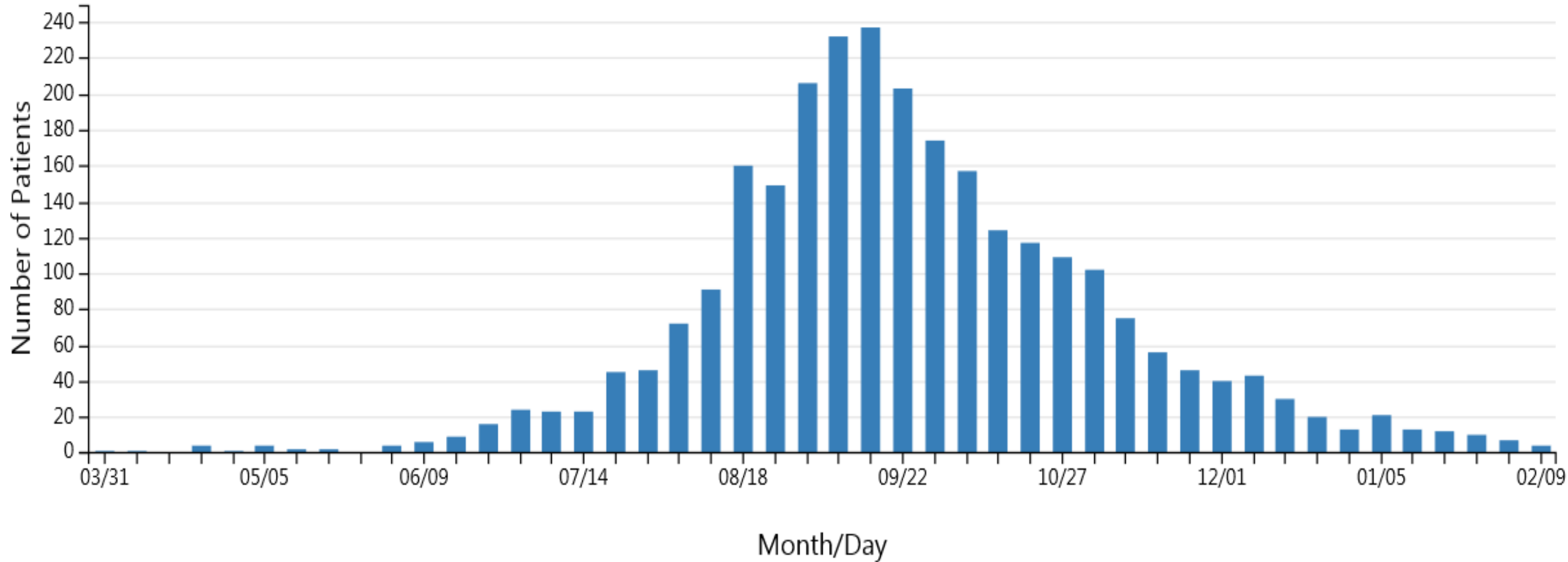


Figure 3. Emergency Department (ED) Visits for Severe Unexplained Respiratory Illness among Patients 14 to 30 Years of Age, According to Sex, in Illinois Counties in 2018 and 2019.

Dates of symptom onset and hospital admission for patients with lung injury associated with e-cigarette use, or vaping — United States, March 31, 2019–February 15, 2020



Numbers do not sum to 2,807 due to missing admission dates.

Latest information for a total of 2,807 hospitalized EVALI

- Age 15-75 years (49.5)
- Male 66%
- Death 68 patients (2.4%)
- 82% THC containing products
- 57% nicotine-containing products (exclusive 14%)

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ESTABLISHED IN 1812

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*

Table 3. Frequency of Detection of Priority Toxicants in EVALI Case Patients and in Healthy Comparators.* BALF

| Toxicant | EVALI Case Patients (N = 51) | Nonusers (N = 52) | Healthy Comparators | | |
|--------------------------------------|---------------------------------|----------------------|-------------------------------|-------------------------------|-----------------------------|
| | | | E-Cigarette Users (N = 18) | Cigarette Smokers (N = 29) | All Comparators (N = 99) |
| <i>number/total number (percent)</i> | | | | | |
| Vitamin E acetate | 48/51 (94) | 0/52 | 0/18 | 0/29 | 0/99 |
| Medium-chain tri-glyceride oil | 0/49 | 0/34 | 0/11 | 0/18 | 0/63 |
| Coconut oil | 1/48 (2) | 0/34 | 0/11 | 0/18 | 0/63 |
| Plant oil | 0/49 | 0/34 | 0/11 | 0/17 | 0/62 |
| Squalane | 0/38 | 0/52 | 0/17 | 0/29 | 0/98 |
| Squalene | 0/38 | 0/52 | 0/17 | 0/29 | 0/98 |
| α -Pinene | 0/39 | 0/52 | 0/17 | 0/28 | 0/97 |
| β -Pinene | 0/39 | 0/52 | 0/17 | 0/28 | 0/97 |
| 3-Carene | 0/39 | 0/52 | 0/17 | 0/28 | 0/97 |
| Limonene | 1/39 (3) | 0/52 | 0/17 | 0/28 | 0/97 |
| Petroleum distillates | 0/12 | 0/52 | 0/17 | 0/29 | 0/98 |



보건복지부

보건복지부
질병관리본부

식품의약품안전처

보도참고자료

배포일

2019. 9. 20. / (총 7매)

보건복지부, 액상형 전자담배 **사용 자제 권고**

- 미국 내 액상형 전자담배 사용 관련 폐질환 530건·사망8건 발생 - 보건복지부 2019.09.20



보건복지부
보건복지부
질병관리본부
식품의약품안전처
기획재정부
환경부
여성가족부
관세청

보도자료

10월 23일(수) 브리핑 시작(11:00) 이후

배포일

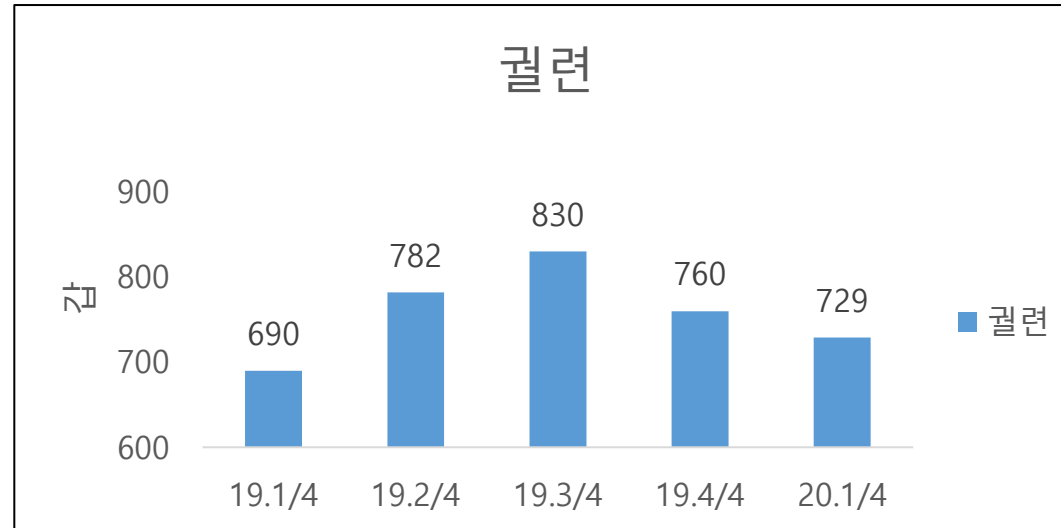
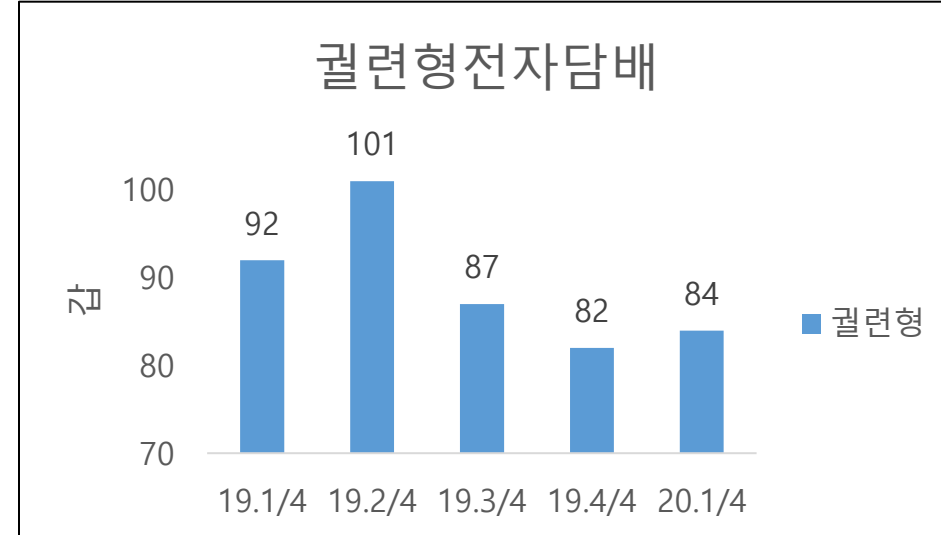
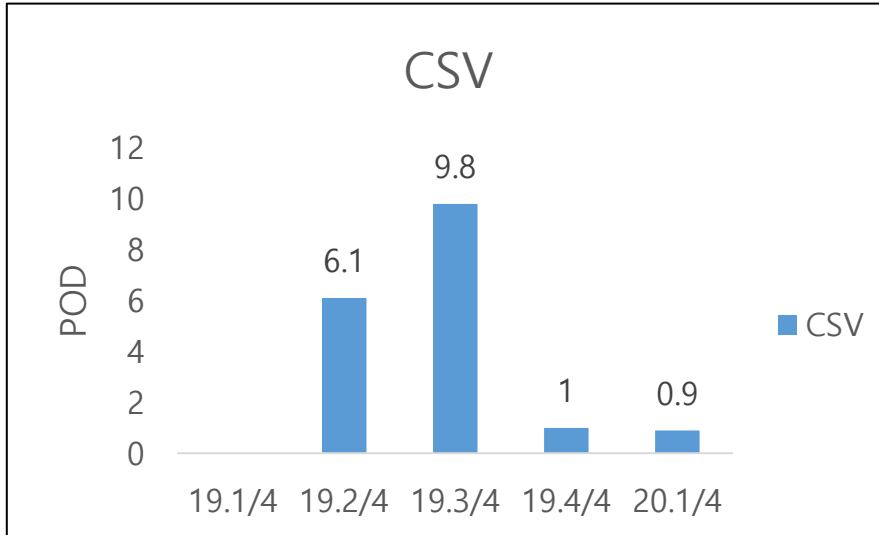
2019. 10. 23. / (총 13매)

액상형 전자담배 **사용중단 강력 권고**

- 국내 폐손상 의심사례 첫 발생, 미국 중증 폐손상 1,479건·사망 33건 발생 -
- 담배 위해정보 제출 및 공개 법률안 조속 처리 촉구 -

KCDC, 2019.10.23

담배판매량 2019~2020

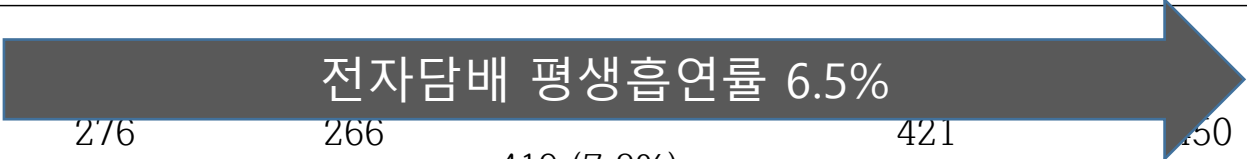


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꺁련담배흡연률과 전자담배흡연률이 연도별 변화 (2013~2017)

| | 2013 | 2014 | 2015 | 2016 | 2017 | 총 | P | P for trend |
|-----------|--|-------------|--------------|--------------|--------------|------------|--------|-------------|
| 꺁련담배흡연률 | | | | | | | <0.001 | 0.408 |
| 현재흡연 | 1073 (20.1%) | 997 (19.2%) | 958 (17.7%) | 1130 (18.8%) | 1094 (17.9%) | 5252 | | |
| 과거흡연 | 1018 (19.1%) | 997 (19.2%) | 1188 (22.0%) | 1245 (20.7%) | 1331 (21.8%) | 5779 | | |
| 흡연시작연령* | - | - | 20.64±6.29 | 20.6±6.19 | 20.5±6.19 | 20.16±5.42 | 0.024 | 0.132 |
| 하루평균흡연량 | 1.20±0.67 | 1.23±0.66 | 1.13±0.65 | 1.11±0.64 | 1.11±0.64 | 1.12±0.65 | 0.045 | 0.007† |
| -현재흡연자에서 | | | | | | | | |
| 하루이상금연여부‡ | 621 (57.9%) | - | - | 661 (58.5%) | 623 (57.0%) | 1905 | 0.773 | 0.814 |
| -현재흡연자에서 | | | | | | | | |
| 전자담배흡연률 |  | | | | | | | |
| 전자담배평생흡연 | 276 (5.2%) | 266 (5.1%) | 419 (7.8%) | 421 (7.0%) | 450 (7.4%) | 1832 | <0.001 | <0.001 |
| 전자담배 현재흡연 | 50 (0.9%) | 75 (1.4%) | 142 (2.6%) | 96 (1.6%) | 102 (1.7%) | 465 | <0.001 | 0.005 |

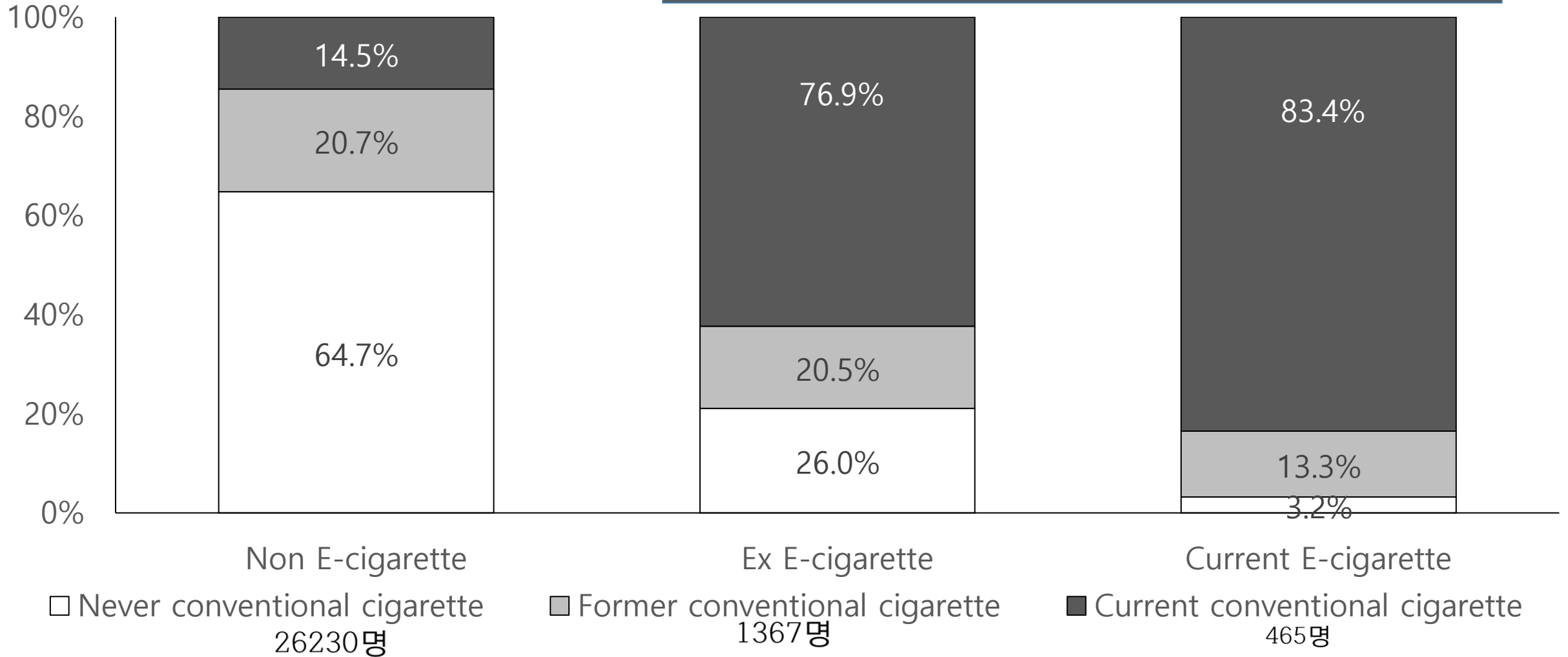
전자담배 선택이유 (KNHANES) 2013-2017

| | 전자담배흡연자 840명 | 현재전자담배흡연자 238명 |
|-----------------------|-----------------|-------------------|
| 금연하는데 도움이 될 것 같아서 | 391 (46.5%) | 108 (45.4%) |
| 담배보다 덜 해로울 것 같아서 | 163 (19.4%) | 47 (19.7%) |
| 담배 냄새가 나지 않아서 | 140 (16.7%) | 36 (15.1%) |
| 향이 좋아서 | 66 (7.9%) | 29 (12.2%) |
| 실내에서도 피울 수 있어서 | 33 (3.9%) | 11 (4.6%) |
| 호기심으로 | 35 (4.2%) | 4 (1.7%) |
| 맛이 더 좋아서 | 5 (0.6%) | 2 (0.8%) |
| 쉽게 구할 수 있어서 | 3 (0.4%) | 0 (0%) |
| 기타 | 4 (0.5%) | 1 (0.4%) |
| 가격이 저렴해서 | 1 | 0 |
| 등산하면서 피울때 라이타가 필요 없어서 | 1 | 0 |
| 일반담배보다 가격이 싸서 | 1 | 1 |
| 전자담배 수입하는 지인이 줘서 피움 | 1 | 0 |
| 주위사람의 권유로 | 1 | 0 |

궐련담배흡연과 전자담배흡연의 관계

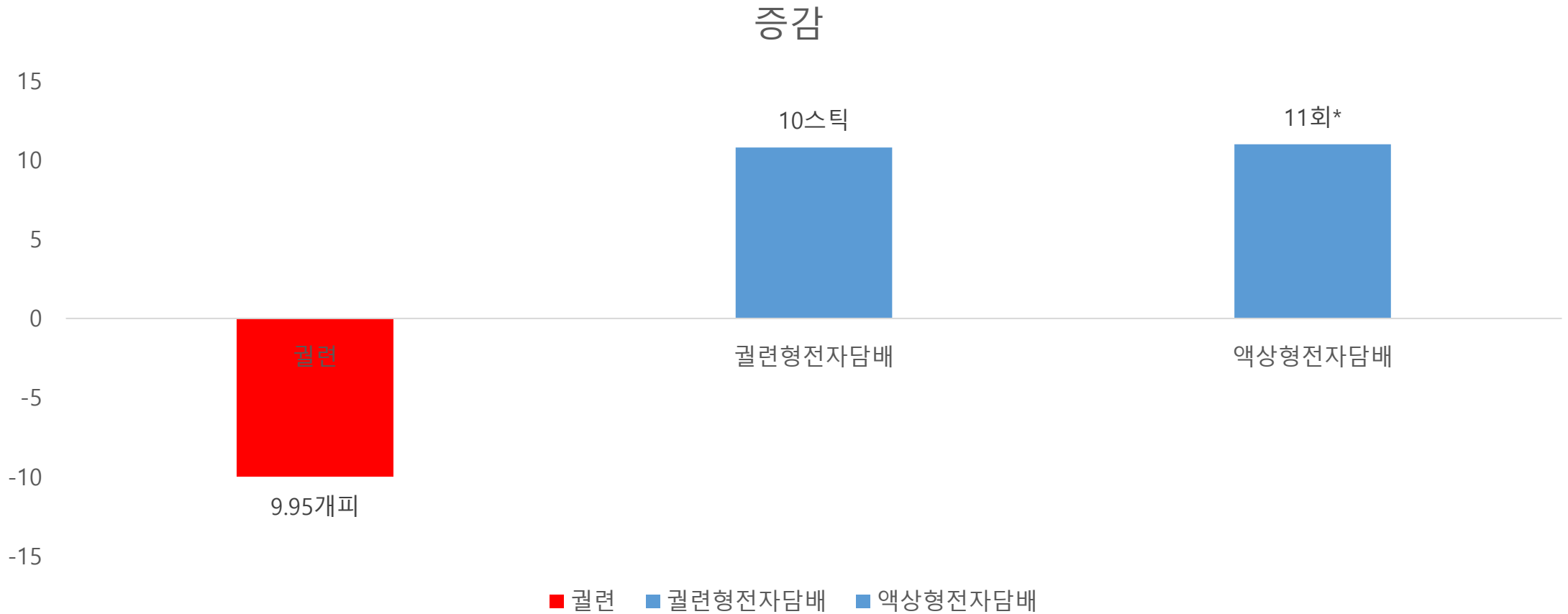
(KNHANES) 2013-2017(28062명)

전자담배평생흡연자 (1,832명)의 97.3%가 궐련담배흡연력



전자담배 사용 후 궤련담배 감소량

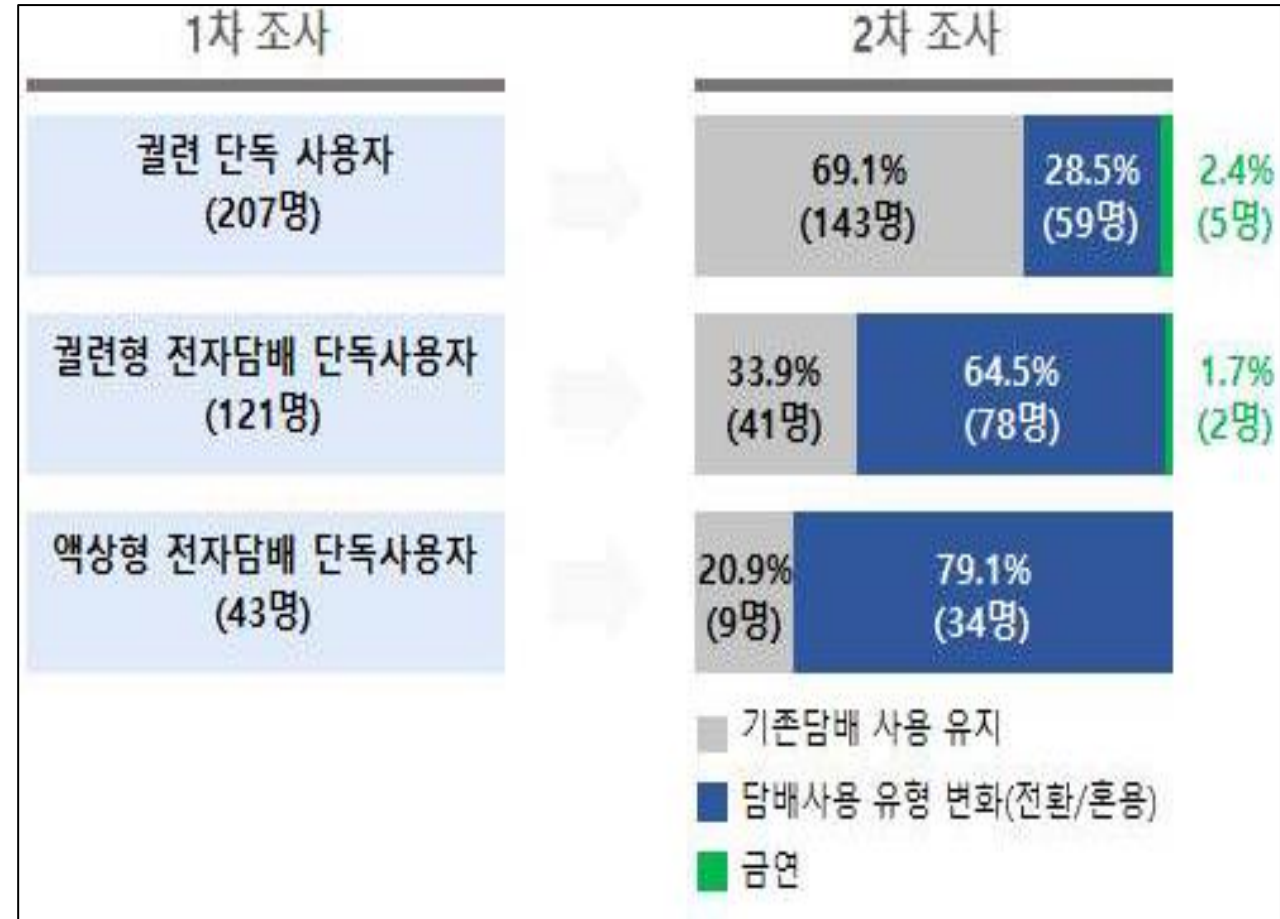
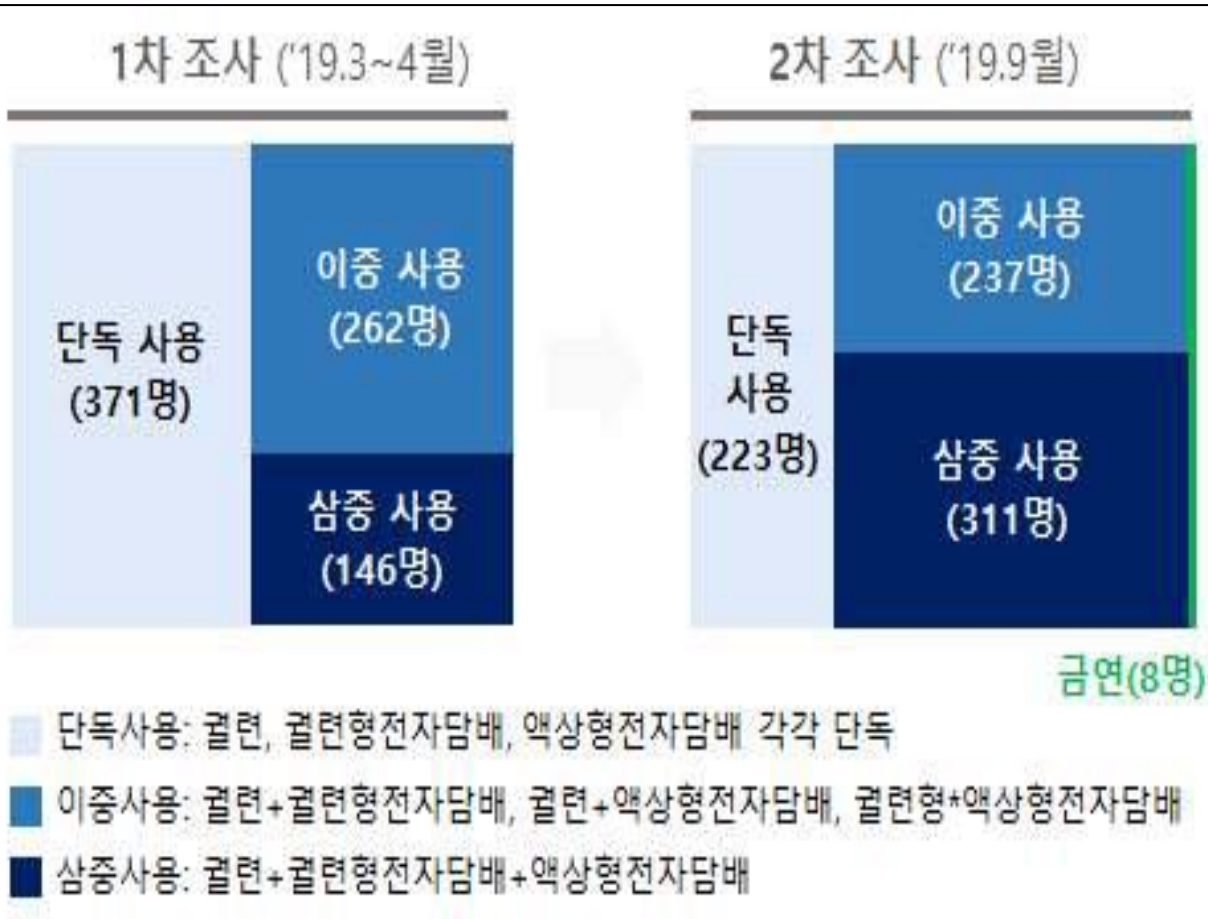
호흡기내과 외래를 방문한 만성기도질환환자, n=51



* 회당 13회 흡연


궤련형 1스틱 = 1개피
액상형 10회 = 1개피

2019년 담배사용 유형별 흡연행태 변화 추적조사 결과



니코틴 의존도, FTND(Fagerstrom Test for Nicotine Dependence)

| | | p |
|----------|---------|----|
| 궤련 | 3.5±2.1 | NS |
| 궤련형 전자담배 | 3.2±1.8 | |
| 액상형 전자담배 | 2.9±1.8 | |

| | | | |
|---|-----------------------|------|-------------|
|  보건복지부 질병관리본부 | 보 도 참 고 자 료 | | |
| 배 포 일 | 2020. 4. 10. / (총 7매) | 담당부서 | 호흡기·알레르기질환과 |

신종전자담배 흡연행태 금연과 건강에 전혀 도움 안돼

담배사용 유형별 소변내 생체지표 수준

| | 비흡연 (n=65) | 궤련 단독사용 (n=436) | 궤련형전자담배 단독사용 (n=79) | 이중사용 (궤련+궤련형전자) (n=106) | 이중사용 (궤련+액상형전자) (n=68) | 삼중사용 (n=46) |
|-------------------------|-----------------|--------------------------|---------------------------|-------------------------------|------------------------------|-----------------------|
| Median값 (4분위수 범위) | | | | | | |
| 니코틴 (ng/mL) | 3.9 (3.9-149.5) | 1121.1 (42.3-4558.7) | 874.5 (51.4-7446.3) | 1203.7 (149.1-4424.7) | 2326.3 (295.5-7865.4) | 1039.9 (240.2-6969.7) |
| 코티닌 (ng/mL) | 0.9 (0.9-0.9) | 729.5 (185.8~1342.6) | 765.5 (305.9~1511.3) | 676.7 (199.0~1246.7) | 886.2 (200.0~1575.8) | 916.7 (346.4~2082.8) |
| OH코티닌 (ng/mL) | 2.6 (2.6-2.6) | 2227.1 (500.3~4802.3) | 2824.7 (848.0~7108.1) | 2022.2 (785.4~5500.4) | 3148.7 (485.9~5973.0) | 2701.8 (645.2~5461.0) |
| NNAL (pg/mL) | 4.0 (4.0-4.0) | 32.0 (4.0~69.8) | 14.5 (4.0~58.8) | 27.9 (4.0~71.6) | 28.9 (4.0~76.7) | 33.7 (4.0~101.1) |

강의 순서

- E-cigarette, or vaping, product
- E-cigarette, or vaping, product use-associated lung injury (EVALI)
- Current status of E-cigarette, or vaping, product use in Korea
- **E-cigarette, or vaping, product use-associated effects on health status**
 - Nicotine dependence
 - Respiratory symptoms
 - Mental health
 - Medical utilization

전자담배흡연자의 특성

| | 전자담배비흡연자 26230 (93.5%) | 전자담배흡연자 | | 전자담배비흡연자vs. 과거전자담배흡연자vs. 현재전자담배흡연자 | | 전자담배비흡연자 vs 전자담배흡연자 | |
|-----------|---------------------------|-------------------|------------------|--|---------|------------------------|--------|
| | | 과거 1367 (4.9%) | 현재 465 (1.7%) | P | P* | P | P** |
| 남자, 명 (%) | 10495 (40.0%) | 1177 (86.1%) | 399 (85.8%) | <0.001 | | <0.001 | |
| 나이 | 51.78±16.64 | 39.86±14.24 | 39.34±13.73 | <0.001 | | <0.001 | |
| 궐련담배흡연 | | | | <0.001 | <0.001 | <0.001 | <0.001 |
| 현재, 명(%) | 3810 (14.5%) | 1051 (76.9%) | 388 (83.4%) | | | | |
| 갑년 | 33.53±26.60 | 26.40±24.22 | 24.95±23.34 | <0.001† | <0.001‡ | <0.001 † | <0.001 |
| 과거, 명(%) | 5437 (20.7%) | 280 (20.5%) | 62 (13.3%) | | | | |
| 갑년 | 18.00±21.11 | 16.98±19.6 | 19.22±17.38 | 0.728† | <0.001‡ | 0.643 † | <0.001 |
| 비흡연, 명(%) | 16980 (64.7%) | 36 (2.6%) | 15 (3.2%) | | | | |
| 가정수입 | | | | <0.001 | <0.001 | <0.001 | <0.001 |
| 1분위 | 5215 (20.0%) | 159 (11.7%) | 50 (10.8%) | | | | |
| 2분위 | 6521 (25.0%) | 342 (25.1%) | 97 (21.0%) | | | | |
| 3분위 | 7027 (26.9%) | 437 (32.1%) | 164 (35.4%) | | | | |
| 4분위 | 7356 (28.2%) | 425 (31.2%) | 152 (32.8%) | <0.001 | <0.001 | <0.001 | <0.001 |
| 교육수준 | | | | | | | |
| ≤초등학교 | 5947 (23.7%) | 86 (6.6%) | 29 (6.6%) | | | | |
| ≤중학교 | 2675 (10.6%) | 96 (7.4%) | 36 (8.2%) | | | | |
| ≤고등학교 | 8023 (31.9%) | 592 (45.5%) | 203 (46.5%) | | | | |
| ≥대학교 | 8477 (33.7%) | 528 (40.6%) | 169 (38.7%) | | | | |

Clinical characteristics of Korean adults (≥19 years) according to conventional and e-cigarette smoking (n=28,059).

(KNHANES) 2013-2017

| | NCNE (N=16,980; 60.5 %) | NCEE (N=51; 0.2%) | ECNE (N=9,247; 33.0 %) | ECEE (N=1,781; 6.3 %) | P ^a | NCNE vs. NCEE | | | ECNE vs. ECEE | | |
|-------------------------------------|-------------------------------|----------------------|------------------------------|-----------------------------|----------------|---------------|-------------|----------------|---------------|--------------|----------------|
| | | | | | | OR(B) | 95% CI | P ^a | OR(B) | 95% CI | P ^b |
| Male sex | 2,721 (16.0) | 19 (37.3) | 7,772 (84.0) | 1,557 (87.4) | <0.001 | 2.680 | 1.503-4.778 | 0.001 | 2.050 | 1.749-2.403 | <0.001 |
| Age (years) | 50.8±17.04 | 42.47±18.31 | 53.43±15.75 | 39.65±13.97 | <0.001 | -7.166 | | 0.003 | -14.036 | | <0.001 |
| Smoking amount (PYs) | 0 | 0 | 23.93±24.55 | 24.25±23.34 | <0.001 | | | | 9.268 | | <0.001 |
| Household income^c | | | | | <0.001 | -0.196 | | 0.167 | -0.128 | | <0.001 |
| Lowest quartile | 3,313 (19.6) | 11 (21.6) | 1,901 (20.6) | 198 (11.2) | | | | | | | |
| Lower middle quartile | 4,162 (24.6) | 11 (21.6) | 2,537 (25.6) | 428 (24.1) | | | | | | | |
| Upper middle quartile | 5,433 (26.8) | 13 (25.5) | 2,494 (27.1) | 588 (33.1) | | | | | | | |
| Highest quartile | 4,896 (29.0) | 16 (31.4) | 2,460 (26.7) | 561 (31.6) | | | | | | | |
| Level of education | | | | | <0.001 | -0.631 | | <0.001 | -0.128 | | <0.001 |
| ≤Elementary school | 4,204 (25.7) | 12 (24.5) | 1,741 (19.8) | 103 (6.1) | | | | | | | |
| ≤Middle school | 1,586 (9.7) | 6 (12.2) | 1,089 (12.4) | 126 (7.5) | | | | | | | |
| ≤High school | 5,084 (31.1) | 26 (53.1) | 2,939 (33.4) | 769 (45.5) | | | | | | | |
| ≥College | 5,457 (33.4) | 5 (10.2) | 3,020 (34.4) | 692 (40.9) | | | | | | | |
| Comorbidity | | | | | | | | | | | |
| Asthma | 536 (3.3) | 0 (0) | 247 (2.8) | 45 (2.7) | 0.070 | - | - | - | 1.127 | 0.728-1.745 | 0.591 |
| COPD (≥40 years) | 61 (0.6) | 0 (0) | 96 (1.5) | 5 (0.7) | <0.001 | - | - | - | 0.196 | 0.027-1.43 | 0.110 |
| Allergic rhinitis | 2,411 (14.7) | 7 (14.7) | 975 (11.0) | 267 (15.8) | 0.495 | 0.767 | 0.339-1.735 | 0.240 | 1.015 | 0.836-1.232 | 0.884 |
| Atopic dermatitis | 453 (2.8) | 5 (10.2) | 196 (2.2) | 74 (4.4) | 0.420 | 2.521 | 0.958-6.630 | 0.061 | 1.022 | 0.707-1.475 | 0.909 |
| Lung cancer | 13 (0.1) | 0 (0) | 29 (0.3) | 3 (0.2) | 0.088 | - | - | - | 2.474 | 0.677-93.042 | 0.171 |
| Major depression | 872 (5.3) | 2 (4.1) | 308 (3.5) | 65 (3.8) | <0.001 | 1.030 | 0.247-4.293 | 0.968 | 1.173 | 0.811-1.698 | 0.396 |

Nicotine dependence and plan of smoking cessation in current tobacco smokers.

(KNHANES) 2013-2017

| | ECNE N=782 | ECEE N=346 | OR(B) | 95% CI | P ^a |
|------------------|---------------|---------------|--------|-------------|----------------|
| 기상후 첫번째 담배 (min) | | | -0.396 | | <0.001 |
| ≤ 5 | 155 (19.8) | 109 (31.5) | | | |
| 6-30 | 240 (30.7) | 99 (28.6) | | | |
| 31-60 | 104 (13.3) | 69 (19.9) | | | |
| ≥ 60 | 283 (36.2) | 69 (19.9) | | | |
| 6개월 금연계획 | 1,360 (35.7) | 563 (39.1) | 1.233 | 1.041-1.462 | 0.016 |
| 최근 1년중 하루이상 금연 | 1,354 (56.7) | 550 (60.8) | 1.237 | 1.013-1.510 | 0.037 |

Mental health status within the previous year according to tobacco and E-cigarette smoking status (KNHANES) 2013-2017

| | NCNE (N=16,980) | NCEE (N=51) | ECNE (N=9,247) | ECEE (N=1,781) | P ^a | NCNE vs. NCEE | | | ECNE vs. ECEE | | |
|-------------------|--------------------|----------------|-------------------|-------------------|----------------|---------------|--------------|----------------|---------------|-------------|----------------|
| | | | | | | OR(B) | 95% CI | P ^a | OR(B) | 95% CI | P ^b |
| 평소 스트레스 인지정도 | | | | | 0.001 | -0.072 | | 0.484 | -0.048 | | 0.059 |
| 1.대단히 많다 | 741 (4.4) | 2 (3.9) | 420 (4.5) | 126 (7.1) | | | | | | | |
| 2.많이 느낀다 | 3,481 (20.5) | 10 (19.6) | 1,928 (20.9) | 524 (29.4) | | | | | | | |
| 3.조금 느낀다 | 9,792 (57.7) | 36 (70.6) | 5,250 (56.8) | 944 (53.0) | | | | | | | |
| 4.거의 느끼지 않는다 | 2,952 (17.4) | 3 (5.9) | 1,641 (17.8) | 187 (10.5) | | | | | | | |
| 2주 이상 연속 우울감 | 1,338 (13.2) | 12 (30.8) | 634 (11.4) | 151 (13.7) | <0.001 | 2.854 | 1.386-5.877 | 0.004 | 1.319 | 1.019-1.707 | 0.035 |
| 1년간 정신문제 상담력 | 386 (3.5) | 4 (14.3) | 187 (3.2) | 38 (2.9) | 0.007 | 4.661 | 1.584-13.721 | 0.005 | 0.817 | 0.537-1.243 | 0.345 |
| 1년간 자살 생각 여부 | 481 (4.7) | 6 (15.4) | 324 (5.8) | 68 (6.1) | <0.001 | 3.906 | 1.590-9.594 | 0.003 | 1.361 | 0.944-1.963 | 0.099 |
| 1년간 자살 계획 여부 | 183 (1.3) | 5 (11.9) | 138 (1.8) | 33 (2.2) | <0.001 | 10.228 | 3.850-27.170 | <0.001 | 1.802 | 1.121-2.896 | 0.015 |
| 1년간 자살 시도 여부 | 67 (0.5) | 3 (7.1) | 6 (0.9) | 15 (1.0) | <0.001 | 17.690 | 5.069-61.737 | <0.001 | 1.052 | 0.515-2.149 | 0.889 |
| 스트레스 인지율(1,2/3,4) | 4,222 (24.9) | 12 (23.5) | 2,348 (25.4) | 650 (36.5%) | <0.001 | 0.910 | 0.472-1.757 | 0.780 | 1.210 | 1.044-1.402 | 0.011 |

Health status and chronic respiratory symptoms according to tobacco and E-cigarette smoking status

(KNHANES) 2013-2017

| | NCNE | NCEE | ECNE | ECEE | P ^a | NCNE vs. NCEE | | | ECNE vs. ECEE | | |
|----------------|--------------------|--------------|-------------------|----------------|----------------|---------------|--------------|----------------|---------------|-------------|----------------|
| | | | | | | OR(B) | 95% CI | P ^a | 95% CI | OR(B) | P ^b |
| 최근 1달간 와병여부 | 1,418/16,366 (8.7) | 11/49 (22.4) | 570/8,820 (6.5) | 127/127 (7.5) | <0.001 | 3.757 | 1.898-7.433 | <0.001 | 1.172 | 0.889-1.545 | 0.260 |
| 최근 1달간 결근여부 | 418/9,273 (4.5) | 5/39 (12.8) | 250/6,154 (4.1) | 91/1,404 (6.5) | <0.001 | 3.420 | 1.325-8.823 | 0.011 | 1.445 | 1.022-2.044 | 0.037 |
| 최근 1년간 와병여부 | 820/3,515 (23.3) | 2/3 (66.7) | 353/1,884 (18.7) | 80/398 (20.1) | 0.005 | 7.979 | 0.717-88.775 | 0.091 | 0.984 | 0.733-1.322 | 0.916 |
| 최근 1년간 결근여부 | 335/2,166 (15.5) | 1/3 (33.3) | 206/1,408 (14.6) | 76/353 (21.5) | <0.001 | 2.642 | 0.236-29.616 | 0.431 | 1.436 | 1.038-1.986 | 0.029 |
| 최근 1년간 입원여부 | 869/7,045 (12.3) | 3/9 (33.3) | 419/3,748 (11.2) | 116/818 (14.2) | <0.001 | 4.145 | 1.027-16.731 | 0.046 | 1.568 | 1.228-2.002 | <0.001 |
| 최근 1년간 입원이용 횟수 | 2,292/7,045 (32.5) | 2/9 (22.2) | 1142/3,748 (30.5) | 215/819 (26.3) | 0.021 | 0.807 | 0.164-3.976 | 0.792 | 1.247 | 1.033-1.506 | 0.022 |
| 3개월 이상 기침 | 345/ (3.1) | 0/ (0) | 338/ (5.1) | 53 (7.4) | <0.001 | - | - | - | 1.533 | 0.979-2.407 | 0.062 |
| 3개월 이상 가래 | 577/ (5.2) | 4/ (16.0) | 805 (12.2) | 131 (18.2) | <0.001 | 3.630 | 1.233-10.682 | 0.019 | 1.621 | 1.195-2.199 | 0.002 |

Laboratory finding according to tobacco and E-cigarette smoking status.

(KNHANES) 2013-2017

| Variable | NCNE (N=16,980) | NCEE (N=51) | ECNE (N=9,247) | ECEE (N=1,781) | P ^a | NCNE vs. NCEE | | ECNE vs. ECEE | |
|--------------------------------|--------------------|----------------|-------------------|-------------------|----------------|---------------|----------------|---------------|----------------|
| | | | | | | B | P ^a | B | P ^b |
| WBC (10 ³ /μL) | 5.95±1.61 | 6.54±1.71 | 6.65±1.86 | 7.30±1.89 | <0.001 | 0.488 | 0.036 | 0.428 | <0.001 |
| Hb (g/dL) | 13.45±1.40 | 14.27±1.61 | 14.84±1.45 | 15.34±1.31 | <0.001 | 0.303 | 0.069 | 0.032 | 0.454 |
| Platelet (10 ³ /μL) | 259.25±62.58 | 259.81±48.09 | 250.12±61.52 | 263.76±71.1 | <0.001 | 0.985 | 0.912 | 2.565 | 0.237 |
| Creatinine (mg/dL) | 0.77±0.27 | 0.83±0.20 | 0.94±0.37 | 0.92±0.17 | 0.010 | 0.015 | 0.675 | -0.001 | 0.945 |
| ALT (IU/L) | 19.42±15.86 | 22.10±15.43 | 24.64±18.32 | 28.07±23.53 | 0.032 | 1.269 | 0.572 | 0.931 | 0.160 |
| Total cholesterol (mg/dL) | 191.13±36.30 | 189.12±31.64 | 189.32±37.07 | 191.14±37.08 | 0.002 | 1.049 | 0.840 | -2.038 | 0.118 |
| HDL (mg/dL) | 52.86±12.29 | 56.20±13.69 | 48.40±12.19 | 47.96±11.95 | 0.684 | 3.710 | 0.030 | -1.207 | 0.003 |
| Lead (μg/dL) | 1.71±0.76 | 1.90±1.08 | 2.21±1.06 | 2.07±0.96 | <0.001 | 0.301 | 0.141 | 0.043 | 0.496 |
| Mercury (μg/L) | 3.50±2.61 | 3.22±1.69 | 4.66±3.41 | 4.80±3.47 | <0.001 | -0.206 | 0.779 | 0.054 | 0.807 |
| Cadmium (μg/L) | 1.06±0.64 | 0.95±1.00 | 1.06±0.45 | 1.05±0.58 | <0.001 | 0.145 | 0.350 | 0.073 | 0.029 |
| Nickel (μg/L) | 0.32±0.13 | 0.35±0.08 | 0.33±0.46 | 0.29±0.09 | 0.084 | 0.035 | 0.597 | 0.001 | 0.994 |

맺음말

- EC does not reduce cigarette smoking and is not harmless
- EC or vape cause EVALI
- EC users usually smoke cigarette
- EC users shows
 - higher nicotine dependence
 - higher mental problem
 - higher medical utilization
 - higher WBC count
 - frequent respiratory symptoms