



ELECTRONIC CIGARETTES

Smoking and Pregnancy

HISTORY

Using traditional cigarettes while pregnant can impact the health of the pregnant woman, the pregnancy, and the newborn. Problems with smoking include:

- Problems with placental functioning;
- Reduction in birth weight;
- Premature rupture of membranes;
- Premature birth;
- Certain birth defects;
- Pregnancy loss

HISTORY

The effects on the baby after birth:

- Increased risk of sudden infant death syndrome (SIDS);
- Colic;
- Asthma;
- Childhood obesity.

HISTORY

Over the last 10 years, the smoking rate for traditional cigarettes in the United States has been slowly declining.

This reduction has been a result of recent trends to become healthier, recent smoke-free laws and policies, and newer smoking options.

- Washington Post, www.washingtonpost.com/national/health-science/the-facts-behind-e-cigarettes-and-their-health-risks/2016/02/22/b18b26848c9-11e5

HISTORY

As traditional cigarettes have declined, various alternative **electronic cigarettes and vaping products have been gaining popularity.**

Electronic cigarettes have been sold in the United States **since 2007.**

HISTORY

From **2012 to 2016**, Electronic cigarette sales have skyrocketed by 132%.

Electronic cigarette sales includes 4 types of e-products, including rechargeables, disposables, and prefilled cartridges.

ELECTRONIC CIGARETTES

VAST VAPING CHART

Vast Vaping

Electronic cigarettes dollar sales worldwide from 2008 to 2017 (in million U.S. dollars)



HISTORY

According to the FDA, the overall electronic cigarette use has continued to **increase substantially from 2017-2018, increasing by 78%.**

https://www.cdc.gov/reproductivehealth/maternalinfanthealth/substance-abuse/e-cigarettes-pregnancy.htm?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Freproductivehealth%2Fmaternalinfanthealth%2Ftobaccousepregnancy%2Fe-cigarettes-pregnancy.htm Accessed 11/1/19Page last reviewed: February 25, 2019 Content source: [Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion](#)

HISTORY

In 2018 electronic cigarette sales generated more than **3.6 billion dollars** in the United States alone.

Worldwide the numbers are much higher.

HISTORY, PRESENT, AND FUTURE

- Because of the ability to be **discretely** used, electronic cigarettes are **growing in popularity** since they can be made to look like a pen, a flash-drive, a regular cigarette or cigar, and some can be modified by the user.
- These products can contain nicotine and have appealing flavor options, which has explained the popularity of electronic cigarettes among younger users.

HISTORY, PRESENT, AND FUTURE

- **Future sales** of electronic cigarettes have the potential to **increase** even more since **58% of smokers**, including pregnant smokers, **would like to quit smoking.**
- **Many industry experts** view and advertise electronic cigarettes as being **safer to use for cessation efforts.**

PRESENT AND FUTURE

Electronic cigarettes are quite popular with young people. **85%** of those aged **18-29** years have tried or continue to use electronic cigarettes or vaping products.

Further complicating the issue, **40%** of research subjects ages **18 to 29**, consider **electronic cigarettes as harmless.**



WHAT ARE ELECTRONIC CIGARETTES?

WHAT ARE ELECTRONIC CIGARETTES?

- Electronic cigarettes are **battery operated** heating devices that **heat a liquid** in the **cartridge** into an **aerosol** that the **user inhales**.
- They are **designed to resemble cigarettes, cigars, or pipes**, and **deliver a nicotine containing aerosol**, not just **water vapor**, that looks like **tobacco smoke**.

WHAT ARE ELECTRONIC CIGARETTES?

WHAT ARE ELECTRONIC CIGARETTES?

Many names:

- “vapor cigarettes”
- “ENDS” (electronic nicotine delivery system)
- “E-cigs” or “cigalikes”
- “Vape pens” or “vapes”
- “E-hookahs”
- “Mods”
- “Tank systems”



WHAT ARE ELECTRONIC CIGARETTES?

WHAT'S THE HARM?

Traditional cigarettes have more than **7,000 chemicals**.

Electronic cigarettes have **fewer toxins but they are not harmless**.



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WHAT ARE ELECTRONIC CIGARETTES?

WHAT'S THE HARM?

While there is no tobacco, the liquid vapors can contain:

- Nicotine (which is highly addictive)
- Solvents
- Volatile organic compounds (VOCs)
- Heavy Metals: lead, cadmium, nickel, tin, and other metals
- Other cancer causing agents
- Flavorants
- Toxicants

All of which can cause nervous system or respiratory problems.

Reference: Zhu, S.H., Sun, J.Y., & Bonnevie, E. (2014) Four hundred and sixty brands of e-cigarettes and counting: Implications for product regulation, *Tab Control* 2014; 23:iii3-iii9. doi:10.1136/tobaccocontrol-2014-051670

References: • U.S. Department of Health and Human Services. E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General— Executive Summary. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2016.

Reference: Washington Post, www.washingtonpost.com/national/health-science/the-facts-behind-e-cigarettes-and-their-health-risks/2016/02/22/b18b26848c9-11e5



CAUSE FOR CONCERN: WHAT'S THE HARM?

NICOTINE

Nicotine amounts in electronic cigarettes **vary with manufacturer**, ranging from 0 to 72 milligrams per milliliter of liquid.

Traditional cigarettes have 10 to 20 milligrams per pack.



CAUSE FOR CONCERN: WHAT'S THE HARM?

NICOTINE

However, Nicotine levels on labels of electronic cigarettes are often inconsistent with the actual nicotine level found in the electronic cigarette.

- <https://vapingdaily.com/what-is-vaping/vaping-and-pregnancy/>

CAUSE FOR CONCERN: WHAT'S THE HARM?

CHEMICALS

In addition to nicotine, **propylene glycol** is present. When propylene glycol is **heated**, it degrades into **formaldehyde**.

Formaldehyde is linked to nose and eye irritation and linked to an increased risk of **asthma and cancer**.

CAUSE FOR CONCERN: WHAT'S THE HARM?

CHEMICALS

Benzene (found in car exhaust) and **toxic metal nanoparticles** are produced from vaping.

Reference: • U.S. Department of Health and Human Services. E-Cigarette Use Among Youth and Young Adults: A Report of the Surgeon General—Executive Summary. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2016.

Recent tests on 97 electronic cigarette products found **Acetaldehyde** (a **Class 1 carcinogen**) in **more than half the brands**.

Reference: Washington Post, www.washingtonpost.com/national/health-science/the-facts-behind-ecigarettes-and-their-health-risks/2016/02/22/b18b26848c9-11e5



CAUSE FOR CONCERN: WHAT'S THE HARM?

FLAVORS

There are more than 7,700 flavors and more than 466 brands, which appeal to younger people.

These products do not contain warnings of the hazards associated with use.

CAUSE FOR CONCERN: WHAT'S THE HARM?

FLAVORS

More than 85% of electronic cigarette users, ages 12-17, have tried flavored electronic cigarettes and the flavors are the leading reason for use by younger smokers.

Reference: Zhu, S.H., Sun, J.Y., & Bonnevie, E. (2014) Four hundred and sixty brands of e-cigarettes and counting: Implications for product regulation, *Tab Control* 2014; 23:iii3-iii9. doi:10.1136/tobaccocontrol-2014-05670.

There are harmful flavoring chemicals in electronic cigarettes, some of which can be toxic, such as those used to create the cinnamon flavor.

Reference: American Lung Association. <http://keepsacred.itcmi.org/2016/02/American-lung-association-state-of-tobacco-control-2016>. www.lung.org/about-us/blog/popcorn-lung-risk-ecigarettes by Editorial Staff, 7/716, updated 9/18/18, accessed 11/6/19.



CAUSE FOR CONCERN: WHAT'S THE HARM?

FLAVORS

The heating, vaporization, and inhalation of flavoring chemicals can result in obliterative bronchiolitis, a serious lung disease that is only curable by lung transplant.

Reference: American Lung Association. <http://keepitsacred.itcmi.org/2016/02/American-lung-association-state-of-tobacco-control-2016>. www.lung.org/about-us/blog/popcorn-lung-risk-ecigarettes by Editorial Staff, 7/716, updated 9/18/18, accessed 11/6/19.

CAUSE FOR CONCERN: WHAT'S THE HARM?

FLAVORS

Diacetyl, a butter-flavored chemical, can cause serious and **irreversible lung disease** called “**popcorn lung**”. In a recent study, Diacetyl was found in 39 of 51 brands of electronic cigarettes.

2 other harmful chemicals: **pentanedione and acetoin**, were found **45%-90%** of electronic cigarettes tested.

92% of electronic cigarettes have at least one of these three chemicals present.

UNINTENDED INJURIES

Beyond these hazards, electronic cigarettes have been associated with other unintended injuries:

- **Fires from batteries** have been reported, possibly **from the lithium batteries**, but most have involved connecting to USB ports.
- With **30 incidents** in the **last 3 years** on planes or in airports having **fire, smoke or sparks** from the batteries, the **FAA has prohibited** electronic cigarette batteries on checked bags on airplanes in the United States.

UNINTENDED INJURIES

Because the vials are not child-proof, there is the potential for overdosing for children by swallowing, breathing, or absorption through the skin.

Nationally approximately 50% of all calls to Poison Control Centers have been for incidents involving kids five years of age and younger.

UNINTENDED INJURIES

These devices are **convenient for inhaling illicit drugs.**

- Because the use is unintended and illegal, **there has been little research.** However, due to the recent epidemic deaths related to vaping, research and awareness is increasing.

UNINTENDED INJURIES

Vaping allows use of almost all illicit drug types, of which cannabis is the most commonly vaped drug. Reasons for vaping cannabis:

1. Tastes better (39%)
2. Perceived by users as less harmful than smoking (43%)
3. Stronger high (58%)

Drugs studied for vaping:

Cannabis	Synthetic cannabis	Methamphetamines	MDMA	Cocaine
Mephedrone	Synthetic cathinones	Methylone	Heroin	Fentanyl

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ELECTRONIC CIGARETTE BENEFITS?

SMOKING CESSATION TOOL?

There is a public perception that electronic cigarettes are safer than tobacco products, and may even be an acceptable method of tobacco cessation, promoted and encouraged by some politicians, manufacturers, and retailers.

As such, the public may not realize the associated risks in using electronic cigarettes.



ELECTRONIC CIGARETTE BENEFITS?

SMOKING CESSATION TOOL?

2015 US Preventative Services Task Force (USPSTF) conducted a metaanalysis of 58 studies looking at electronic cigarettes and the effectiveness of smoking cessation.

While many thought electronic cigarettes may lower cravings, this study found insufficient evidence to recommend devices to help adults to quit smoking.

Reference: <https://www.ucsf.edu/news/2016/01/401311/e-cigarettes-used-arent-helping-smokers-quit-study-shows>



ELECTRONIC CIGARETTE BENEFITS?

SMOKING CESSATION TOOL?

Further, there are indications that **electronic cigarettes can actually perpetuate the addiction** in users and can interfere with quitting.

In fact, people who used electronic cigarettes to quit **often end up using both types of cigarettes.**

ELECTRONIC CIGARETTE BENEFITS?

SMOKING CESSATION TOOL?

Further, **no manufacturer has sought approval** of any device to assist in smoking cessation **though many claim their product as a smoking cessation device.**

Neither has the FDA taken any action against any company that has claimed electronic cigarettes are effective for smoking cessation – which sends an unclear message to the consumer.

Reference: <https://www.ucsf.edu/news/2016/01/401311/e-cigarettes-used-arent-helping-smokers-quit-study-shows>

PREGNANCY RISKS

Many think that electronic cigarettes have improved the smoking rates among pregnant women.

Indeed, the rates of smoking among pregnant women has declined overall among pregnant women in the United States:

In 2010, the ratio was 1:10.

In 2016, the ratio was 1:14 women smoked while pregnant.

PREGNANCY RISKS

- **In 2014, the estimates for electronic cigarette use nationally was 3.6% of pregnant women versus 3.3% of non-pregnant women.**

Reference: Liu, Buyun, Xu, Guifeng, Rong, Shanung. 4/29/19. "National Estimates of Use Among Pregnant and Nonpregnant Women of Reproductive Age in the United States, 2014-2017". JAMA Pediatr. 2019; 173(6):600

- **Specifically, in recent data for the United States, the smoking rate for pregnant women ranged from 7.2% to 14.99%.**
- **WV had the highest smoking among pregnant women at a rate of 25.1%.**

Reference: "Tobacco use in West Virginia 2019"; 6/28/19; WV DHHR; Accessed 11/11/19



ELECTRONIC CIGARETTES

PREGNANCY RISKS

Many pregnant women may use electronic cigarettes thinking that they can help them quit or reduce smoking.

Reference: Hays, J. Taylor. Mayo Clinic Dependence Center; 9/12/19 <https://newsnetwork.mayoclinic.org/discussion/womens-wellness-vaping-and-pregnancy/> Accessed 11/1/19

PREGNANCY RISKS

Pregnant women tend to believe that electronic cigarettes are safer than traditional cigarettes, especially when experts such as **Dr. Douglas Kamerow**, a **former assistant Surgeon General** and a **Professor of Family Medicine at Georgetown University** says:

“If a patient switches from smoking two packs a day to only using electronic cigarettes, it’s not as good as quitting, but it’s undeniably better.”

PREGNANCY RISKS

Women who smoke hear from that message that electronic cigarettes are a healthier option while pregnant.

Reference: Hays, J. Taylor. Mayo Clinic Dependence Center; 9/12/19 <https://newsnetwork.mayoclinic.org/discussion/womens-wellness-vaping-and-pregnancy/> Accessed 11/1/19

Consequently, the use of electronic cigarettes with pregnant women continues and increases, in spite of research studies indicating otherwise and expert advice to avoid electronic cigarettes.

- Reference: Washington Post, www.washingtonpost.com/national/health-science/the-facts-behinde-cigarettes-and-their-health-risks/2016/02/22/b18b26848c9-11e5

PREGNANCY RISKS

Nicotine, one of the additives in electronic cigarettes **can have lasting effects on a developing fetus. Specifically:**

- The fetal brain.
- The fetal lungs
- Premature rupture of membranes (before 37 weeks)
- Low-birth weight
- Preterm delivery
- Stillbirth

PREGNANCY RISKS

The **fetal brain** is the last organ in the human body to **develop fully** continuing until the **early to mid-20s**.

Nicotine exposure during periods of brain development can impair and disrupt the growth of brain circuits that control attention, impulse control, learning, mood disorders, and prime the brain for addiction to other drugs, such as cocaine and methamphetamines.

- REFERENCE: <https://www.statista.com/statistics/882660/vaping-harmfulness-opinions-us-adults-gender/> Accessed 11/1/19

PREGNANCY RISKS

Further, according to US Preventative Services Task Force (USPSTF, 2016), Smoking or tobacco **use can impact pregnant women and families in the United States:**

- Tobacco use is related to **480,000 premature fetal deaths annually**
- An additional **16 million suffer from sudden infant death syndrome** caused by tobacco use.

Reference: /Users/plambert/AppData/Local/Microsoft/Windows/INetCache/IE/D1MMQ22P/od1.pdf

Reference: National Institute of Health, May 2016. U.S. Department of Health and Human Resources. <http://www.drugabuse.gov/publications/drugfacts/cigarettes-other-tobacco-products#refs>

PREGNANCY RISKS

In pregnant women, nicotine narrows the blood flow through the vasculature system, reducing oxygen and nutrient delivery to the fetus.

Along with other chemicals, they get into mother's bloodstream and cross the placenta into the baby's developing body.

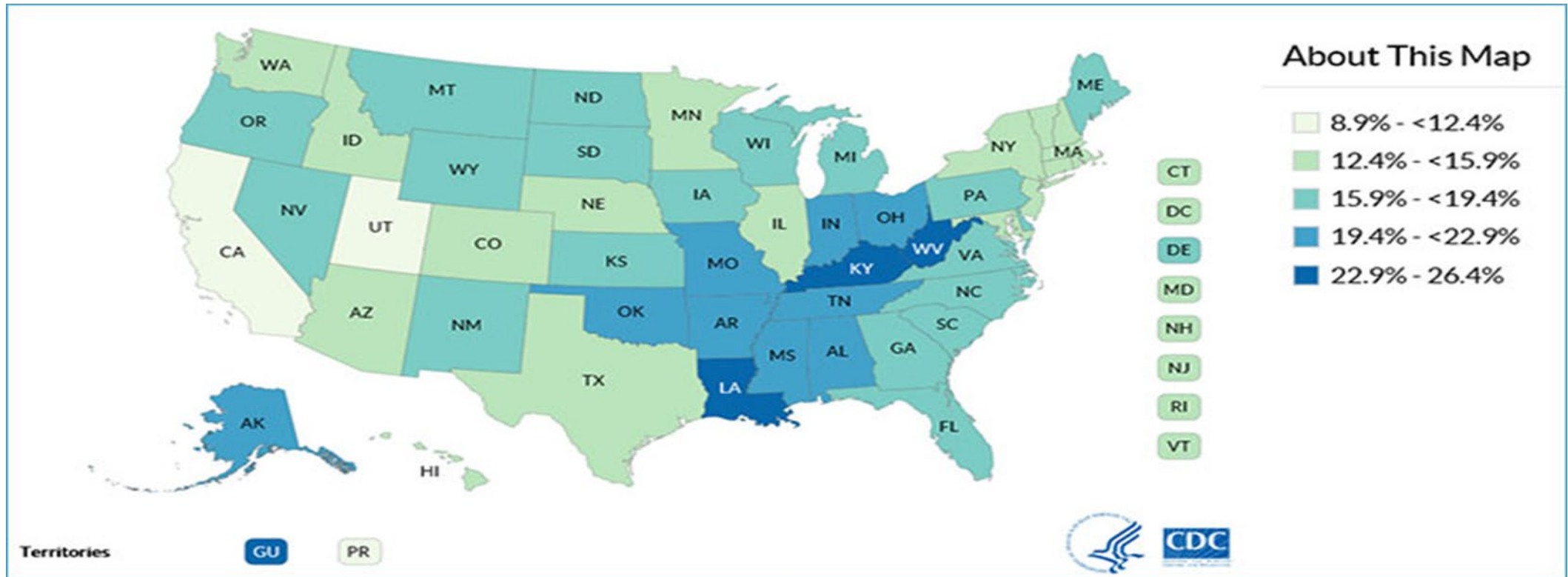
PREGNANCY RISKS

After birth, side effects from electronic cigarette use and nicotine has been associated with:

- Withdrawal in the newborn
- Asthma
- Colic
- Schizophrenia
- Sudden infant death syndrome (SIDS)
- Congenital disabilities
- ADHD
- Childhood obesity
- Alzheimer's disease

- . 2016, Feb. 2. Zelikoff, J., et al, Reproductive and Developmental Effects of Exposure to Emerging Tobacco Products. American Association for the Advancement of Science Annual Meeting, Washington, DC.
- www.mayoclinic.org/healthy-lifestyle/pregnancy-week-by-week; 3/18/18; accessed 11/11/19; vaping.daily.com/what-is-vaping; Published 10/10/17; updated 4/5/19..

CURRENT CIGARETTE SMOKING AMONG ADULTS IN THE UNITED STATES



Centers for Disease Control and Prevention. State Tobacco Activities Tracking & Evaluation (STATE) System. Map of Current Cigarette Use Among Adults (Behavior Risk Factor Surveillance System) 2017 [accessed 2019 November].

Vapingdaily.com/What is Vaping/Vaping&Pregnancy/The Beginning of a New Life; accessed 11/06/2019

ELECTRONIC CIGARETTES

WEST VIRGINIA DATA 2018

Nationally the smoking rate was 17.1%; West Virginia was ranked number one in cigarette smoking at 26% for adults (2017):

Smoking rate for pregnant women in WV was **25.1%**

Two highest age groups using **electronic cigarettes:**

- Ages 18-24, 26.6% of adults, versus 22.3% **traditional** cigarettes
- Ages 25-34, 43.7% of adults versus 36.4% **traditional** cigarettes

Two highest age groups using traditional cigarettes:

- Ages 25-34, 36.4% of adults
- Ages 45-54, 32.3% of adults

For those 65 and older 12.7% use electronic cigarettes versus 10.8% traditional cigarettes

Reference: 2016 "Addressing Tobacco Use and Its Associated Health Conditions in West Virginia"; updated May 2016; West Virginia Department of Health and Human Resources, Bureau for Public Health, Division of Tobacco Prevention; Office of Community Health Services and Health Promotion. Accessed 11/5/19

Reference: "Tobacco Use in West Virginia 2018: West Virginia Health Statistics Center; Sponsored by the West Virginia Department of Health and Human Resources; accessed 11/5/19.

WEST VIRGINIA DATA 2018

In West Virginia, 31.3% of smokers reported using electronic cigarettes during their recent attempt to quit.

Reference: 2014 West Virginia Adult Tobacco Survey: West Virginia Prevention Research Center. Funded by West Virginia Department of Health and Human Resources, Bureau for Public Health, Division of Tobacco Prevention.

Profile of the persons with the highest rate of trying electronic cigarettes in West Virginia:

- Male adults, minority groups, low education attainment, living in rural areas, and lower income.

WHAT'S THE SOLUTION?

There are thousands of electronic cigarette products on the market, and there has been no uniform standards to confirm purity and safety.

- <https://vapingdaily.com/what-is-vaping/vaping-and-pregnancy/> Published 10/10/17; updated 4/5/19

In 2016, the FDA couldn't even track all the hundreds of brands and thousands of flavors on the market.

- <https://vapingdaily.com/what-is-vaping/vaping-and-pregnancy/> Published 10/10/17; updated 4/5/19

WHAT'S THE SOLUTION?

In July 2017 the FDA announced it would delay the requirement that electronic cigarettes companies would submit all ingredients to the FDA for FDA review until 2022.

Reference: American Lung Association. <http://keepitsacred.itcmi.org/2016/02/American-lung-association-state-of-tobacco-control-2016>. www.lung.org/about-us/blog/popcorn-lung-risk-electronic-cigarettes by Editorial Staff, 7/7/16, updated 9/18/18, accessed 11/6/19

With this lack of regulation now and in the immediate future, consumers have no idea what they are buying when purchasing electronic cigarettes.

Reference: www.lung.org/about-us/blog/popcorn-lung-risk-ecigarettes By Editorial Staff, 7/7/16, updated 9/18/18, accessed 11/6/19.

WHAT'S THE SOLUTION?

Electronic cigarette advertising targets young people with marketing strategies that appeal to smokers using sexual content, customer satisfaction, varieties of colors and flavors, using all forms of media outlets.

Because of these unregulated marketing strategies, electronic cigarettes are perceived by the public as safer and promoted as such by the manufacturers.

The public may not realize the risks that are involved in using electronic-cigarettes.

HEALTH CARE INTERVENTIONS

- What you should do:
- Assess every patient at every encounter about tobacco use.
- Provide resources: printed materials, counseling options, Quitline information, medications.
- Ask about progress at every encounter.
- Become an educator about electronic cigarettes, not to just users, but make all your patients aware.
- Become an advocate for tobacco cessation.

HEALTH AND SAFETY

- Electronic cigarettes are increasing in sales and popularity because:
- They are marketed and perceived as relatively safe.
- There are huge varieties of flavors to choose from.
- Manufactured in various discrete forms and sizes.

2019 OUTBREAK OF LUNG INJURY ASSOCIATED WITH ELECTRONIC CIGARETTES/VAPING PRODUCTS

- Latest information from CDC as of 12/10/19: These numbers are very fluid and increasing almost daily:
- **52 deaths** and more deaths are under investigation.
- **2409 cases of injury** related to use of electronic cigarettes/vaping products.
- 79% are under age 35; 30% are women
- Median age is 53, ages range from 17 to 75.
- Based on the ongoing investigation that changes daily, the CDC has issued recommendations about the use of electronic cigarettes/vaping products.



CONCLUSION

- Because of the toxins in cigarettes, pregnant women are encouraged to stop smoking while pregnant
- REFERENCE: <https://www.statista.com/statistics/882660/vaping-harmfulness-opinions-us-adults-gender/> Accessed 11/1/19
- However, most do not stop but continue using both electronic and traditional cigarettes
- To date, NRT products have not been approved for use by pregnant women.



CONCLUSION

Irrespective of the ongoing investigation, the CDC recommends that:

Women who are pregnant should never use electronic cigarettes or vaping products.

Reference: www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease.html Accessed 11/5/2019

https://www.cdc.gov/reproductivehealth/maternalinfanthealth/substance-abuse/e-cigarettes-pregnancy.htm?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Freproductivehealth%2Fmaternalinfanthealth%2Ftobaccousepregnancy%2Fe-cigarettes-pregnancy.htm Accessed 11/1/19