
Health Consequences of Electronic Cigarettes

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Electronic Nicotine Delivery Systems



- ENDS are devices that heat a liquid to create an aerosol that is inhaled by the user.
- They are diverse and increasingly available
- Consists of a battery, heating element and e-liquid cartridge
- Most common ENDS are 'e-cigarettes, vapes or vape pens. Other forms include e-hookahs, e-pipes and e-cigars
- The E-liquid, also known as vape juice contain a mixture of propylene glycerol, vegetable glycerin, flavorings and often nicotine
- Diacetyl and acetyl propionyl (flavorings) inhalation has been associated with serious lung disease like bronchiolitis obliterans (popcorn lung)
- There are also **Electronic Non-Nicotine delivery systems (ENNDS)**, Essentially are the same as ENDS but the e-liquid does not contain nicotine

History of Electronic Cigarettes

In 2003, the first commercially successful ENDS device, called “Ruyan” (meaning like smoke) was invented by a Chinese pharmacist Hon Lik

Reportedly, he created the device after his father died of lung cancer due to smoking



In 2006-2007, ENDS devices were introduced to the European and American markets gaining popularity as a potential alternative to traditional cigarettes

In the late 2010s, pod-based ENDS devices such as JUUL gained significant market share, particularly among the youth for its slick design and introducing nicotine salt e liquids which deliver higher nicotine concentration than traditional e-liquids

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Present Day

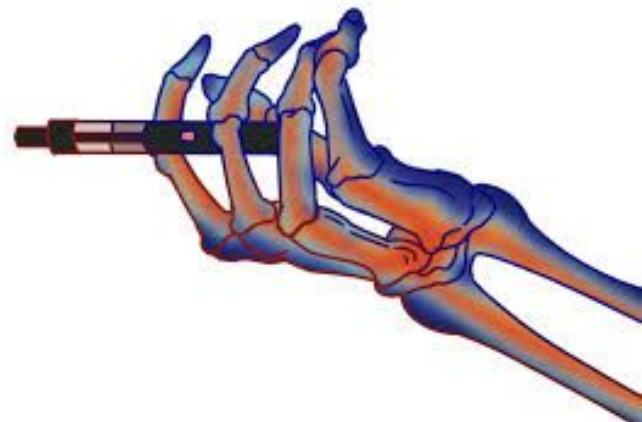
ENDS have evolved into a diverse range of devices

The use of ENDS has grown rapidly worldwide, especially in the youth

The CDC's "National Youth Tobacco Survey" shows that 2.2 million middle and high school students (grades 6-12) are current ENDS users.

16.5% of high school students and 8.8% of middle school students reported ever using ENDS

[https://www.cdc.gov/tobacco/basic_information/youth/index.htm *Youth tobacco prevention*. (2023, January 27). Centers for Disease Control and Prevention. https://www.cdc.gov/tobacco/basic_information/youth/index.htm



Promotion and Targeting of Youth =

ENDS companies have been known to employ various marketing strategies like:



1. Flavored e-liquids: more than 7000 vape juice flavors
2. Social media: utilizing social media platforms like Instagram, Twitter and Facebook
3. Influencer marketing : popular social media influencers are paid to promoted products
4. Youthful advertising : advertisements feature young, attractive models and themes that resonate with youth culture
5. Sponsorship and events: ENDS companies sponsor music festivals, parties and other events that are popular among young people, allowing them to associate their products with fun, social experiences

ENDS vs. Cigarettes

ENDS lack combustion, a process that generates harmful tar and carcinogens in cigarettes.

Cigarettes contain over 7,000 chemicals, many carcinogenic (cancer-causing).



Studies suggest ENDS might be less harmful than cigarettes due to the absence of combustion. (Source: National Institutes of Health,) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8129966/>

Potential Risks of ENDS

Harmful Chemicals

ENDS contain potentially harmful chemicals like ultrafine particles, heavy metals, and flavorings

<https://www.who.int/news-room/questions-and-answers/item/tobacco-e-cigarettes>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8129966/>



Respiratory Problems

Studies link ENDS use to respiratory problems, especially in former or current smokers.

E-cigarettes generate toxic substances that increase the risk of lung disorders.

There is growing evidence that ENDS could be associated with lung injuries. This is described by the United States Centers for Disease Control and Prevention (CDC) as e-cigarette or vaping associated lung injury (EVALI), which led the CDC to activate an emergency investigation into EVALI on 17 September 2019.

(Source: National Institutes of Health, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8683991/>)



Electronic Cigarettes and Addiction

Nicotine Dependency

The high nicotine content in e-cigarettes can lead to dependence and withdrawal symptoms.

Some studies suggest ENDS might be as addictive as cigarettes.

ENDS can deliver nicotine quickly and efficiently, potentially reinforcing addictive behavior.



Risk of Dual Use

Dual users (those who use both ENDS and cigarettes) may have higher nicotine dependence levels.

Dual use might make quitting smoking more challenging due to the combined dependence on nicotine from both sources.

(Source: National Institutes of Health, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6651627/>)

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(Source: World Health Organization, [<https://www.who.int/news-room/fact-sheets/detail/tobacco>])

Dangers of Secondhand E-cigarette Emissions

Toxic Emissions & Impact on Non-Users

Exposure to secondhand e-cigarette aerosol may pose health risks similar to those of mainstream smoke.

The aerosols generated by ENDS typically raise the concentration of particulate matter in indoor environments and contain nicotine and other potentially toxic substances. ENDS emissions therefore pose potential risks to both users and non-users.



Second Hand vapors from e-cigarettes can affect non-users, especially in indoor environments.

Secondhand emissions from ENDS can still contain ultrafine particles and other potentially harmful chemicals.

(Source: World Health Organization, <https://www.who.int/news-room/questions-and-answers/item/tobacco-e-cigarettes>)

Regulation and Policy Framework

In USA

The federal minimum age to purchase ENDS is 21, established by the Food and Drug Administration Amendments Act of 2012.

The FDA restricts the marketing and sales of ENDS to minors. This includes bans on certain marketing tactics like using cartoon characters or free giveaways, and restrictions on online sales that may not verify age effectively.

Warning Labels: ENDS are required to carry warning labels about the addictive nature of nicotine and the potential health risks.

State and Local Regulations: Many states and localities have additional regulations on ENDS, including bans on flavored ENDS products, restrictions on vaping in public places, and additional licensing requirements for retailers.

<https://www.fda.gov/tobacco-products/products-ingredients-components/e-cigarettes-vapes-and-other-electronic-nicotine-delivery-systems-ends>

Regulation and Policy Framework



In Europe

the Tobacco Products Directive (TPD) governs Electronic Nicotine Delivery Systems (ENDS), imposing limits on nicotine content, regulating packaging and labeling, and restricting advertising. Member states implement age restrictions on sales, and manufacturers must notify authorities about product details. Cross-border sales within the EU are subject to TPD compliance, ensuring a standardized approach to ENDS regulation.

In Turkey

ENDS are regulated under the Tobacco and Alcohol Market Regulatory Authority. The sale and advertising of ENDS are restricted, with age limitations for purchases. The country enforces packaging requirements, including health warnings, and prohibits online sales of ENDS. Turkish authorities continually update regulations to address emerging challenges related to electronic smoking devices.

E-cigarette Use in Cyprus

Studies and surveys showed that in 2018, 1.8% of NEU medical students smoke e-cigarettes and in 2023, 7.8% of the general population smoke e-cigarettes.

Legal status: The sale, distribution, and use of e-cigarettes are legal in the TRNC.

Age restriction: The sale of e-cigarettes and related products to individuals under the age of 18 is prohibited.

Advertising and promotion: The advertising and promotion of e-cigarettes are subject to certain restrictions, similar to those applied to traditional tobacco products.

Public use: The use of e-cigarettes is prohibited in public places where smoking is banned, such as enclosed public spaces, workplaces, and public transportation.

Taxation: E-cigarettes and related products are subject to taxation, although the specific tax rates may differ from those applied to traditional tobacco products.



Future directions and Recommendations

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Reducing the use of Electronic Nicotine Delivery Systems (ENDS) involves a multi-faceted approach, combining regulatory, educational, and public health efforts.

Decreasing ENDS use requires a combination of regulatory measures, education, and community involvement. Collaboration between governments, public health organizations, and communities is crucial to developing and implementing effective strategies.

References



Products, C. F. T. (2024, January 29). E-Cigarettes, Vapes, and other Electronic Nicotine Delivery Systems (ENDS). U.S. Food And Drug Administration.

<https://www.fda.gov/tobacco-products/products-ingredients-components/e-cigarettes-vapes-and-other-electronic-nicotine-delivery-systems-ends>

Tobacco: e-cigarettes. (2024, January 16).

<https://www.who.int/news-room/questions-and-answers/item/tobacco-e-cigarettes>

Youth tobacco prevention. (2023, January 27). Centers for Disease Control and Prevention.

https://www.cdc.gov/tobacco/basic_information/youth/index.htm

Hart, J. L., Payne, T. J., Groom, A., Tran, H., Walker, K. L., Kesh, A., Robertson, R. M., & Vu, T.-H. T. (2021). Association between electronic nicotine delivery systems (ENDS) device and E-liquid alterations and flavor use with clinical and EVALI-like symptoms. *Preventive Medicine Reports*, 24, 101619. <https://doi.org/10.1016/j.pmedr.2021.101619>

What Is Nicotine....? (n.d.). Retrieved March 6, 2024, from

<https://manufacturing.ct.gov/-/media/Departments-and-Agencies/DPH/dph/hems/tobacco/PDF/Fact-Sheets-and-Resources-2023/FACT-SHEET-Nicotine.pdf>

[https://www.cdc.gov/tobacco/basic_information/youth/index.htm *Youth tobacco prevention*. (2023, January 27). Centers for Disease Control and Prevention. https://www.cdc.gov/tobacco/basic_information/youth/index.htm

