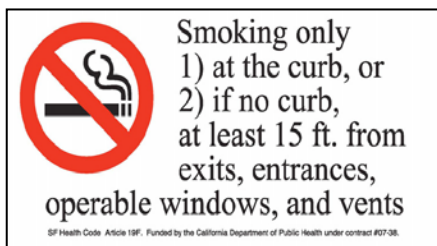


Electronic Cigarettes



WHAT LAWS GOVERN E-CIGARETTES IN SAN FRANCISCO?

[California Health and Safety Code 119405](#) prohibits the sales of e-cigarettes to minors. Effective April 2014, [San Francisco Health Code Article 19N](#) prohibits the use of e-cigarettes wherever traditional cigarettes are prohibited. This generally means smoking or using e-cigarettes (vaping) is only permitted at the curb. Sales of e-cigarettes in San Francisco require a tobacco permit, just like cigarettes. These are common sense regulations supported by major health organizations such as the American Lung Association, American Heart Association, and World Health Organization that have also been supported by vapor industry representative leader Smoke-Free Alternatives Trade Association. They agree that e-cigarette products should not be sold to minors and advocate that users “don’t vape on planes and other places where smoking is generally prohibited.”¹ Health code section 19N exists so a new potential pollutant is not introduced into environments that San Francisco has made smoke-free.



E-cigarettes **ARE NOT BANNED** in San Francisco, they are simply regulated. If businesses choose to sell these products, they are perfectly allowed to as long as they are within the confines of the law. If a person chooses to use these devices, they must be over 18 and use them only where allowed by law. *Please be considerate of others and vape and smoke at the curb.*

WHY IS THE CITY CONCERNED ABOUT E-CIGARETTES?

As of 2014, there were at least 466 different brands of e-cigarettes that came in all different shapes and sizes.² Despite urging from public health leaders, medical professionals, health and youth organizations, and individuals, there are currently **NO FDA REGULATIONS** or **STANDARDS IN E-CIGARETTE PRODUCTION**.^{3,4} Therefore, all e-cigarettes are not created equal. Just because one version is safe does not mean all are safe. The lack of standards in production results in a lack of quality control. This has resulted in cases of malfunctioning e-cigarette devices that have exploded and caused fires.^{5,6} Until regulations are set, caution is necessary.

Since introduction into the market, e-cigarette sales have been increasing exponentially. In 2013, sales were estimated at \$2.5 billion worldwide and are expected to top \$10 billion by 2017.⁷ This rapid increase in sales and use is also a cause for concern regarding youth uptake. Several large surveys have shown increased youth usage of e-cigs with the potential for leading to traditional cigarette usage.⁸ (See: Are Young People Using E-cigarettes?)

E-cigarettes were introduced to the United States roughly eight years ago, and are therefore new products. There are no long term studies on the health effects of first hand, [second hand](#), or [third hand](#) e-cigarette usage. Additionally, the onset of the diseases of interest, such as cancer, usually take decades to develop, therefore the long term health effects of e-cigs will not be known for quite some time.⁹ There is already some evidence of immediate adverse health effects similar to those resulting from cigarette usage such as airway resistance and reduced fraction of exhaled nitrous oxide.¹⁰

San Francisco subscribes to the [Precautionary Principle](#), which states that if an activity or action has the potential to harm, then precautionary measures must be taken. This also means the burden of definitive proof of safety lies with the e-cigarette industry. There is also concern over the potential for e-cigarettes to renormalize tobacco use

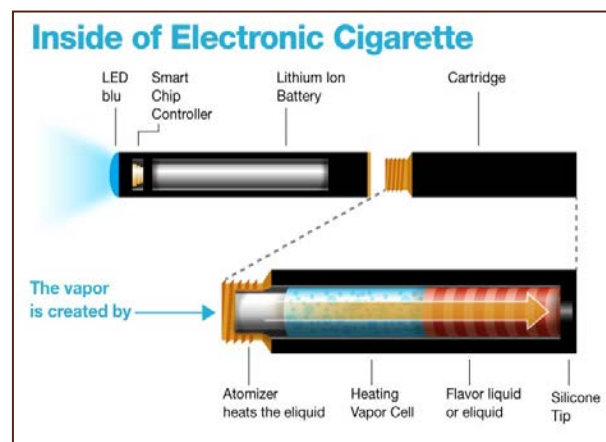
in smoke free environments and to cause confusion as to why it is allowed.¹¹ Prior to [San Francisco Health Code Article 19N](#), the San Francisco Department of Public Health received several inquiries from businesses and community members regarding e-cigarette usage in smoke free areas.

WHAT'S IN AN E-CIGARETTE?

See Table 1: What's in an E-cigarette?

A common ingredient in most e-cigarettes is nicotine. Nicotine (LD_{50} : 3.34mg/kg)¹² is a stimulant and is toxic at relatively low concentrations when compared to other stimulants such as caffeine (LD_{50} : 192mg/kg).¹³ It is the main addictive ingredient in cigarettes and has been considered as addictive as heroin or cocaine.¹⁴ Persons under the age of 18 are highly susceptible due to their still developing brains.^{8,15,16} Studies show that nicotine usage at an early age causes changes to the brain and is associated with greater usage during adulthood.¹⁷ Like most drugs, nicotine usage results in the development of tolerance and a necessity for increased usage. It is also associated with withdrawal symptoms such as anxiety, loss of concentration, tremors, and teeth chattering.¹⁸ Studies have shown that nicotine may act as a gateway drug for more illicit drugs, such as cocaine.¹⁹

Inhalation of nicotine quickly distributes the drug into the bloodstream and then the brain. Nicotine use can produce birth defects through first hand or second hand usage.^{16,20} Nicotine is also readily absorbed through dermal contact and can quickly lead to sickness.²¹ While nicotine is not a carcinogen, studies have shown that it may act as a "tumor promoter."²² The amount of nicotine listed on an e-cigarette product has been shown to be inaccurate at times.^{23,24} This is most likely attributable to a lack of quality control standards. It should be noted that all e-cigarette nicotine is derived from tobacco; therefore, e-cigarettes are tobacco products.²⁵



Nicotine is a toxin and is NOT harmless.

Another common ingredient in e-cigarettes is propylene glycol, which is the component of e-cigs that creates the simulation of cigarette smoke. Propylene glycol is generally regarded as safe as a food additive; however, propylene glycol can produce sore throat, lung and eye irritation, and muscle soreness if inhaled in its gaseous state. This can be particularly dangerous for persons with lung conditions such as asthma.^{26,27} Dow Chemical Company is the world leader of production of propylene glycol and states that it "does not support or recommend the use of PG in applications where inhalation exposure or human eye contact with the spray mists of these materials is likely."²⁸ Currently there is no long term data on the health effects of inhaling propylene glycol on a regular basis.²⁹

Flavors such as strawberry, chocolate, cotton candy, grape, peach, cherry, etc., are also commonly found in e-cigarettes. Flavorants that are generally regarded as safe (GRAS) by Section 201 (s) of the Federal Food, Drug, and Cosmetic Act, are only considered safe as food additives. The Flavor and Extract Manufacturers Association (FEMA) warns that e-cigarette flavor additives should not be considered safe due to their FEMA GRAS status. This status is only awarded to flavors meant for human ingestion, not inhalation. They also further warn that the use of occupational exposure limits (OELs), permissible exposure limits (PELs), recommended exposure limits (RELs), and threshold limit values (TLVs) for flavorings are only applicable to workplace conditions and should not be used as indicators of safety for e-cigarettes.³⁰

Several e-cigarette aerosols have tested positive for toxic substances, volatile organic compounds, tobacco specific nitrosamines, and heavy metals.^{31,32, 33,34,43,44,45} The presence of heavy metals, such as tin, lead, and

zinc are most likely attributed to the lack of oversight in the manufacturing of e-cigarette parts. Ninety percent of the world's e-cigarettes are produced in China with little to no quality control standards.³⁵ Carcinogens such as formaldehyde and acrolein have been found in e-cig aerosol to be at similar, but at lower levels than the smoke produced by cigarettes.

While e-cigarettes may contain and produce fewer toxins than traditional cigarettes, they are not harmless. Without regulations, standards, and long term data; the safety of these products cannot be guaranteed or determined.

HOW ARE E-CIGARETTES HARMFUL TO OTHERS?

SECOND-HAND HARM

See: Table 1: What's in an E-cigarette?

A non-smoker sharing the same air space can smell and see second-hand smoke emitted from traditional cigarettes, which are known to the scientific community to contain toxic and cancer-causing chemicals. Electronic cigarettes do not emit the same smoke as traditional cigarettes, but similar to traditional cigarettes they can cause second-hand exposure or "passive vaping."



When used, electronic cigarettes emit aerosol that often contains nicotine, ultrafine particles and low levels of toxins, introducing new pollutants into the air.^{36,37} Studies have found that non-smokers who were exposed to passive vaping absorb nicotine (cotinine – a biomarker of nicotine) at significantly higher levels than those who are not exposed to e-cigarettes or traditional cigarettes.³⁸ In fact, the levels of cotinine absorbed by non-smokers exposed to passive vaping are similar to that of traditional cigarettes.^{38,39} The World Health Organization and American Industrial Hygiene Association recommend that electronic cigarettes should not be used indoors or in designated smoke-free environments due to potential harm.^{9,40} San Francisco Health Code 19N prohibits the use of electronic cigarettes in public places wherever the use of cigarettes is prohibited to minimize second-hand harm to others. In addition to potential second hand harms, there is evidence that electronic cigarettes may be a source of thirdhand exposure to nicotine.⁴¹



**E-CIGARETTES ARE HARMFUL, LIKE CIGARETTES.
NOT ALLOWED IN PUBLIC
VAPE AND SMOKE ONLY AT THE CURB.**

Vaping and Smoking are **not** allowed in: Buildings • **Muni & BART** Lobbies • Enclosed Structures • Restrooms • Indoor & Outdoor Dining Halls • Elevators • Cab Stands • Lounges • Waiting Areas • Sports Arenas • Playing Fields • Marine Facilities • Piers • Docks • Wharfs • Residential Hotels • Laundry Facilities • Ticket Lines • Farmer's Markets • Workplaces • Eating & Break Rooms • Senior Housing & Condos • Covered Parking Areas • Entrances to Public Places • Event Lines • Playgrounds & Tot Lots • ATM & Bank Teller Windows • Meeting Rooms • Public Transit Buses & Trains • City Parks & Recreational Areas • SF Housing Authority Buildings • Single Room Occupancy Hotels • Taxis/Vehicles for Hire • Outdoor Events on City & County Property • Multi-Unit Housing Enclosed Common Areas • Ticketing Areas • Stairways • Outdoors within 15 Feet of Operable Windows & Vents

#CURBIT | SFTOBACCOFREE.ORG | QUIT NICOTINE (415) 206-6074 | SF DEPT OF PUBLIC HEALTH

TABLE 1: WHAT'S IN AN E-CIGARETTE?

Without regulations and standards, contents of e-cigarette liquids vary, therefore the makeup of the aerosol emitted varies as well. The following table summarizes some constituents detected in e-cigarette aerosol when researchers measured the vaping and passive vaping of e-cigarettes and lists the potential harm of these constituents.

(Prop 65) indicates that the constituent is listed on the California Prop 65 (Safe Drinking Water and Toxic Enforcement Act) list of chemicals known to the state to cause cancer or reproductive toxicity.⁴² An asterisk () indicates that the constituent was detected in studies examining second-hand harm. IARC = International Agency for Research on Cancer*

Constituents	Source(s)	Potential Harm
Volatile organic compound		
Nicotine*	Goniewicz 2013, Schripp 2012 ⁴³ , Westenberger 2009 ⁴⁴ , Balbe 2014, Flouris 2013	Reproductive harm; Carcinogenic and Reproductive toxin (Prop 65)
Acetaldehyde*	Schripp 2012, Goniewicz 2013, Hutzler 2014, Kosmider 2014	Toxic, irritating, possibly carcinogenic as classified as Group 2 based on IARC (Prop 65)
Acetyl Propionyl	Farsalinos 2014	Respiratory disease
Acrolein	Goniewicz 2013	Toxic, irritating to nasal cavity
Diacetyl	Farsalinos 2014 ⁴⁵	Respiratory disease
Diethylene Glycol	Westenberger 2009	Poisonous organic compound
Formaldehyde*	Schripp 2012, Goniewicz 2013, Hutzler 2014, Kosmider 2014	Toxic, irritating, carcinogenic; carcinogenic and reproductive toxin classified as Group 1 based on IARC
Propylene glycol*	Schripp 2012	Short term irritation of eyes, throat and airways
Toluene	Goniewicz 2013	Carcinogenic and reproductive toxin (Prop 65)
Metals		
Aluminum	Williams 2013	Respiratory distress & disease
Boron	Williams 2013	Respiratory distress
Cadmium	Goniewicz 2013	Toxic metal (Prop 65)
Calcium	Williams 2013	Respiratory distress
Chromium	Williams 2013	Carcinogenic, Respiratory disease toxicant, Reproductive development toxicant (Prop 65)
Iron	Williams 2013	Respiratory distress & disease
Lead	Goniewicz 2013, Williams 2013	Carcinogenic, Respiratory disease toxicant, Reproductive development toxicant (Prop 65)
Nickel	Williams 2013	Respiratory distress & disease (Prop 65)
Silicon	Williams 2013	Respiratory distress & disease
Sodium	Williams 2013	Respiratory distress & disease
Tin	Williams 2013	Respiratory distress & disease
Carcinogenic nitrosamines		
NNN	Goniewicz 2013, Westenberger 2009	Carcinogenic and reproductive toxin
NNK	Goniewicz 2013	Carcinogenic nitrosamines

Other important findings from these studies include:

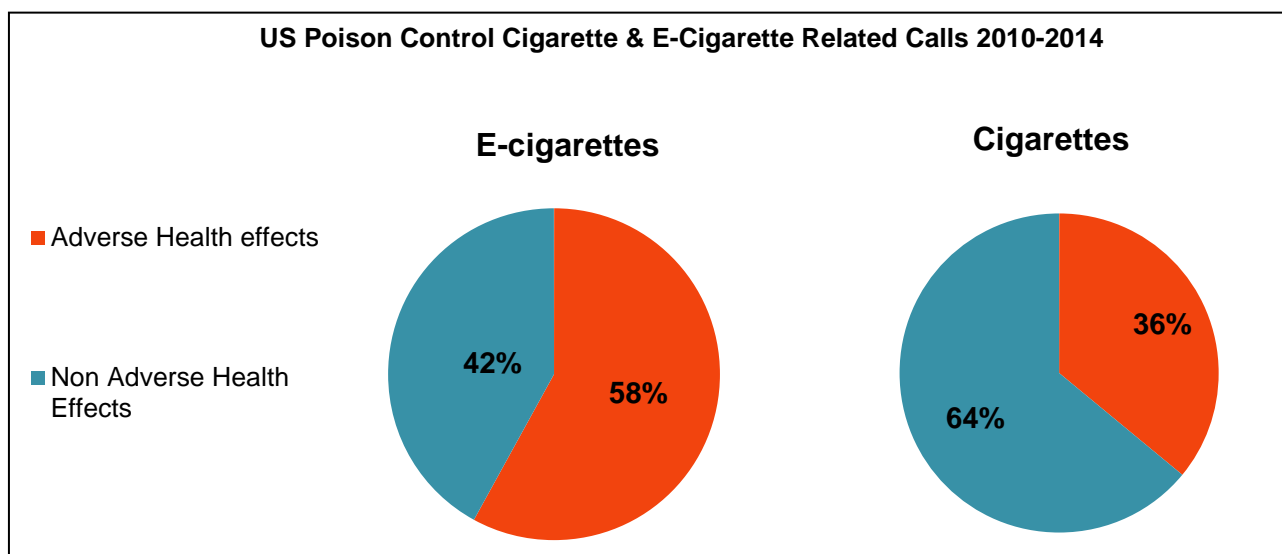
- Goniewicz et al (2013) showed that the following were emitted from the majority of e-cigarette products at significantly higher levels (p<0.05) than that of a nicotine inhalator (reference): formaldehyde, acetaldehyde, acrolein, and toluene. Nicorette inhalator was used as a reference because it is a Food and Drug Administration approved cessation product.
- Williams et al (2013) showed the following were at higher concentration per 10 puffs in electronic cigarette aerosol than in cigarettes: sodium, iron, aluminum, copper, and nickel. All of these metals can cause respiratory distress.
- Farsalinos et al (2014) showed that 47% of samples that contain diacetyl and 41.5% of samples that contain acetyl propionyl exposed people to levels higher than safety limits set by National Institute for Occupational Safety and Health.

NICOTINE POISONING OF CHILDREN FROM E-CIGARETTES

Cases of nicotine poisoning related to electronic cigarettes are dramatically increasing among children, mostly under 5 years old. U.S. poison control centers have seen an increase in calls related to e-cigarettes from 1 per month in 2010 to upwards of 200 per month in 2014. During that same period, among all tobacco-related calls the proportion of e-cigarette related calls increased from 0.3% to 41.6%. More than half (57.8%) of e-cigarette exposure calls reported an adverse health effect in comparison to 36% of cigarette related calls. Common adverse health effects of e-cigarette calls are vomiting, nausea, and eye irritation.⁴⁶ Currently, there are no standards to require child-proof packaging of e-cigarette cartridges, making it easy for children to access toxic nicotine, which is often colored and flavored.⁴⁷ E-liquids usually contain nicotine, which if ingested can be lethal; 10 mg or 2 teaspoon dose of nicotine can be fatal to a child. Half a pack of cigarettes contains about 10 mg of nicotine; cartridges of electronic cigarettes contain up to 20 mg of nicotine depending on the brand and type.⁴⁸ Adults are often unaware that nicotine is toxic and can pose a health hazard to them and their child.⁴⁹



In December 2014, a one-year-old in New York was the first case of death related to ingestion of liquid nicotine from an electronic cigarette.⁵⁰ Adult poisonings related to e-cigarettes have also occurred. In Kentucky, 40% of their poison control cases related to e-cigarettes involve adults including one woman who was admitted to a hospital for cardiac problems after she spilled e-liquid and absorbed nicotine through her skin.



ARE YOUNG PEOPLE USING E-CIGARETTES?

Over the last few years multiple studies nationally and internationally have shown an increase in youth usage of e-cigarettes.²³ According to National Youth Tobacco Survey by the Centers for Disease Control and Prevention (CDC), in 2013, 263,000 teens had used e-cigarettes but had never smoked traditional cigarettes. This represents a 3-fold increase from the 79,000 young people reported in 2011.⁵¹ Monitoring the Future, another 2014 nation-wide study, showed the same trend: 16% of 10th graders and 17% of 12th graders used e-cigs while 7% of 10th graders and 14% of 12th graders used cigarettes within the last month.⁵²



Another study showed that usage among 15-19 year olds increased from 5.5% to 29.9% from 2010-11 to 2013-14 respectively. However, youth are not replacing traditional cigarette use with e-cigarettes. This study showed that usage of both cigarettes and e-cigarettes (dual use) among these youths increased from 3.6% to 21.8% during the same period.^{53,54} Bay Area schools have added e-cigarettes to their tobacco policies in response to increasing usage and popularity among their students.⁵⁵ Another study shows that children may be using e-cigarettes to imitate the behaviors of their parents.⁵⁶ Early nicotine addiction is a particular concern, especially among youth. Youth tend to use e-cigarettes and traditional cigarettes concurrently.⁵⁷

A closer look at the National Youth Tobacco Survey shows that youth who have ever smoked an electronic cigarette were 1.7 times more likely to express positive intentions to smoke traditional cigarettes, than those who have never used electronic cigarettes.⁸ A survey of almost 5,000 youth from middle school and high school showed that one-fifth of youth who tried e-cigarettes did not know whether their e-cigarette contained nicotine. Youth who had never smoked cigarettes were more likely to transition from e-cigarettes without nicotine to e-cigarettes containing nicotine than youths that had previously smoked.⁵⁸ Also, for youth who have ever smoked cigarettes, e-cigarette use was associated with lower abstinence of cigarettes, implying that e-cigarettes may not discourage cigarette usage or facilitate cessation.

Youth are being targeted by the e-cigarette industry with similar tactics to those used by traditional cigarette sellers in the past, including cartoons, celebrities, flavors, and sports sponsorships.⁵⁹ The Food and Drug Administration has considered flavored tobacco products as a starter product for youth and considered unsafe.⁶⁰ However, unlike marketing for traditional cigarettes, regulation of e-cigarettes marketing does not exist and therefore youth are not protected from targeted marketing on television, radio, and the internet. In 2013, six e-cigarette companies alone spent \$59.3 million on marketing. Between 2012 and 2013, e-cigarette companies offered sponsorship or free samples at 348 events, many of which were youth oriented.⁶¹ This level of marketing seems to have been successful given that 89% of youth ages 13-17 are aware of e-cigarettes.⁶² An analysis of Nielsen data showed that youth exposure to e-cigarette television advertisements increased by 256% between 2011 and 2013.⁶³ Focus groups held with over 1,000 middle school, high school, and college-age youth showed that the top reason for experimenting with e-cigarettes was curiosity (54.4%), appealing flavors (43.8%), and peer influences (31.6%).⁶⁴ Monitoring the Future Survey (2014) also found that youth tend to be less aware of potential harms of e-cigarettes while the majority of youth know that cigarettes are harmful.⁶⁵ This lack of awareness of potential harms of e-cigarettes may be associated with increased experimentation.⁶⁶ Stanford University School of Medicine has compiled a large [depository of e-cigarette advertisements](#) illustrating marketing toward youths and similarities to previous tobacco industry tactics.



WHAT IS BIG TOBACCO'S RELATIONSHIP TO E-CIGARETTES?

The electronic cigarette market initially consisted of businesses selling products over the internet. Now, major tobacco companies have come into the electronic cigarette market due to a decline in cigarette sales in the United States and local vape shop businesses are appearing.⁶⁷ The growing e-cigarette market is an opportunity and the tobacco industry is heavily investing in it.⁶⁸ Business deals among major tobacco companies in the US and internationally have changed the face of both the e-cigarette and cigarette industries.⁶⁹ Currently, each major tobacco company, such as Altria (Philip Morris International), Lorillard, and Reynolds American, owns an e-cigarette company.⁷⁰ Patents of e-cigarettes have been purchased and intellectual property rights are being obtained, promising future law suits between rivals with similar technology. In 2013, British Imperial bought a portfolio of global e-cigarette patents from Dragonite International, the company credited for inventing the e-cigarette.⁷¹

DO E-CIGARETTES HELP PEOPLE QUIT SMOKING?

No e-cigarette product has been evaluated or approved as a smoking cessation device. Studies have shown that they are no more effective than approved cessation methods on the population level. An analysis of state telephone quit line callers showed that e-cigarette users were less likely to remain tobacco abstinent.⁷² Other longitudinal studies have also demonstrated that e-cigarette usage was not a predictor of abstinence and in some instances resulted in increased tobacco usage.^{73,74} However, it should be noted that many short and long term smokers have claimed to have quit or reduced smoking traditional cigarettes through the usage of e-cigarettes. Despite these claims, smoking cessation is complicated and it is impossible to state that one method will work for everyone.⁷⁵ The success of a cessation attempt is influenced by many factors such as age, gender, smoking history, and environment in addition to method.⁷⁶ Analysis of sales shows that many e-cig users are either returning to traditional cigarettes or using both products (dual use). It is believed that up to 80% of e-cig users are using both traditional and electronic cigarettes.⁷⁷ More extensive research is required to determine the impacts of these devices. Experts state that e-cigarettes should only be used when other approved methods have failed and should be used with caution.⁷⁸

Many proponents of e-cigarettes have claimed the product to be a method of harm reduction. However, unlike with needle exchange and other harm reduction practices, e-cigarettes are sold with a vested business interest. A successful e-cigarette harm reduction model would be counter intuitive to a sustainable business.⁷⁹

- ¹ Colliver, V. (2015). "[Big battles ahead over e-cigarettes' safety, regulation.](#)" *San Francisco Chronicle*.
- ² Zhu, S., Sun, J., et al. (2014). "[Four hundred and sixty brands of e-cigarettes and counting: implications for product regulation.](#)" *Tobacco Control*. doi:10.1136/tobaccocontrol-2014-051670
- ³ Van Hollen, J., Hood, J., et al. (2013). "[FDA Regulation of E-Cigarettes.](#)" *National Association of Attorneys General*.
- ⁴ Bankhead, C. (2015). "[AACR, ASCO Urge FDA to Move on E-Cig Regulations.](#)" *MedPage Today*.
- ⁵ Corona, M. & Marcus, E. (2015). "Electronic cigarette caused Sparks High gym explosion." *Reno-Gazette Journal*.
- ⁶ Liebelson, D. & Suebsaeng, A. (2014). "[Should You Be Worried About Your E-Cigarette Exploding?](#)" *MotherJones*
- ⁷ Goodman, A. (2013). "[E-Cigarettes Are Smoking Hot - Four Ways To Invest In Them.](#)" *Forbes*.
- ⁸ Bunnell, R., Agaku, I., et al. (2014). "[Intentions to smoke cigarettes among never-smoking U.S. middle and high school electronic cigarette users, National Youth Tobacco Survey, 2011-2013.](#)" *Nicotine & Tobacco Research*. doi:10.1093/ntr/ntu166
- ⁹ World Health Organization. (2014). "[Electronic Nicotine Delivery Systems.](#)" *Conference of the Parties to the WHO Framework Convention on Tobacco Control*
- ¹⁰ Avdolic, M & Murin, S. (2012). "Electronic Cigarettes: No Such Thing as a Free Lunch...Or Puff." *Chest*. 141(6):13711372. doi:10.1378/chest.120205
- ¹¹ Slavitt, W. (2011). "[What Employers Need to Know About Electronic Cigarettes.](#)" *National Business Group on Health*.
- ¹² (2013). "[Material Safety Data Sheet L-Nicotine MSDS.](#)"
- ¹³ (2013) "[Material Safety Data Sheet Caffeine MSDS.](#)"
- ¹⁴ Lande, G. & Dunayevich, E. (2014). "[Nicotine Addiction.](#)" *Medscape*.
- ¹⁵ Breslau, N. & Peterson, E.L. (1996) "[Smoking cessation in young adults: age at initiation of cigarette smoking and other suspected influences.](#)" *American Journal of Public Health*. Vol. 86, No. 2, pp. 214-220. doi: 10.2105/AJPH.86.2.214.
- ¹⁶ U.S. Department of Health and Human Services. (2014) "[The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General.](#)" Atlanta: 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.
- ¹⁷ Benowitz, N. (2010). "[Nicotine Addiction.](#)" *The New England Journal of Medicine*. doi: 10.1056/NEJMra0809890
- ¹⁸ Berrendero, F., Robledo, P., et al. (2010). "[Neurobiological mechanisms involved in nicotine dependence and reward: Participation of the endogenous opioid system.](#)" *Neuroscience and Biobehavioral Reviews*. Vol. 35. Pp. 220-231.
- ¹⁹ Kandel, E. & Kandel, D. (2014). "[A Molecular Basis for Nicotine as a Gateway Drug.](#)" *The New England Journal of Medicine*. Vol. 371. Pp. 932-943.
- ²⁰ Wickstrom, R. (2007). "[Effects of Nicotine During Pregnancy: Human and Experimental Evidence.](#)" *Current Neuropharmacology*. Vol. 4, No. 3. Pp. 213-222.
- ²¹ Benowitz, N., Hukkanen, J., Jacob, P. (2009). "[Nicotine Chemistry, Metabolism, Kinetics and Biomarkers.](#)" *Handbook of Experimental Pharmacology*. Vol. 192. Pp. 29-60.
- ²² Zong, Y., Zhang, S., et al. (2009). "[Nicotine enhances migration and invasion of human esophageal squamous carcinoma cells which is inhibited by nimesulide.](#)" *World Journal of Gastroenterology*. doi:10.3748/wjg.15.2500
- ²³ Durmowicz, E. (2014). "[The impact of electronic cigarettes on the pediatric population.](#)" *Tobacco Control*. doi:10.1136/tobaccocontrol-2013-051468
- ²⁴ Hutzler, C., Paschke, M., et al. (2014). "[Chemical hazards present in liquids and vapors of electronic cigarettes.](#)" *Archives of Toxicology*. Vol. 88, Is. 7, pp. 1295-1308
- ²⁵ Scudder, L. & Zeller, M. (2014). "[Preventing Teen Tobacco Use: An Interview With the FDA.](#)" *Medscape*
- ²⁶ Wieslander, G., Norbäck, D., Lindgren, T. (2001) "[Experimental exposure to propylene glycol mist in aviation emergency training: acute ocular and respiratory effects.](#)" *Occupational and Environmental Medicine*. Vol. 58 No. 10. Pp. 649-655
- ²⁷ Choi, H., Schmidbauer, N., Spengler, J., Bornehag, C. (2010). "[Sources of Propylene Glycol and Glycol Ethers in Air at Home.](#)" *International Journal of Environmental Research and Public Health*. Vol. 7, No. 12. Pp. 4213–4237
- ²⁸ Dow Chemical (DOW). (2006). "[Product Safety Assessment \(PSA\): Propylene Glycol.](#)"
- ²⁹ Callahan-Lyon, P. (2014). "[Electronic cigarettes: human health effects.](#)" *Tobacco Control*. doi:10.1136/tobaccocontrol-2013-051470
- ³⁰ (2015). "[The Safety Assessment and Regulatory Authority to Use Flavors – Focus on E-Cigarettes.](#)" *Flavor and Extract Manufacturers Association of the United States*.
- ³¹ Goniewicz, M., Knysak, J., et al. (2013). "[Levels of selected carcinogens and toxicants in vapour from electronic cigarettes.](#)" *Tobacco Control*.
- ³² Williams, M., Villareal, A., et al. (2013). "[Metal and Silicate Particles Including Nanoparticles Are Present in Electronic Cigarette Cartomizer Fluid and Aerosol.](#)" *PLOS ONE*. doi: 10.1371/journal.pone.0057987
- ³³ Kosmider, L., Sobczak, A., et al. (2014). "[Carbonyl Compounds in Electronic Cigarette Vapors—Effects of Nicotine Solvent and Battery Output Voltage.](#)" *Nicotine & Tobacco Research*. doi: 10.1093/ntr/ntu078
- ³⁴ Czogla, J., Goniewicz, M., et al. (2013). "[Secondhand Exposure to Vapors From Electronic Cigarettes.](#)" *Nicotine & Tobacco Research*. doi: 10.1093/ntr/ntt203
- ³⁵ Barboza, D. (2014). "[China's E-Cigarette Boom Lacks Oversight for Safety.](#)" *New York Times*
- ³⁶ German Cancer Research Center. (2013). "[Electronic Cigarettes – an Overview.](#)" *Tobacco Prevention and Tobacco Control*. Vol. 19

- ³⁷ Grana, R., Benowitz, N., Glantz, S. (2013). [“Background Paper on E-cigarettes.”](#) Center for Tobacco Control Research and Education, University of California, San Francisco and WHO Collaborating Center on Tobacco Control
- ³⁸ Ballbè, M., Martínez-Sánchez, J. M., Sureda, X., Fu, M., Pérez-Ortuño, R., Pascual, J. A., ... & Fernández, E. (2014). [“Cigarettes vs. e-cigarettes: Passive exposure at home measured by means of airborne marker and biomarkers.”](#) *Environmental Research*, 135, 76-80.
- ³⁹ Flouris, A. D., Chorti, M. S., Poulianiti, K. P., Jamurtas, A. Z., Kostikas, K., Tzatzarakis, M. N., ... & Koutedakis, Y. (2013). [“Acute impact of active and passive electronic cigarette smoking on serum cotinine and lung function.”](#) *Inhalation Toxicology*, 25(2), 91-101.
- ⁴⁰ AIHA Indoor Environmental Quality Committee and Risk Assessment Committee (2014) [“White Paper: Electronic Cigarettes in the Indoor Environment.”](#) American Industrial Hygiene Association
- ⁴¹ Goniewicz, M. & Lee, L. (2014). [“Electronic Cigarettes Are a Source of Thirdhand Exposure to Nicotine.”](#) *Nicotine & Tobacco Research*. doi: 10.1093/ntr/ntu152
- ⁴² Office of Environmental Health Hazard Assessment. (2014). [“Proposition 65 list.”](#)
- ⁴³ Schripp, T., Markewitz, D., Uhde, E., & Salthammer, T. (2013). [“Does e-cigarette consumption cause passive vaping?”](#) *Indoor Air*, 23(1), 25-31
- ⁴⁴ Westenberg, B.J., [“Evaluation of e-cigarettes.”](#) St. Louis, MO: U.S. Department of Health and Human Services (DHHS), Food and Drug Administration (FDA), Center for Drug Evaluation and Research, Division of Pharmaceutical Analysis, May 4, 2009
- ⁴⁵ Farsalinos, K. E., Kistler, K. A., Gillman, G., & Voudris, V. (2014). [“Evaluation of electronic cigarette liquids and aerosol for the presence of selected inhalation toxins.”](#) *Nicotine & Tobacco Research*, ntu176
- ⁴⁶ Catham-Stephens, K., Law, R., et al. (2014). [“Notes from the Field: Calls to Poison Centers for Exposures to Electronic Cigarettes — United States, September 2010–February 2014.”](#) *Morbidity and Mortality Weekly Report*. Vol. 63, No. 13; pp. 292-293
- ⁴⁷ Food and Drug Administration (2014) [“News and events—electronic cigarettes \(e-cigarettes\).”](#) Silver Spring, Maryland: US Department of Health and Human Services, Food and Drug Administration
- ⁴⁸ Cobb, N. K., & Abrams, D. B. (2011). [“E-cigarette or drug-delivery device? Regulating novel nicotine products.”](#) *The New England journal of medicine*, 365(3), 193.
- ⁴⁹ Ritche, M. (2014) [“Selling a Poison by the barrel: Liquid Nicotine for E-cigarettes”](#) *New York Times*
- ⁵⁰ Gillian Mohney (2014) [“First Child’s Death from Liquid Nicotine Reported as ‘Vaping’ Gains Popularity”](#) *ABC News*
- ⁵¹ Center for Disease Control (2014) [“More than a quarter million youth who have never smoked a cigarette used e-cigarettes in 2013”](#)
- ⁵² Monitoring the Future (2014) [“E-cigarettes surpass tobacco cigarettes among teens”](#)
- ⁵³ Goniewicz, M., Gawron, M. et al. (2014). [“Rise in Electronic Cigarette Use Among Adolescents in Poland.”](#) *Journal of Adolescent Health*. Vol. 55. Pp. 713-715.
- ⁵⁴ Lee, Y. et al. (2015). “Youth Tobacco Use in the United States.” *Pediatrics*. doi: 10.1542/peds.2014-3202
- ⁵⁵ Tsai, J. (2014). [“Bay Area school districts rewind tobacco policies to counter teen e-cigarette use.”](#) *Contra Costa Times*.
- ⁵⁶ Moore, G., Moore, L., et al. (2014). [“Exposure to secondhand smoke in cars and homes, and e-cigarette use among 10-11 year old children in Wales: CHETS Wales 2.”](#) *Llywodraeth Cymru Welsh Government*
- ⁵⁷ Dutra, L. M., & Glantz, S. A. (2014). [“Electronic cigarettes and conventional cigarette use among US adolescents: a cross-sectional study.”](#) *JAMA pediatrics*.
- ⁵⁸ Krishnan-Sarin, S., Morean, M., Camenga, D., Cavallo, D. A., & Kong, G. (2014). [“E-cigarette Use among High School and Middle School Adolescents in Connecticut.”](#) *Nicotine & Tobacco Research*, ntu243.
- ⁵⁹ Tobacco Free Kids (2013) [“7 ways E-cigarette Companies Are Copying Big Tobacco’s Play book.”](#)
- ⁶⁰ US Food and Drug Administration (2011) [“Flavored Tobacco Product Fact Sheet.”](#)
- ⁶¹ (2014). [“Gateway to Addiction?”](#)
- ⁶² Legacy for Health. (2014). [“Vaporized.”](#)
- ⁶³ Duke, J., Lee, Y., et al. (2014). [“Exposure to Electronic Cigarette Television Advertisements Among Youth and Young Adults.”](#) *Pediatrics*. doi:10.1542/peds.2014-0269
- ⁶⁴ Kong, G., Morean, M. E., Cavallo, D. A., Camenga, D. R., & Krishnan-Sarin, S. (2014). [“Reasons for Electronic Cigarette Experimentation and Discontinuation Among Adolescents and Young Adults.”](#) *Nicotine & Tobacco Research*, ntu257.
- ⁶⁵ Monitoring the Future (2014) [“University of Michigan’s Monitoring the Future Text, Figures, & Tables.”](#)
- ⁶⁶ Choi, K. & Forster, J. (2014). “Beliefs and Experimentation with Electronic Cigarettes. A Prospective Analysis Among Young Adults.” *American Journal of Preventive Medicine*. 46(2). Pp. 175-178
- ⁶⁷ Esterl, M. & Evans, P. (2014). [“Reynolds American, Lorillard Confirm Merger Talks.”](#) *Wall Street Journal*.
- ⁶⁸ Andrew Goodman (Dec 5, 2013) [“E-cigarettes Are Smoking Hot- Four ways to Invest in them”](#) *Forbes*
- ⁶⁹ Tobacco Tactics (November 2014) [“Tobacco Tactics- Tobacco Companies Investing in E-cigarettes”](#)
- ⁷⁰ Tobacco Control Research Group (2014) [“Tobacco Industry’s Investment in non-cigarette nicotine products”](#)
- ⁷¹ The Economist. (2014). [“E-cigarette patent wars.”](#)
- ⁷² Vickerman, K., Carpenter, K., et al. (2013). “Use of Electronic Cigarettes Among State Tobacco Cessation Quitline Callers.” *Nicotine & Tobacco Research*.
- ⁷³ Borederud, S., et al. (2014). “Electronic cigarette use among patients with cancer: Characteristics of electronic cigarette users and their smoking cessation outcomes.” *Cancer*. 120(22) 3527-3535 doi: 10.1002/cncr.28811
- ⁷⁴ Prochaska, J. & Grana, R. (2014). [“E-Cigarette Use among Smokers with Serious Mental Illness.”](#) *PLOS One*. doi: 10.1371/journal.pone.0113013

-
- ⁷⁵ Hung, W., Dunlop, S., et al. (2011). "[Use and perceived helpfulness of smoking cessation methods: results from a population survey of recent quitters.](#)" *BMC Public Health*. doi:10.1186/1471-2458-11-592
- ⁷⁶ (2014). "[Methods to Facilitate Smoking Cessation: Guidelines and Treatment Modalities.](#)" *Medscape*.
- ⁷⁷ Stanford, D. (2014). "[E-Cig Sales Slide as Regular Smokers Return to Real Thing.](#)" *Bloomberg*.
- ⁷⁸ Fiore, M., Schroeder, S., et al. (2014). "[Smoke, the Chief Killer — Strategies for Targeting Combustible Tobacco Use.](#)" *The New England Journal of Medicine*. doi: 10.1056/NEJMp1314942
- ⁷⁹ Maziak, W. (2014). "Harm Reduction at the Crossroads The Case of E-Cigarettes." *American Journal of Preventive Medicine*. 47(4):505-507.