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# Are E-Cigarettes an Optimal Choice for Harm Reduction for Tobacco Smokers?

Brenda Talley

Deborah Allen

*Georgia Southern University*, [dallen@georgiasouthern.edu](mailto:dallen@georgiasouthern.edu)

Kathryn H. Anderson

*Georgia Southern University*, [khanderson@georgiasouthern.edu](mailto:khanderson@georgiasouthern.edu)

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# Virginia Henderson

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THE UNIVERSITY OF ALABAMA IN HUNTSVILLE



**GEORGIA  
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# Are e-cigarettes an optimal choice for harm reduction for tobacco smokers?

Brenda Talley, RN, PhD, NEA-BC  
University of Alabama in Huntsville  
Huntsville, Alabama, U. S. A.

Deborah Allen, PhD, FNP-C, BC  
Georgia Southern University  
Statesboro, Georgia, U. S. A.



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# Purpose of Presentation

- 1. Describe the most common electronic nicotine inhalation devices, composition of inhaled vapors, patterns of use and current marketing and sales trends.
- 2. Provide an overview of health risks and burden to society of both cigarette smoking and inhaled nicotine and the chemical components of nicotine delivery systems.
- 3. Discuss current impending laws and regulations including global concerns, such as expressed by the World Health Organization, related to electronic nicotine delivery devices.
- 4. Critically appraise relevant research related to the use of e-cigarettes as a means of harm reduction for cigarette smoking.
- 5. Summarize the evidence, providing conclusions and identification of areas of needed research.

# *What are e-cigarettes?*

[http://www.who.int/tobacco/communications/statements/electronic\\_cigarettes/en/](http://www.who.int/tobacco/communications/statements/electronic_cigarettes/en/)

- Electronic nicotine delivery systems (ENDS) or devices (EDDs)
- Electronic cigarettes are the most common
- Devices that do not burn or use tobacco leaves
- Vaporize a solution the user then inhales.
- Main constituents of the solution
  - nicotine
  - propylene glycol
  - flavouring agents.
- ENDS solutions and emissions contain other chemicals, some of them considered to be toxicants.

VAPING





# Quit Smoking This New Years Using E-Cigs

<http://www.electroniccigaretteconsumerreviews.com/quitting-smoking-with-e-cigarettes-new-years-2015/>

# An Interview With Louise Ross of the NHS Stop Smoking Service, Leicester

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How one NHS clinic is  
using e-cigarettes to  
help smokers.



halo



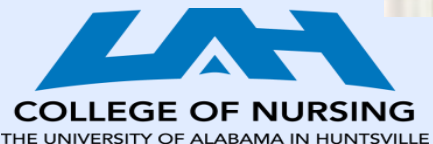
# CDC Creates 1st Anti-Smoking Ad Citing E-Cigarettes

Mar 27, 2015, 12:58 PM ET

By GILLIAN MOHNEY



Podcast available at: <http://www2c.cdc.gov/podcasts/player.asp?f=8635977>







Have you seen the billboards?

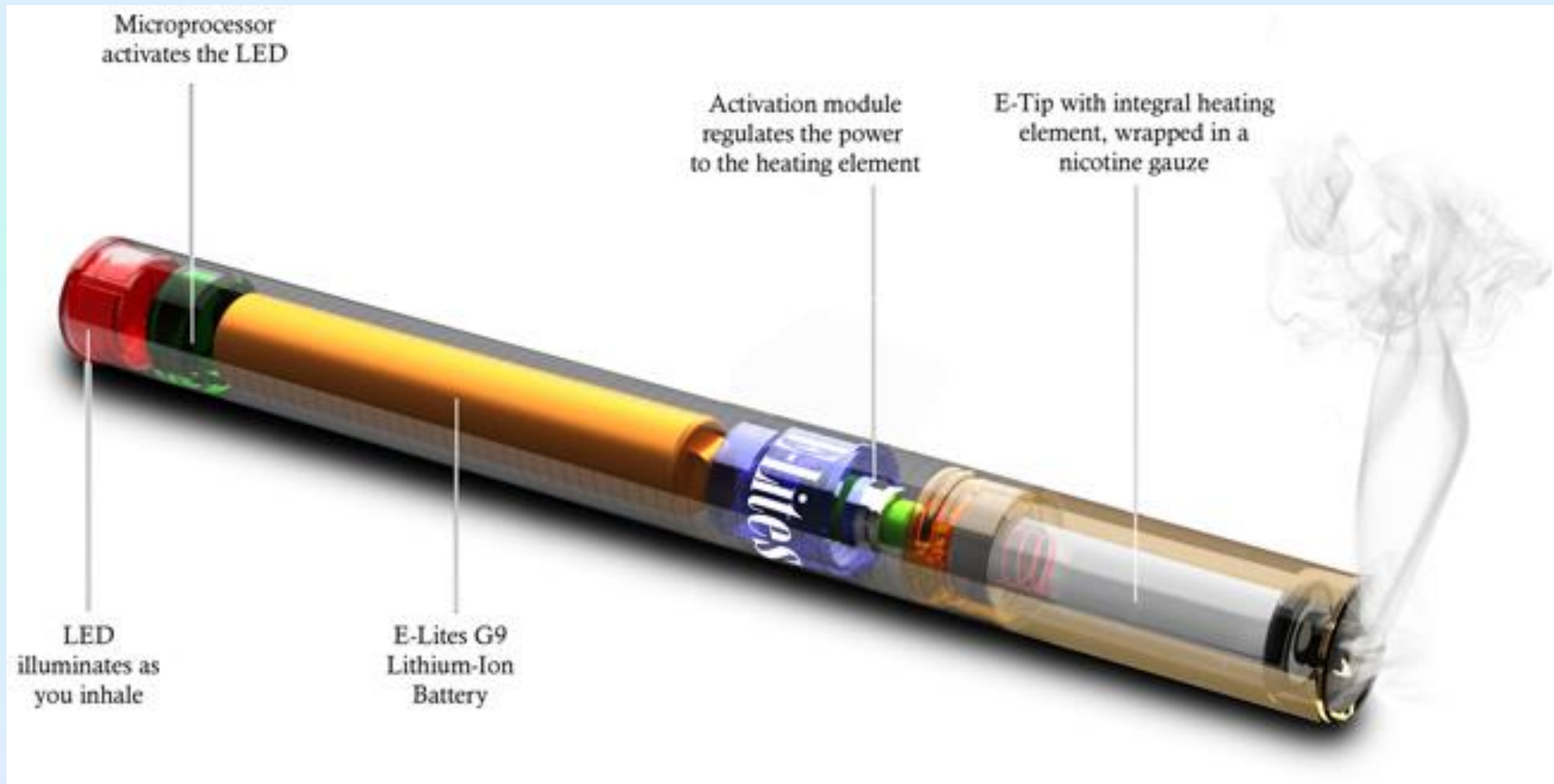
<http://www.medicaldaily.com/vaping-billboard-shows-santa-smoking-e-cigarette-mirroring-old-tobacco-ads-265578>

# A Vape Shop on every corner!



- [Huffington Post.ca](https://www.huffpost.ca)





# Order on-line!

Flavors! Bacon, Popcorn, Carrot (yes, carrot!), any imaginable tobacco, herb, beverages, fruit and candy,

## Fast World-Wide Shipping Options

Low Cost Shipping



## THE BEST

- HIGHEST QUALITY
- WIDEST CATALOG --Over **200** flavors.
- LOWEST PRICES

**62** E-TOBACCO Flavors

**21** E-HERBS Flavors

**40** E-BEVERAGE Flavors

**43** E-JUICE Flavors

**8** E-HEALTHCARE Flavors

# The Federal Food and Drug Administration Issue Snapshot on Deeming: Regulating Additional Tobacco Products

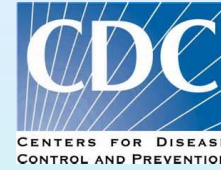
The Family Smoking Prevention and Tobacco Control Act (Tobacco Control Act), signed by the President in 2009, created the FDA Center for Tobacco Products and gave FDA powerful tools to protect the public's health through oversight of the manufacture, distribution, and marketing of tobacco products.

<http://www.fda.gov/downloads/TobaccoProducts/NewsEvents/UCM397724.pdf>

# Regulation of ENDS by FDA

Consistent with currently regulated tobacco products, under the proposed rule, makers of newly deemed tobacco products would, among other requirements:

- Register with the FDA and report product and ingredient listings;
- Only market new tobacco products after FDA review;
- Only make direct and implied claims of reduced risk if the FDA confirms that scientific evidence supports the claim and that marketing the product will benefit public health as a whole; and
- Not distribute free samples.
- In addition, under the proposed rule, the following provisions would apply to newly “deemed” tobacco products:
  - Minimum age and identification restrictions to prevent sales to underage youth;
  - Requirements to include health warnings; and
  - Prohibition of vending machine sales, unless in a facility that never admits youth.



**TABLE.**

**State laws prohibiting sales of electronic nicotine delivery systems (ENDS) to minors and laws prohibiting conventional smoking and the use of ENDS in indoor areas of private worksites, restaurants, and bars — United States, November 30, 2014**

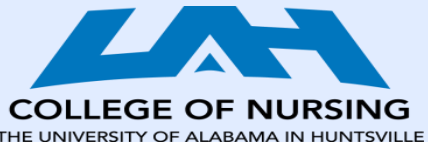
<b>States Restricting sales to Minors</b>	<b>Prohibits conventional smoking in worksites, restaurants, and bars</b>	<b>Includes restriction on ENDS use</b>
<b>40</b>	<b>27</b>	<b>3</b>

Morbidity and Mortality Weekly Report (MMWR)

December 12, 2014 / 63(49);1145-1150

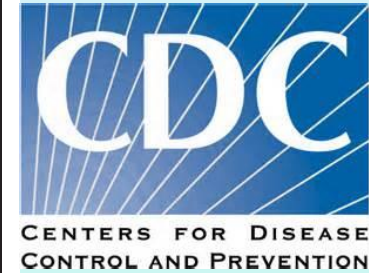
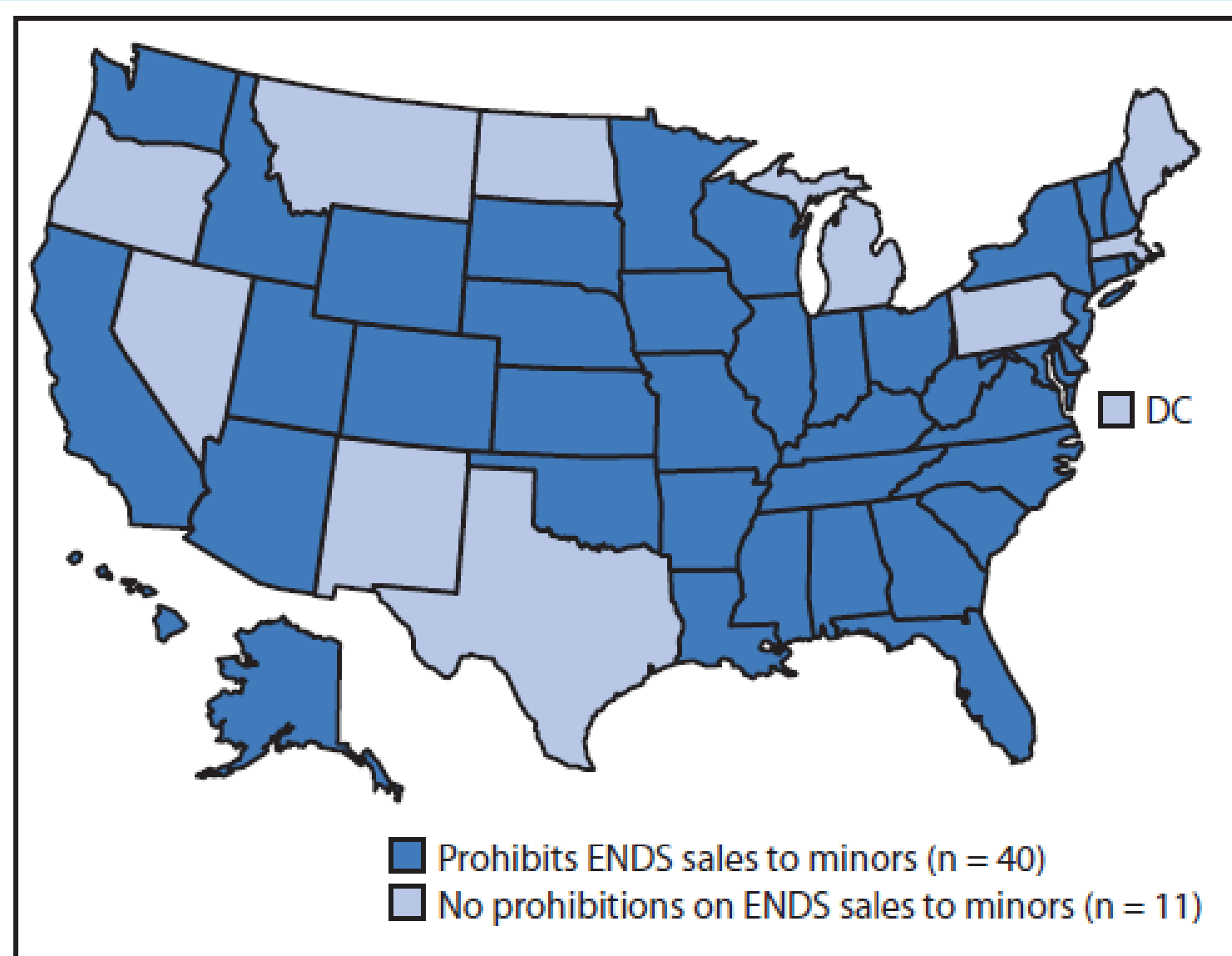


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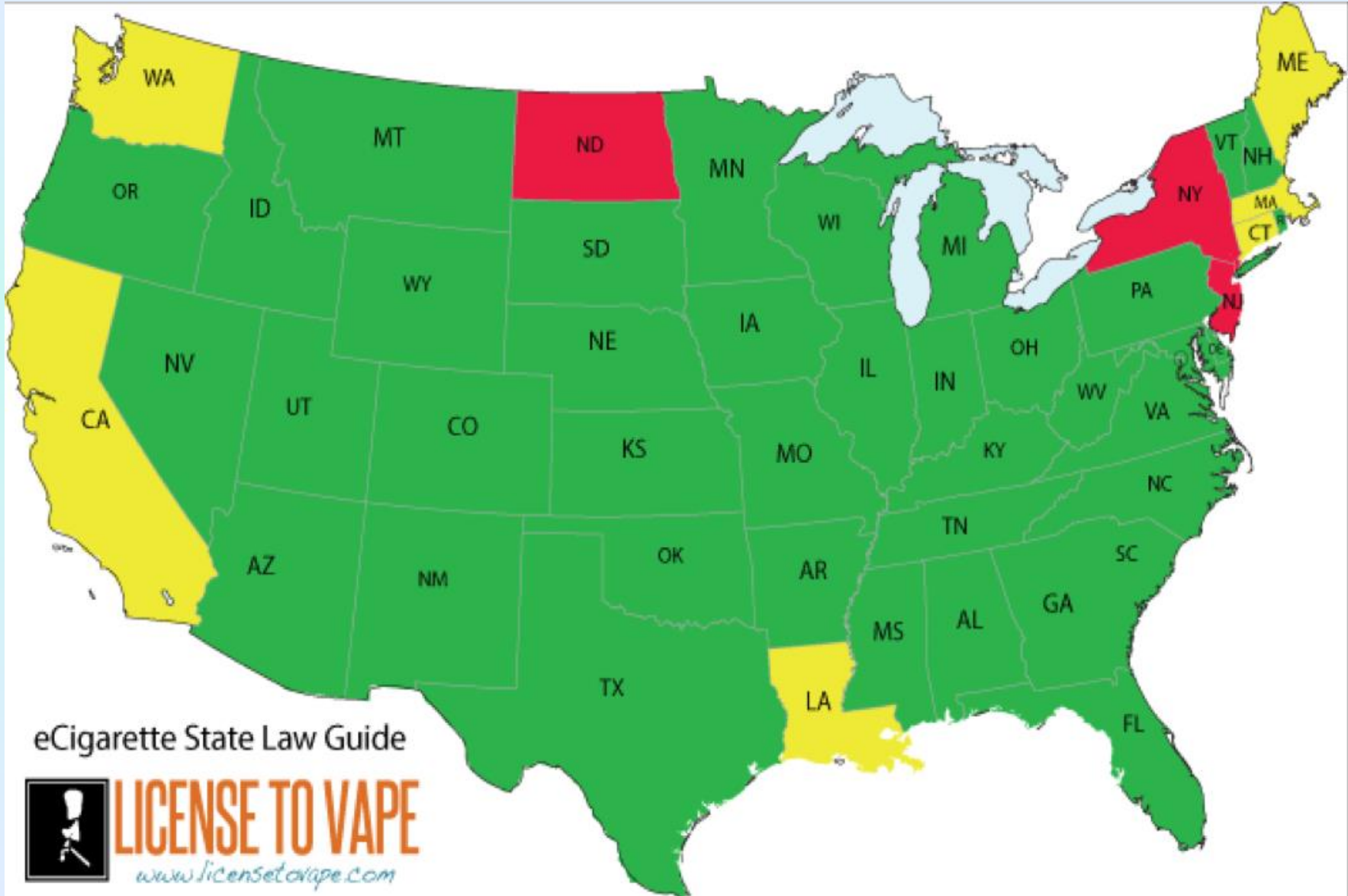




States with and without laws prohibiting sales of electronic nicotine delivery systems (ENDS) to minors\* — United States, November 30, 2014



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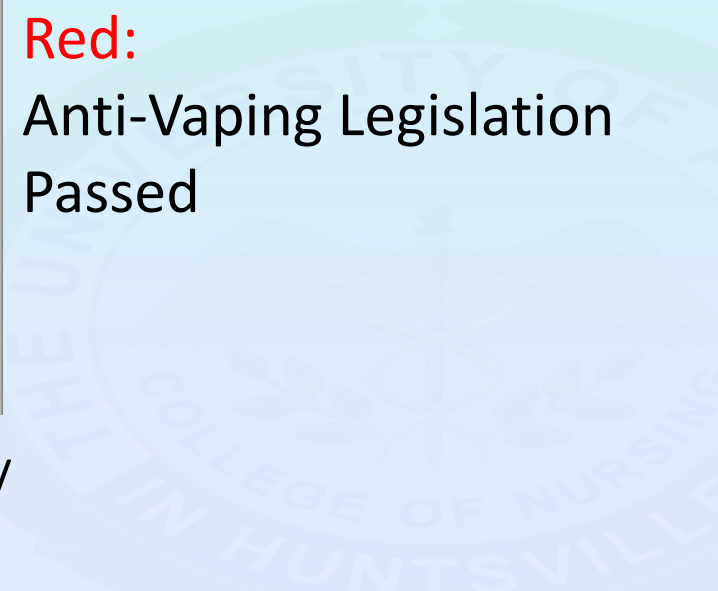


# “Safe to Vape” States

## State Color Key:

- Green:** Safe to Vape (For Now)
- Yellow:** Anti-Vaping Legislation Pending
- Red:** Anti-Vaping Legislation Passed

<http://www.licensetovape.com/e-cigarette-state-laws-guide/>



# European Parliament Approves Tough Rules on Electronic Cigarettes

By DAVID JOLLY FEB. 26, 2014

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PARIS — The European Parliament on Wednesday approved rules for the region’s fast-growing market for electronic cigarettes, regulations that could help set a benchmark for standards around the world.

Beginning in mid-2016, advertising for e-cigarettes would be banned in the 28 nations of the European Union, as it already is for ordinary tobacco products. E-cigarettes would also be required to carry graphic health warnings and must be childproof. The amount of nicotine would be limited to 20 milligrams per milliliter, similar to ordinary cigarettes.

Governments across the globe are grappling with how to regulate e-cigarettes, which turn nicotine-infused propylene glycol into an inhalable vapor. As sales of e-cigarettes have ballooned, the debate over the public health implications has intensified.



The European Parliament adopted rules requiring electronic cigarettes to carry health warnings and be childproof. Charles Platiau/Reuters

## 28 countries in European Union

Beginning mid 2016,

- Ban on advertising
- Health warnings
- Must be child safe



[https://en.wikipedia.org/wiki/Member\\_state\\_of\\_the\\_European\\_Union](https://en.wikipedia.org/wiki/Member_state_of_the_European_Union)



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**Conference of the Parties to the WHO Framework  
Convention on Tobacco Control Sixth session  
Moscow, Russian Federation, 13–18 October 2014**



**Decision Paper:**

**Objectives**

- (a) prevent the initiation of ENDS/ENNDS by non-smokers and youth with special attention to vulnerable groups;
- (b) minimize as far as possible potential health risks to ENDS/ENNDS users and protect non-users from exposure to their emissions;
- (c) prevent unproven health claims from being made about ENDS/ENNDS; and
- (d) protect tobacco-control activities from all commercial and other vested interests related to ENDS/ENNDS, including interests of the tobacco industry;

**INVITES** Parties to consider prohibiting or regulating ENDS/ENNDS, including as tobacco products, medicinal products, consumer products, or other categories, as appropriate, taking into account a high level of protection for human health;

**URGES** Parties to consider banning or restricting advertising, promotion and sponsorship of ENDS

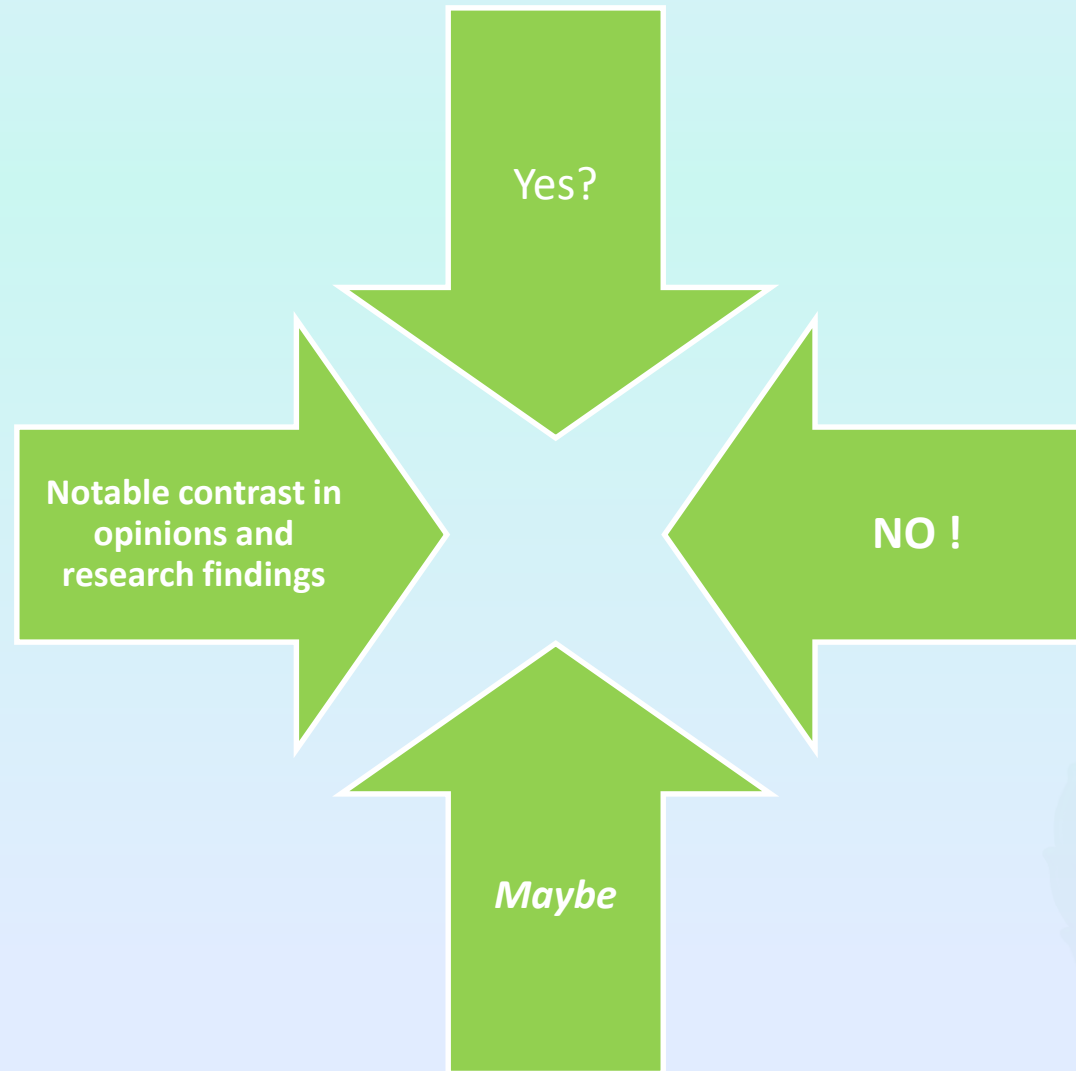
# Concerns

- Nicotine can be taken in at very high dosages. Will this lead to an even more powerful addiction if they return to smoking?
- Addiction to nicotine in non-tobacco users
- The liquid nicotine is dangerous, poison in high doses
- Accessibility to children?
- Unevenness in nicotine solutions, flavoring and propellants
- Inconsistent regulation on marketing
- MUCH misinformation
- Second hand vaping
- Nicotine risk to fetus and vulnerable groups.
- Expense of vaping

- We understand the risks to health from using tobacco products. The question is ....
- Is reducing the risk to health that comes from quitting smoking worth the risk of using ENDDs?
- Is using ENDDs a better alternative to smoking cessation that other means?
- One problem is that the risk of using ENDDs is uncertain



# Relevant Literature





Cochrane Database Systematic Review. 2014;12:CD010216. doi:  
10.1002/14651858.CD010216.pub2. Epub 2014 Dec 17.  
McRobbie H, Bullen C, Hartmann-Boyce J, Hajek P.

- 13 completed studies (two RCTs, 11 cohort)
- “...evidence from two trials that ECs help smokers to stop smoking long-term compared with placebo Ecs”
- “No evidence emerged that short-term EC use is associated with health risk.”
- Applying “the GRADE system the overall quality of the evidence for our outcomes was rated 'low' or 'very low' because of imprecision due to the small number of trials.”
- nine ongoing trials

# Studies Suggest E-Cigarettes Don't Aid Long-term Smoking Cessation Continued Rise in Teen E-Cigarette Use Becomes Greater Concern Allehebi, R. O., Kahn, M., & Stanbrook, M. D.

- Presentation at the American Thoracic Society International Conference, May 2015, Denver, Co.
- Reviewed 297 articles, selected 4 studies of efficacy, 22 on safety
- Meta-analysis of currently available research on electronic cigarettes (e-cigarettes)
- “Vaping” devices haven't proven to be successful long-term solutions for patients who want to quit smoking. Good short term, not sustained.
- May have more serious adverse effects than nicotine patches
- [http://www.atsjournals.org/doi/abs/10.1164/ajrccm-conference.2015.191.1\\_MeetingAbstracts.A3715](http://www.atsjournals.org/doi/abs/10.1164/ajrccm-conference.2015.191.1_MeetingAbstracts.A3715)

**Kandra et al. (2014)**

## **E-Cigarettes and physicians**

- Study by Physicians in North Carolina indicated that over two years 67.2% of physicians surveyed indicated e-cigarettes are a helpful aid for smoking cessation
- 35.2% recommended them to their patients despite not having concrete evidence of the long term health effects. Worryingly
- 13% of the physicians in the study incorrectly believed that e-cigarettes are already approved by the FDA for smoking cessation.

**Pokhrel, P., Fagan, P., Little, M. A., Kawamoto, C. T., & Herzog, T. A. (2013)  
Smokers who used e-cigarettes to quit smoking**

- Smokers who had tried e-cigarettes to quit smoking tended to report significantly ( $P < 0.05$ ) higher motivation to quit than other smokers.
- Smokers reported having used e-cigarettes to quit smoking appear to be motivated to quit
- Consider e-cigarettes to be a valid cessation aid, comparable to using FDA approved pharmacotherapies

# Etter, (2010)

## Benefits of using e-cigarettes

- 82 participants surveyed
- 53% used e-cigarettes to quit smoking.
- 79% said that e-cigarette use had helped them quit smoking 'a lot'.

*Most frequently cited beneficial effects of e-cigarettes were:*

- 'improved breathing and respiration',
- 'helps to quit smoking',
- coughing less,
- expectorated less,
- had fewer sore throats, and use
- improved their health and physical fitness

## **Hua, M., Alfi, M., & Talbot, P. (2013) Negative aspects of using e-cigarettes**

- Data collected from online forums for e-cigarette users.
- 405 different symptoms, 326 were negative versus 78 positive.
- Most users who reported symptoms spoke of those occurring in the mouth, throat, respiratory, neurological, sensory, and digestive systems.
- Most users also reported multiple negative symptoms versus reports of benefits being usually singular and most commonly in the respiratory system.

# Research on Marketing

- Besaratinia & Tommasi, (2014)
  - E-cigarettes are aggressively marketed as an alternative to traditional cigarettes, although little is yet known about the potential long term health consequences.
- Wagoner, Song, Egan, Sutfin, Reboussin, Spangler, & Wolfson (2014)
  - Both advertising and availability of e-cigarettes in stores doubled in a single year.

# Research on Patterns of Use

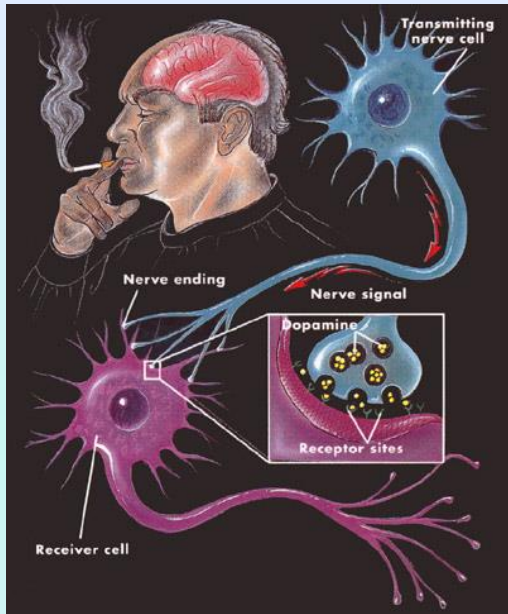
- Centers for Disease Control and Prevention (Arnold, 2014).
  - Use among adolescents doubled between 2011 and 2012, by which time an estimated 1.78 million students in grades 6-12 had tried the devices
- Carroll Chapman, S. L., & Wu, L. (2014)
  - Ever-use of e-cigarettes increased among various age groups.
    - Highest among young adults (college students and those aged 20-28; 4.9%-7.0%),
  - Followed by adults (aged  $\geq 18$ ; 0.6%-6.2%),
  - ...and adolescents (grades 6-12 and aged 11-19; <1%-3.3%).
  - In 2012 the ever-use among high school students went as high as 10%.



Wagoner et al. (2014)

## E-cigarette availability and promotion among retail outlets near college campuses

- A study by surveying in two southern states
- e-cigarette availability increased from 24.7% of retailers that sold at least one brand in 2012 to 59.9%
- Previously only accessible for purchase online, e-cigarettes are becoming widely available through traditional retailers in surrounding colleges in both disposable and kit forms (Wagoner et al., 2014).



# Children

According to a CDC's *Morbidity and Mortality Weekly Report*.

**April 3, 2014**

- The number of calls to poison centers involving e-cigarette liquids containing nicotine rose from one per month in September 2010 to 215 per month in February 2014

**August 26, 2014**

- Electronic cigarettes may be more tempting to non-smoking youths than conventional cigarettes, and once young people have tried e-cigarettes they are more inclined (2X) to give regular cigarettes a try, U.S. researchers
- Nicotine impacts the neurological development of adolescents

# Nicotine

## Risk in pregnancy

Prenatal exposure to nicotine is a major risk factor for the newborn, increasing morbidity and even mortality in the neonatal period but also beyond.

– Wickstrom, R. (2007, Sum) *Current Neuropharmacology* 5(3), 213–222.

Expectant mothers may be trying to protect their unborn children by quitting smoking by using e-cigarettes though exposure to nicotine is the most harmful of the elements of smoking

- Baeza-LoSep)ya S., et al (2014). *Bulletin of Menninger Clinic* 78(3), 243-251

# Nicotine

## Risk to those with fragile respiratory conditions

- Emerging research indicates that those with fragile lung conditions such as COPD have more and more serious respiratory conditions. It is thought that the “particles” in the inhaled vapors are irritating to the respiratory system. Cinnamon seems to be the most irritating. Statistically significant reduction in airway resistance.
- A study presented at the European Respiratory Society's Annual Congress in Vienna
- European Lung Foundation. (2012, September 2). E-cigarettes can damage the lungs, experts warn. *Science Daily*. Available at: [www.sciencedaily.com/releases/2012/09/120902113550.htm](http://www.sciencedaily.com/releases/2012/09/120902113550.htm)

# *Conclusions ?????*

- **E-Cigarettes Not Recommended as Tool to Quit Smoking**
  - [Physicians News](http://www.physiciansnews.com/2015/01/16/e-cigarettes-not-recommended-as-tool-to-quit-smoking-hospital-says/) on January 16, 2015  
<http://www.physiciansnews.com/2015/01/16/e-cigarettes-not-recommended-as-tool-to-quit-smoking-hospital-says/>
- American Heart Association---only as a last resort
  - <http://blog.heart.org/aha-e-cigarette-policy-emphasizes-caution-when-using-devices-to-quit-smoking/>

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