E-Cigarettes:

Talking Tech with the New Generation

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Objectives

- Describe the e-cigarette device
- Discuss its appeal to users
- Recognize usage patterns of e-cigarettes
- Identify current e-cigarette prevention strategies

- Electronic cigarettes do not contain the same cancer causing chemicals that are found in traditional cigarettes.
 - True
 - False



- Electronic cigarette use has increased among the US population since 2007 with 13% of all high school students currently using them.
 - True
 - False

- The Federal Drug Administration has approved the use of electronic cigarettes as a smoking cessation aid.
 - True
 - False

17 Facts about E-Cigarettes that May Surprise You



Electronic Cigarettes



- E-cigs
- Electronic Nicotine Delivery Systems (ENDS)
- Battery powered devices that heats up a liquid
- Liquid, and in turn, the vapor contains:
 - Nicotine
 - Flavoring
 - Chemicals
- Inhale the vapor
 - "vaping"
 - "cloud chasing"



What is an E-Cigarette?



How do E-Cigarettes work?





Recharging









Nicotine



Flavors











Chemicals

- Propylene glycol
- Glycerol
- Nicotine
- Formaldehyde
- Acetaldehyde
- Acrolein
- Toluene
- Nickel
- Lead

Current E-Cigarette Use

Middle school

- **2011:** 0.6% 1.4%
- **2012**: 1.1% 2.7%
- 2013: 1.1%
- 2014: 3.9% (450,000)

High school

- **2011**: 1.5% 4.7%
- **2012: 2.8% 10.0%**
- 2013: 4.5%
- 2014: 13.4% (2 million)

Adults:	
2010: 3.3%	
2011: 6.2%	
2013: 8.5%	

Stealth Vaping











Adverse Medical Effects

- Vomiting
- Nausea
- Ocular irritation
- Dizziness
- Tachycardia
- Agitation
- Headache
- Red eye

- Abdominal pain
- Oral irritation
- Chest pain
- Coughing
- Flushing
- Palpitations
- Confusion
- Death

Poison center calls involving e-cigarettes



Texas Poison Control Network

- E-cig exposure related calls
- January 2010 June 2014
 - □ 57% Age <5
 - Unintentional
 - 96% in residence
 - 85% ingestion
 - 11% dermal
 - 23% vomiting

Dangers of E-Cigs









Smoking Cessation Aid

- Not been approved by the FDA as a cessation aid
- Smokers that used e-cigarettes were less likely to quit smoking – Majority of studies
 Contradictory reports
- Nicotine delivery that exceeds a traditional cigarettes



"I'M JUST CHECKING MY E-CIGARETTE."

Nicotine Comparison

Regular Cigarette

E-liquid Nicotine

Unfiltered, very strong	Super High	-	36mg
Full Flavored, Strong	Extra High	-	24mg
Regular (most)	High	-	16mg
Light	Med	-	11mg
Ultra-light	Low	-	8mg
Freedom from Nicotine!	No Nicotine	-	0mg

Increase in Sales

- Increase in sales every year since 2007
 - Decrease in traditional cigarette sales
- Internet sales of e-cigarettes are unregulated

Table 1. /	Annual Dollar Sal	les (Thousands) for	Disposable E-Cigarettes,	Starter Kits, and Ca	rtridge Refills, Co	onvenience Stores
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	Disposable e-cigarettes			Starter kits			Cartridge refills		
Geographic area	2012	2013	% Change	2012	2013	% Change	2012	2013	% Change
Total U.S.	76,927	323,696	320.8	40,245	69,381	72.4	72,942	132,738	82.0

Policies on E-cigarettes

- Lack of restrictions to minors
- Not regulated by FDA



- April 24, 2014 Proposed to extend tobacco regulatory authority to included e-cigs
- June 2014 El Paso City Council passed a ban on E-cigarettes
- Sept 1, 2014 Use of electronic cigarettes in public places is prohibited (El Paso)
 - Vaping banned within 20 feet of all public entrances

El Paso Ban on E-Cigarettes

El Paso City Council passes ban on e-cigarettes

By Cindy Ramirez / El Paso Times POSTED: 08/17/2014 07:52:05 PM MDT

» Replay live Twitter updates: El Paso City Council meeting

The use of electronic cigarettes in public places across El Paso where smoking is now banned will be prohibited starting Sept. 1, and both smoking and vaping will be banned from all city-owned properties such as parks starting in 2015.

That comes after the City Council on Tuesday approved changes to its ordinance regulating smoking in public and workplaces. The approved changes also will ban smoking and vaping within 20



Daryl Cura demonstrates an e-cigarette at Vape store in Chicago, Wednesday, April 23, 2014. (AP Photo/Nam Y. Huh) (Nam Y. Huh)

feet of all public entrances, except for the El Paso International Airport, starting Sept. 1.



City Rep. Eddie Holguin voted against the changes, while city Rep. Emma Acosta was absent. The other six representatives voted in favor of the ordinance changes.

E-cigarettes are battery-operated devices that heat a flavored liquid which generally contains nicotine. The devices often look like cigarettes or pens and release a vapor that is inhaled by the users known as vapers.

Supporters of the ordinance change argue that the e-cigarettes are unhealthy and the secondhand vapor is unwelcomed even if the devices are healthier than cigarettes.

"Let's set limits that protect shared public spaces," said Perla Retana, who has a 10-month-old son and says she doesn't want to be exposed to smoking or vaping at city parks or other public places. "I worry that he'll find cigarettes or parts of an e-cigarette and that it could be deadly. They're



Fig. 2 State-by-state comparison of e-cigarette regulation profiles. Mix, Mixed regulations; SBM, Sale to minors ban; SBM-UPL, Sale to minors ban and prohibited use in limited venues; SBM-UPM, Sale to minors ban and prohibited use of e-cigarette by minors; SBM-UPL-UPM, Sale to minors ban, prohibited use by minors, and in limited venues; UPC, Use prohibited comprehensively in indoor public places. Map created with [24]



Marketing

- Flavoring
- Renormalizing "smoking"
- Channels used for traditional cigarettes

SLIM. CHARGED. READY TO GO. AVAILABLE NATIONWIDE

- Celebrity endorsements
- Online/Social media presence
- Product innovations mods





0 Calories | 50 Servings





Get Paid \$1500 to Try This ... Smoke a Healthier Cigarette, Boost Energy, Lose A Few Pounds, & Get Paid.





Marketing as a Safe Alternative



STOP SMOKING AND START VAPING



Advertising costs 2011: \$6.4 million 2012: \$18.3 million 2013: \$82.1 million 2014: \$112.9 million



American Public Health Association

1. The Food and Drug Administration to establish regulations that hold e-cigarettes to at least the same marketing and advertising rules as conventional tobacco cigarettes.

2. The Consumer Product Safety Commission to add nicotine to its list of substances covered by regulations and to require special packaging, such as childproof packaging and warning labels, on nicotine solution cartridges to prevent childhood poisoning.

3. States and municipalities to enact and enforce laws restricting sales of e-cigarettes to minors, prohibiting the distribution of all free samples of and coupons for e-cigarettes, and prohibiting the use of e-cigarettes in all enclosed areas of public access and places of employment. 4. States and municipalities to impose a tax on the nicotine liquid used in e-cigarettes.

5. Congress to amend the Prevent All Cigarette Trafficking Act to include e-cigarette products, which would prohibit Internet venders from distributing them through the US Postal Service.

6. Employers to prohibit the use of e-cigarettes on their premises.

7. Federal agencies and voluntary health organizations to fund research on the shortand long-term health effects of e-cigarettes on users and nonusers and the efficacy of ecigarettes as a harm reduction/smoking cessation strategy

Arguments

• Contains lower levels of toxicants than a traditional cigarette

- Most contain nicotine
- Long-term health outcomes of chronic use have not been tested
- Safer smoking
 - Increased use
 - Gateway effect

• Can choose nicotine level

- Variation in nicotine
 - Not consistent between puffs, brands, or within brands
- Deviation from label
- Foreign manufacturing
- Products marked as no nicotine have been found to contain up to 10 mg



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- The Federal Drug Administration has approved the use of electronic cigarettes as a smoking cessation aid.
 - True
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Questions?

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References

Brown, J., Beard, E., Kotz, D., Michie, S., & West, R. (2014). Real-world effectiveness of e-cigarettes when used to aid smoking cessation: a cross-sectional population study. Addiction, 109(9), 1531-1540.

Callahan-Lyon P. Electronic cigarettes: human health effects. Tob Control. 2014;23(suppl 2):ii36–ii40.

Cantrell FL. Adverse effects of e-cigarette exposures. J Community Health. 2014;39(3):614–6

Centers for Disease Control and Prevention (CDC. (2013). Notes from the field: electronic cigarette use among middle and high school students-United States, 2011-2012. MMWR. Morbidity and mortality weekly report, 62(35), 729.

Chang, H. 2014. Research gaps related to the environmental impacts of electronic cigarettes. Tob. Control 23: ii54–ii58.

Chatham-Stephens, K., Law, R., Taylor, E., Melstrom, P., Bunnell, R., Wang, B., ... & Schier, J. G. (2014). Notes from the field: calls to poison centers for exposures to electronic cigarettes--United States, September 2010-February 2014. MMWR Morb Mortal Wkly Rep, 63(13), 292-293.

Cheng, Tianrong. 2014. "Chemical Evaluation of Electronic Cigarettes." Tobacco Control 23 Suppl 2: ii11–17. doi:10.1136/tobaccocontrol-2013-051482.

Cobb, C. O., Hendricks, P. S., & Eissenberg, T. (2015). Electronic cigarettes and nicotine dependence: evolving products, evolving problems. BMC medicine, 13(1), 119.

Durmowicz, E. L. (2014). The impact of electronic cigarettes on the paediatric population. Tobacco control, 23(suppl 2), ii41-ii46. Dutra, L. M., & Glantz, S. A. Electronic cigarettes and conventional cigarette use among US adolescents: a cross-sectional study. JAMA Pediatr 2014; 168: 610-617. External Resources Pubmed/Medline (NLM) CrossRef (DOI).

Etter, J. F., & Bullen, C. (2014). A longitudinal study of electronic cigarette users. Addictive behaviors, 39(2), 491-494.

Etter, J. F., Zäther, E., & Svensson, S. (2013). Analysis of refill liquids for electronic cigarettes. Addiction, 108(9), 1671-1679.

Flouris AD, Poulianiti KP, Chorti MS, Jamurtas AZ, Kouretas D, Owolabi EO, Tzatzarakis MN, Tsatsakis AM, Koutedakis Y. Acute effects of electronic and tobacco cigarette smoking on complete blood count. Food Chem Toxicol. 2012;50:3600–3603.

Forrester, M. B. (2015). Pediatric exposures to electronic cigarettes reported to Texas poison centers. The Journal of emergency medicine.

References

Grana, R., Benowitz, N., & Glantz, S. A. (2014). E-cigarettes a scientific review. Circulation, 129(19), 1972-1986.

Grana RA, Ling PM, Benowitz N, et al. Electronic cigarettes. Circulation 2014;129:e490-2.

Goniewicz, M. L., Hajek, P. and McRobbie, H. (2014), Nicotine content of electronic cigarettes, its release in vapour and its consistency across batches: regulatory implications. Addiction, 109: 500–507. doi: 10.1111/add.12410

Goniewicz, M.L. et al. 2014. Levels of selected carcinogens and toxicants in vapour from electronic cigarettes. Tob. Control 23: 133–139.

Gualano MR, Passi S, Bert F, La Torre G, Scaioli G, Siliquini R. Electronic cigarettes: assessing the efficacy and the adverse effects through a systematic review of published studies. J Public Health (Oxf). 2014. Epub 2014/08/12. doi: fdu055 [pii] doi: 10.1093/pubmed/fdu055 pmid:25108741.

Hajek, P., Etter, J. F., Benowitz, N., Eissenberg, T., & McRobbie, H. (2014). Electronic cigarettes: review of use, content, safety, effects on smokers and potential for harm and benefit. Addiction, 109(11), 1801-1810.

Kornfield, R., Huang, J., Vera, L., & Emery, S. L. (2015). Rapidly increasing promotional expenditures for e-cigarettes. Tobacco control, 24(2), 110-111.

Kuschner, W. G., Reddy, S., Mehrotra, N., & Paintal, H. S. (2011). Electronic cigarettes and thirdhand tobacco smoke: two emerging health care challenges for the primary care provider. International Journal of General Medicine, 4, 115–120. http://doi.org/10.2147/IJGM.S16908

Lerner, C. A., Sundar, I. K., Yao, H., Gerloff, J., Ossip, D. J., McIntosh, S., ... & Rahman, I. (2015). Vapors produced by electronic cigarettes and e-juices with flavorings induce toxicity, oxidative stress, and inflammatory response in lung epithelial cells and in mouse lung. PloS one, 10(2).

Loomis, B. R., Rogers, T., King, B. A., Dench, D. L., Gammon, D. G., Fulmer, E. B., & Agaku, I. T. (2015). National and State-Specific Sales and Prices for Electronic Cigarettes—US, 2012–2013. American journal of preventive medicine.

Schober, W., Szendrei, K., Matzen, W., Osiander-Fuchs, H., Heitmann, D., Schettgen, T., ... & Fromme, H. (2014). Use of electronic cigarettes (e-cigarettes) impairs indoor air quality and increases FeNO levels of e-cigarette consumers. International journal of hygiene and environmental health, 217(6), 628-637.

Siegel, M.B., K.L. Tanwar & K.S. Wood. 2011. Electronic cigarettes as a smoking-cessation: tool results from an online survey. Am. J. Prev.Med. 40: 472–475.

Tremblay, M. C., Pluye, P., Gore, G., Granikov, V., Filion, K. B., & Eisenberg, M. J. (2015). Regulation profiles of e-cigarettes in the United States: a critical review with qualitative synthesis. BMC medicine, 13(1), 130.