



# Public Health Promise or Peril?

## The Rise of E-Cigarettes and Implications for Tobacco Control Policy and Practice

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# Overview

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Background

**2**

Patterns of Use

**3**

Health Effects

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Policy Options

1

# Background

# Electronic Nicotine Delivery Systems (ENDS)

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**E-Cigarettes**



**Hookah Pens**

**E-Cigars**



**Vape Pens**



**E-Pipes**



**E-Hookahs**

At least 450 Brands

# Types of E-Cigarette Products



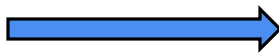
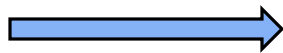
MINI E-CIG



MID-SIZED



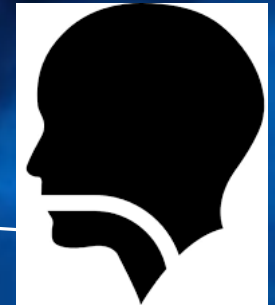
MODIFIED



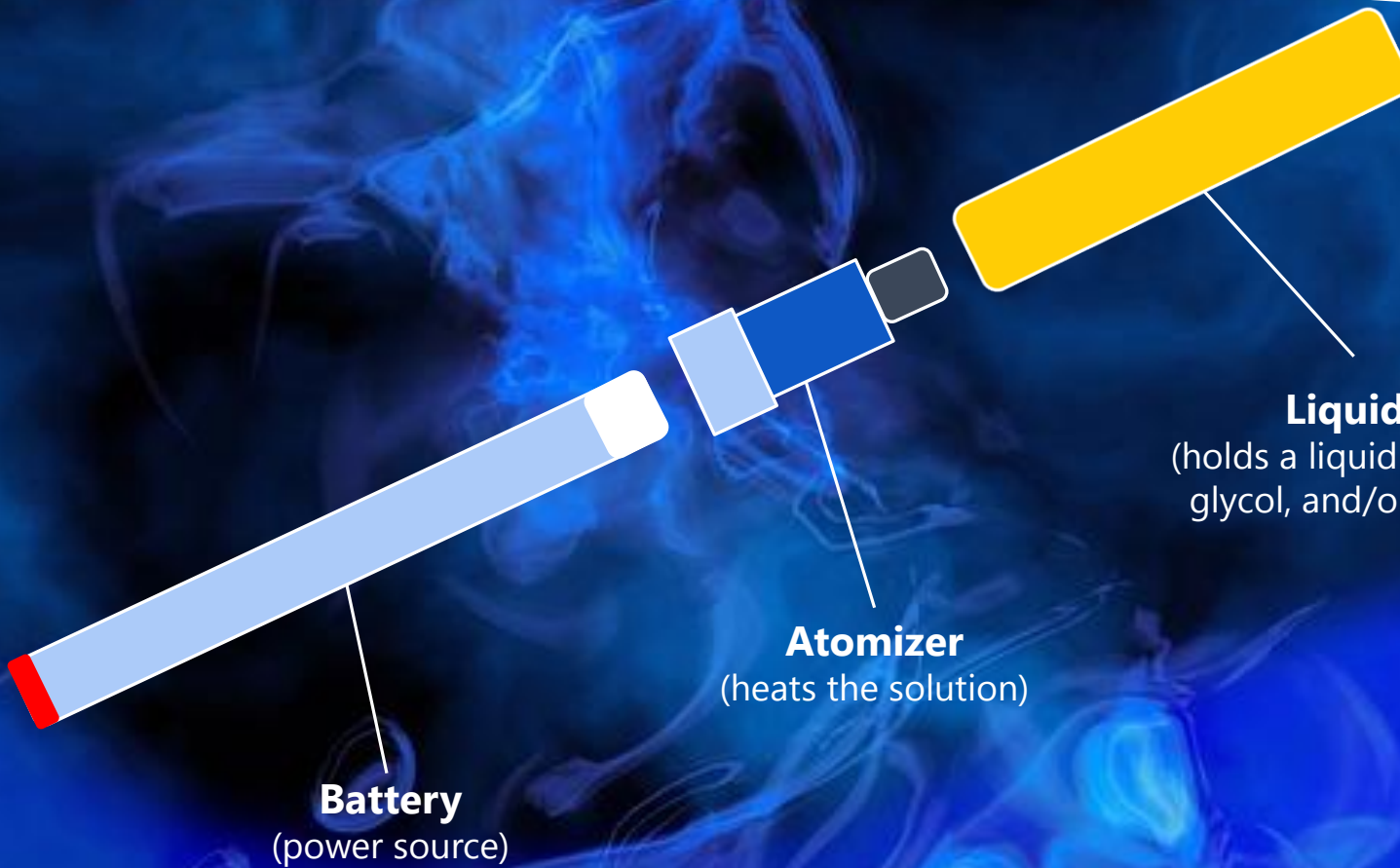
Smaller/Fixed

Larger/Customizable

# Anatomy of an E-Cigarette



User inhales aerosol



**Liquid Cartridge**

(holds a liquid nicotine, propylene glycol, and/or glycerin solution)

**Atomizer**

(heats the solution)

**Battery**

(power source)

# Emissions from E-Cigarettes



**Mainstream Aerosol**

# 2014 Surgeon General's Report: E-Cigarettes

## Could have negative and positive individual and population health impact

“This shift in patterns of tobacco use could have a number of potential impacts, ranging from the positive effect of accelerating the rate at which smokers quit smoking cigarettes completely to a negative effect of slowing down the decrease in the use of all tobacco products, especially cigarettes”

Chapter 15, Page 859





# REPORT RELEASE

Report was  
released  
December 8, 2016  
in Washington,  
D.C.



# KEY FINDINGS

## 7 Major Conclusions

### E-Cigarette Use Among Youth and Young Adults

A Report of the Surgeon General



U.S. Department of Health and Human Services

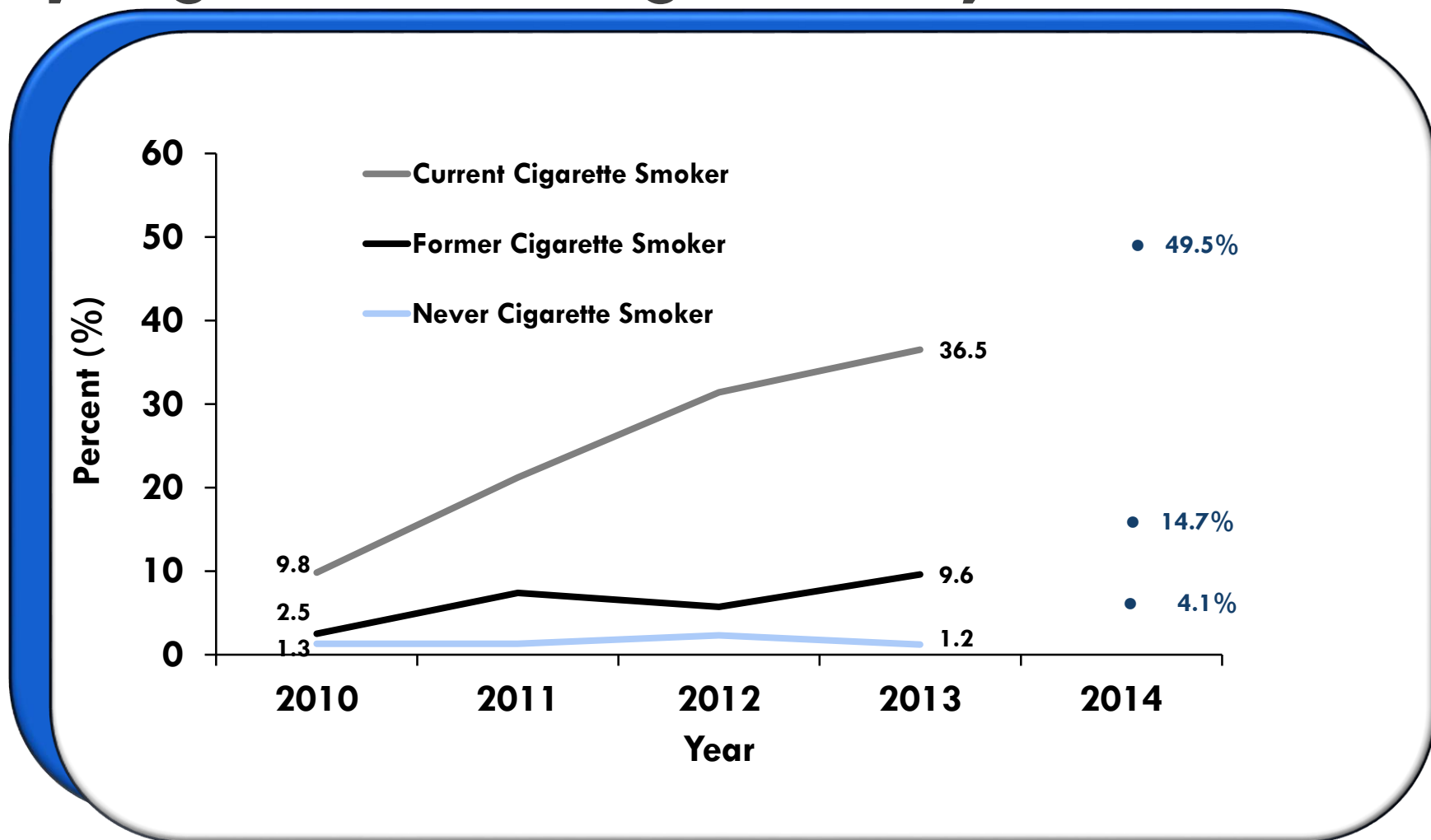
### Major Conclusions

1. E-cigarettes are a rapidly emerging and diversified product class. These devices typically deliver nicotine, flavorings, and other additives to users via an inhaled aerosol. These devices are referred to by a variety of names, including “e-cigs,” “e-hookahs,” “mods,” “vape pens,” “vapes,” and “tank systems.”
2. E-cigarette use among youth and young adults has become a public health concern. In 2014, current use of e-cigarettes by young adults 18–24 years of age surpassed that of adults 25 years of age and older.
3. E-cigarettes are now the most commonly used tobacco product among youth, surpassing conventional cigarettes in 2014. E-cigarette use is strongly associated with the use of other tobacco products among youth and young adults, including combustible tobacco products.
4. The use of products containing nicotine poses dangers to youth, pregnant women, and fetuses. The use of products containing nicotine in any form among youth, including in e-cigarettes, is unsafe.
5. E-cigarette aerosol is not harmless. It can contain harmful and potentially harmful constituents, including nicotine. Nicotine exposure during adolescence can cause addiction and can harm the developing adolescent brain.
6. E-cigarettes are marketed by promoting flavors and using a wide variety of media channels and approaches that have been used in the past for marketing conventional tobacco products to youth and young adults.
7. Action can be taken at the national, state, local, tribal, and territorial levels to address e-cigarette use among youth and young adults. Actions could include incorporating e-cigarettes into smokefree policies, preventing access to e-cigarettes by youth, price and tax policies, retail licensure, regulation of e-cigarette marketing likely to attract youth, and educational initiatives targeting youth and young adults.

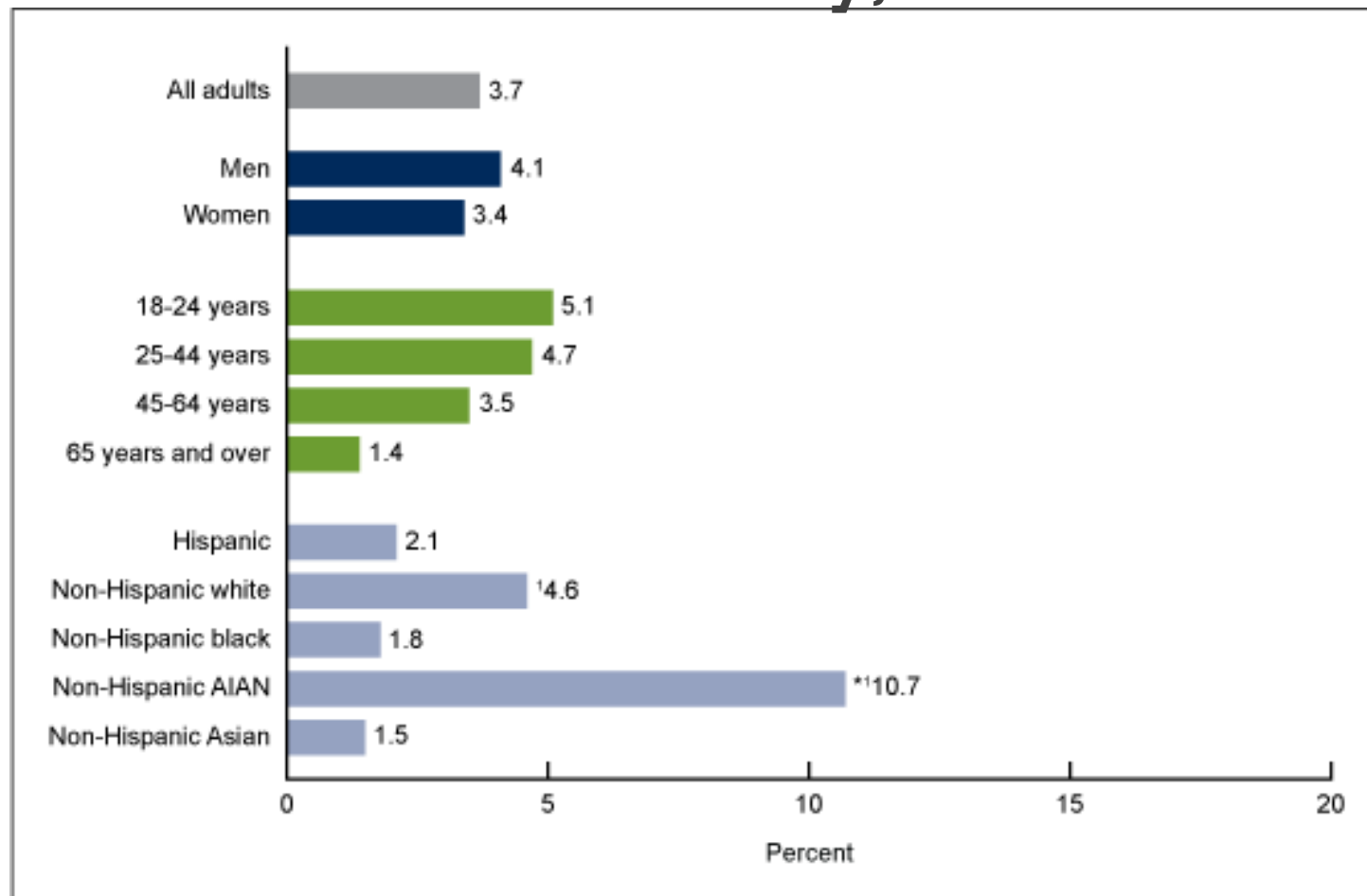
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## Patterns of Use

# Ever Use of E-Cigarettes Among U.S. Adults, by Cigarette Smoking Status, *Styles*, 2010-2014



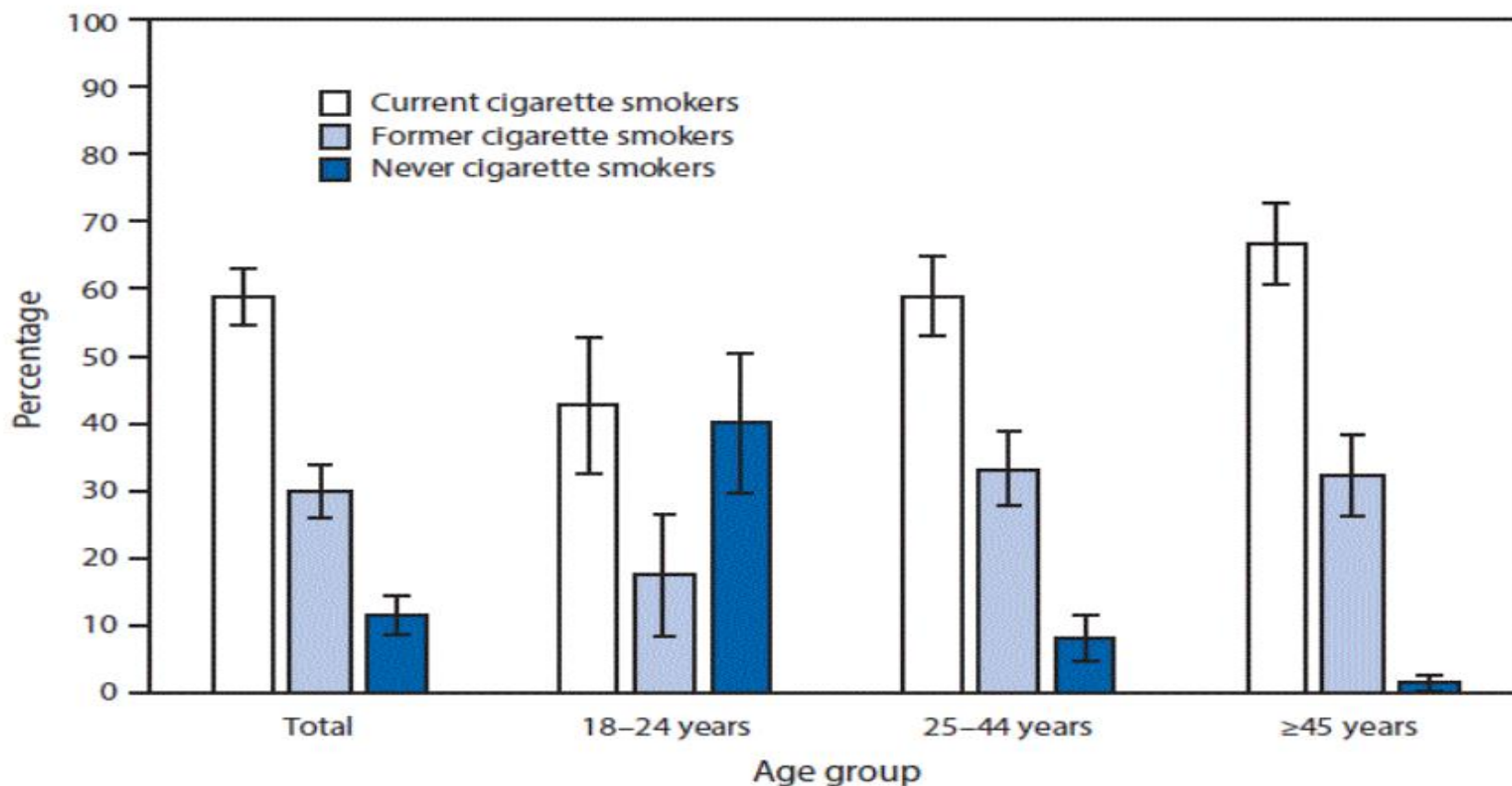
# Percentage of U.S. Adults who Currently Use E-Cigarettes, by Sex, Age, and Race/Ethnicity, 2014



A majority of adult e-cigarette users also smoke conventional cigarettes: “dual use.”



## Cigarette Smoking Status Among Current Adult E-Cigarette Users, by Age Group



# “Cutting back” is not enough—even a few cigarettes per day is dangerous

## RISKS FOR DUAL USERS OF CIGARETTES AND E-CIGARETTES

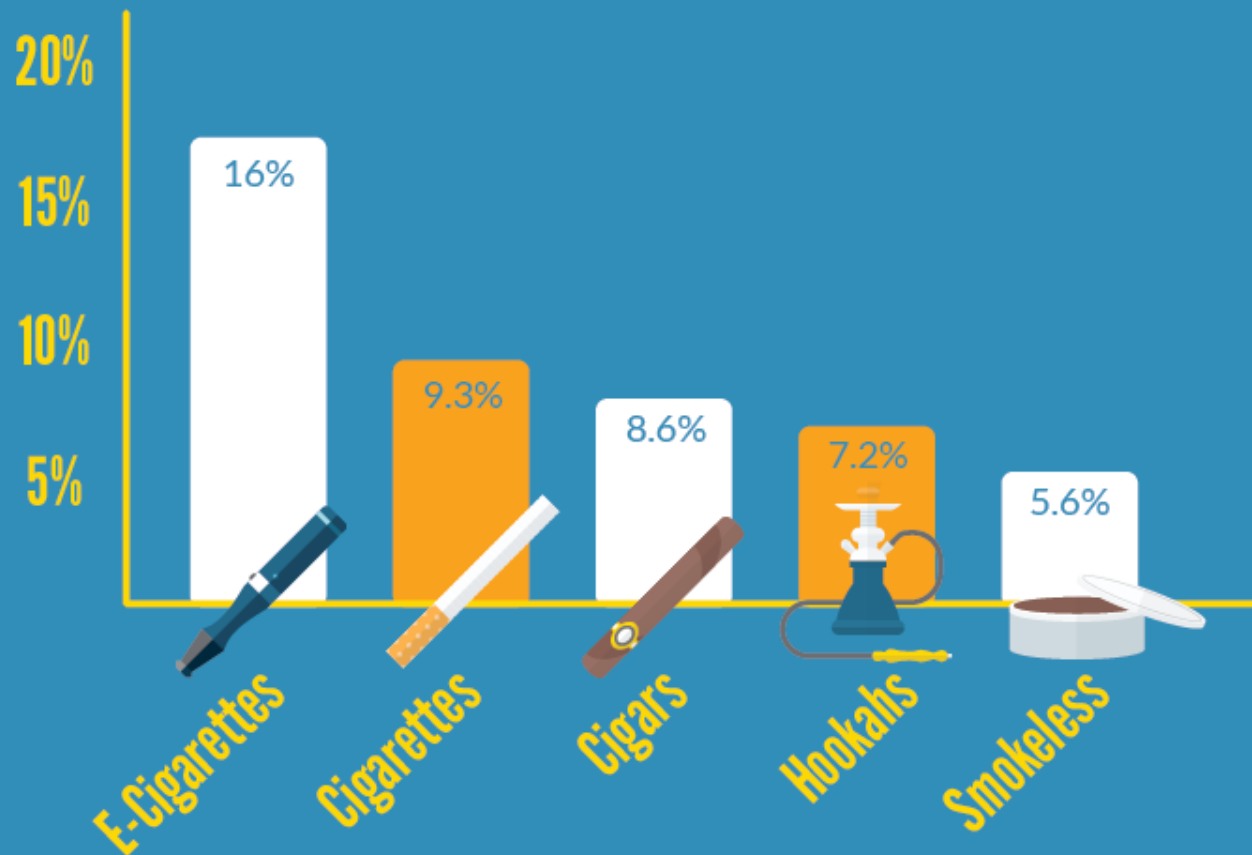
- Smoking just five cigarettes a day doubles the risk of dying from heart disease.
- Heavy smokers who reduce their cigarette use by half do not reduce their risk of early death by half.

## BENEFITS OF QUITTING SMOKING COMPLETELY

- Heart disease risk is cut in half one year after quitting and continues to drop over time.
- Even quitting at age 50 cuts your risk in half for early death from a smoking-related disease.

# Current use of tobacco products

by high school students in 2015.







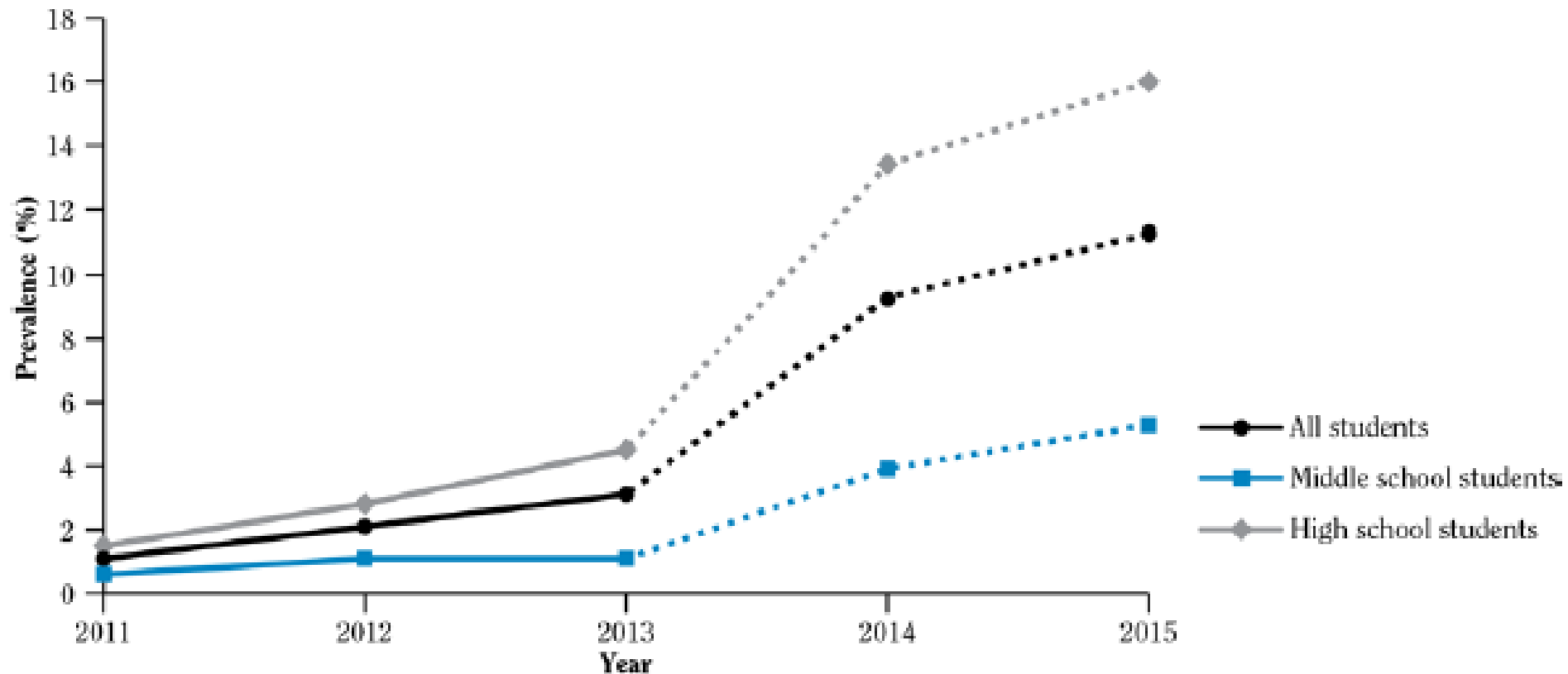
# Major Conclusion

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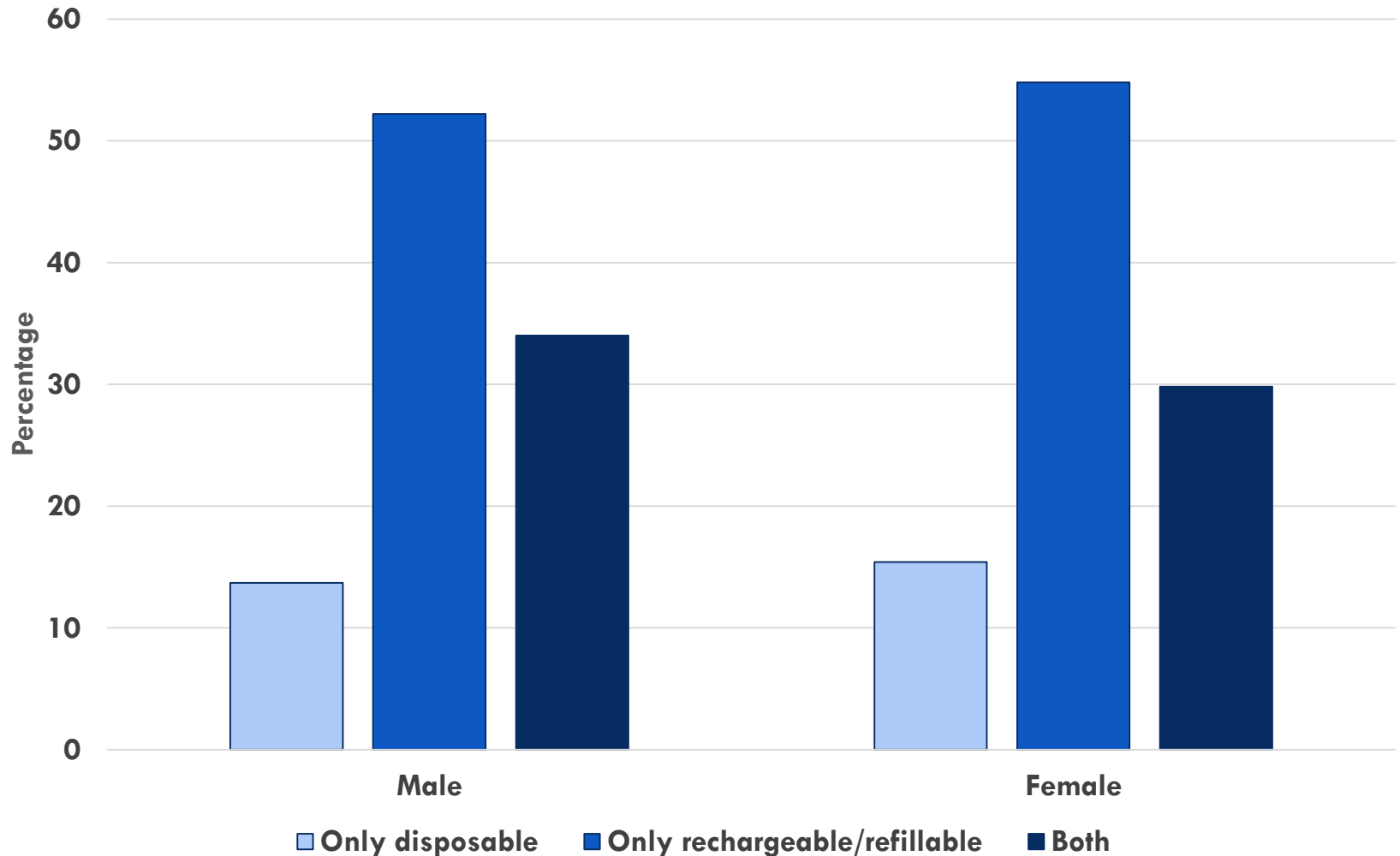


“E-cigarettes are now the most commonly used tobacco product among youth, surpassing conventional cigarettes in 2014. E-cigarette use is strongly associated with the use of other tobacco products among youth and young adults, including combustible tobacco products.”

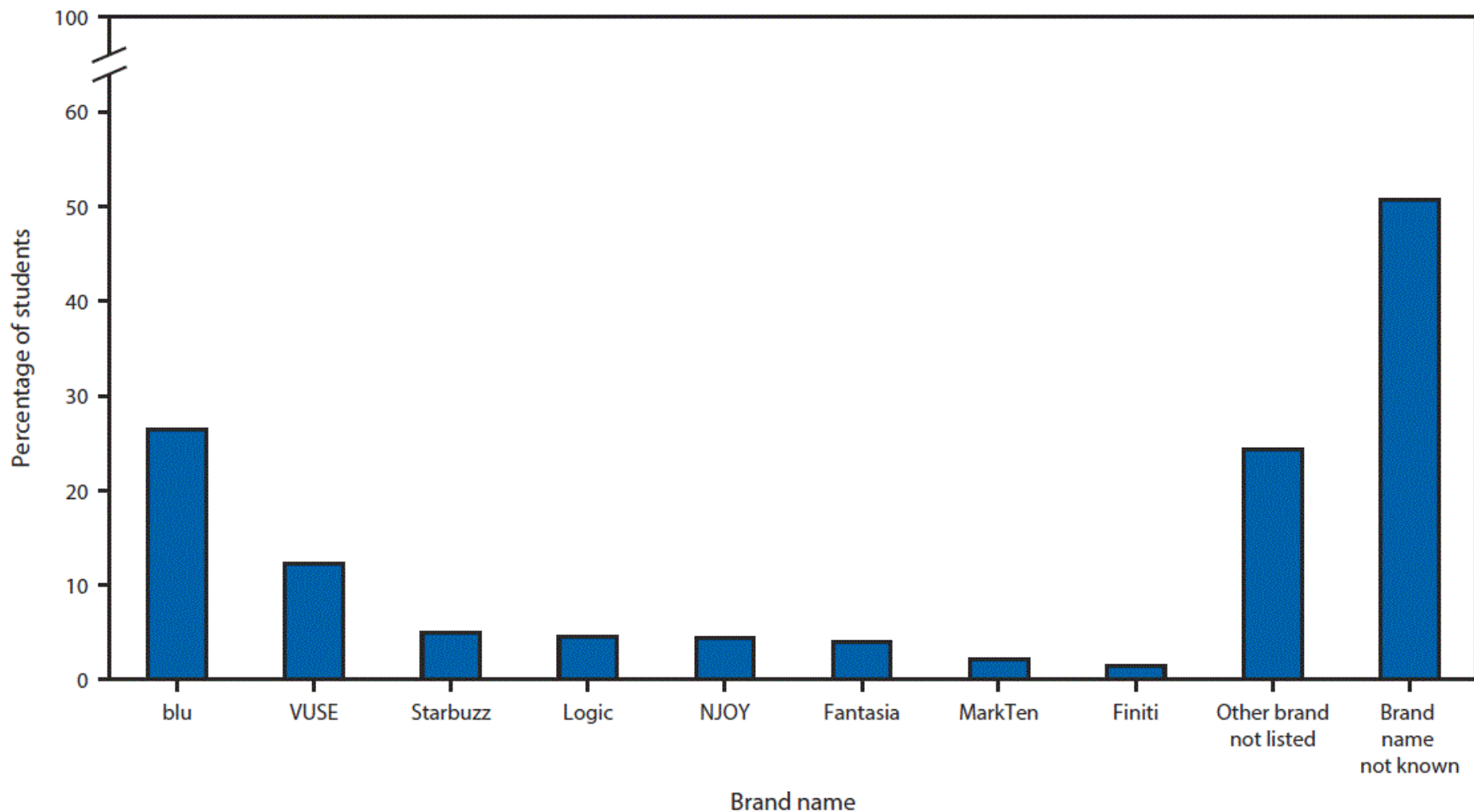
## Figure 2.2. Trends in Past-30-Day E-Cigarette Use Among U.S. Middle and High School Students



# Percentages of Middle & High School Students Who Reported Ever Using an E-Cigarette, by Type & Sex

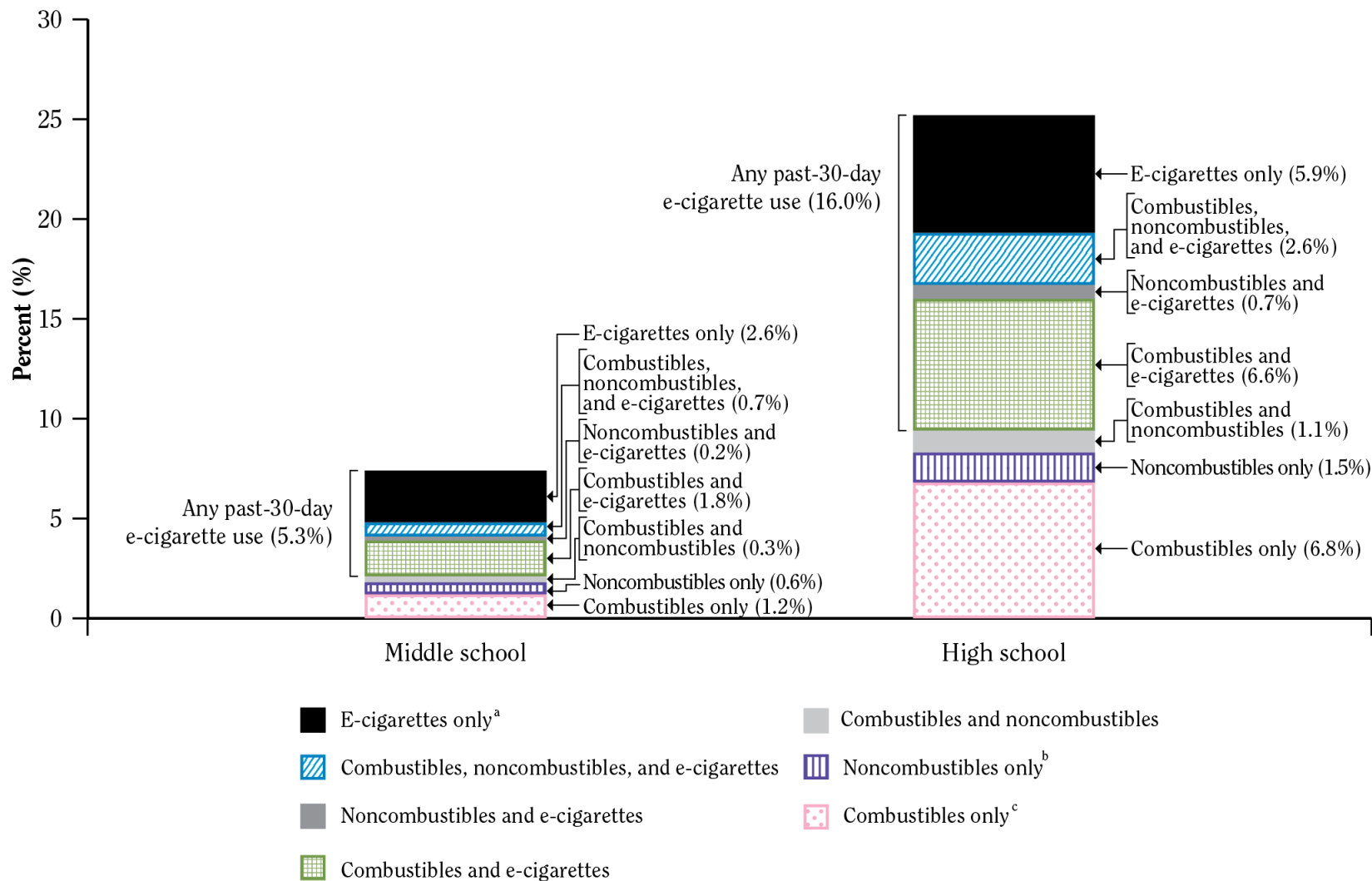


# Percentages of Middle & High School Students Who Reported Ever Using E-Cigarettes, by Brand of E-Cigarette Used\*



\* Categories are not mutually exclusive.

# Figure 2.5. Past-30-Day Use of Various Tobacco Products Among U.S. Middle & High School Students



# Among Youth, E-Cigarette Use May Lead to Conventional Cigarette Use

- Never smoking high school students who reported **ever using e-cigarettes** at baseline:
  - Were **2.7 times more likely** to report initiation of combustible tobacco use after 1 year compared with **never users of e-cigarettes**

JAMA  
study



- Never smoking U.S. adolescent and young adult **e-cigarette users** at baseline:
  - Were **8.3 times more likely** to progress to cigarette smoking after 1 year than **non-users of e-cigarettes**

JAMA  
Pediatrics study



# What Factors Lead to Youth Smoking?

## Preventing Tobacco Use Among Youth and Young Adults

A Report of the Surgeon General



U.S. Department of Health and Human Services

- Youth-appealing flavors

- Youth-resonating themes

- Low prices/price promotions

- Ease of access & product use

- Exposure to ads

- Health claims

**Source:** DHHS. *Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General*. Atlanta, GA. 2012.



# Major Conclusion

#6

Some choices are hard...

This is easy.

Don't waste your time trying unproven e-cigs that don't satisfy your cravings. No other brand delivers the great taste and appearance of a real cigarette like Mistic.

The best choice.  
The best value.  
The best choice in e-cigs for Flavor Fanatics.

www.misticigs.com

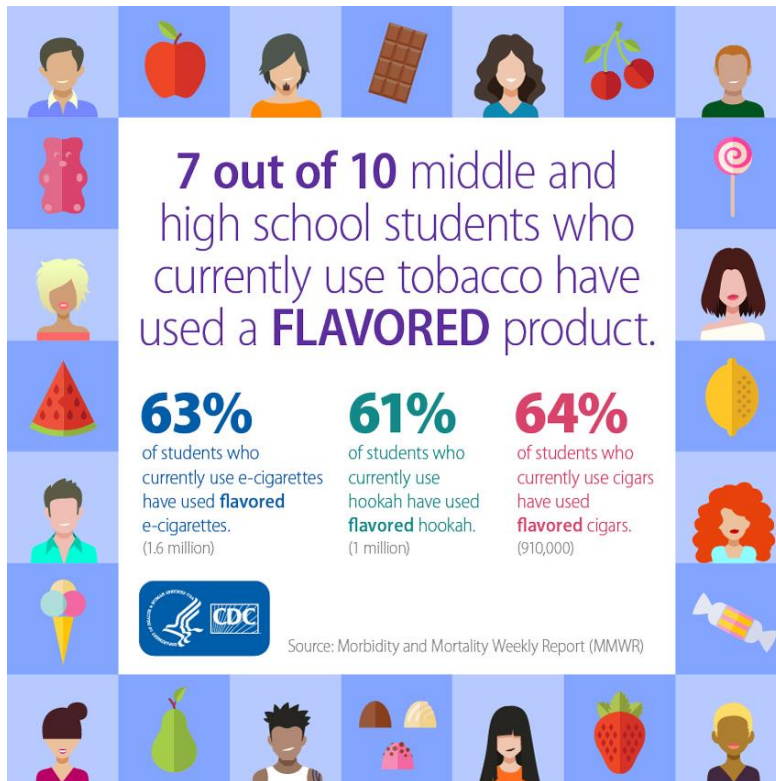
mistic. AVAILABLE AT Walmart

Source: *Soap Opera Digest* (2013).

“E-cigarettes are marketed by promoting flavors and using a wide variety of media channels and approaches that have been used in the past for marketing conventional tobacco products to youth and young adults.”



# A Majority of Current Youth E-Cigarette Users Report Using Flavored E-Cigarettes



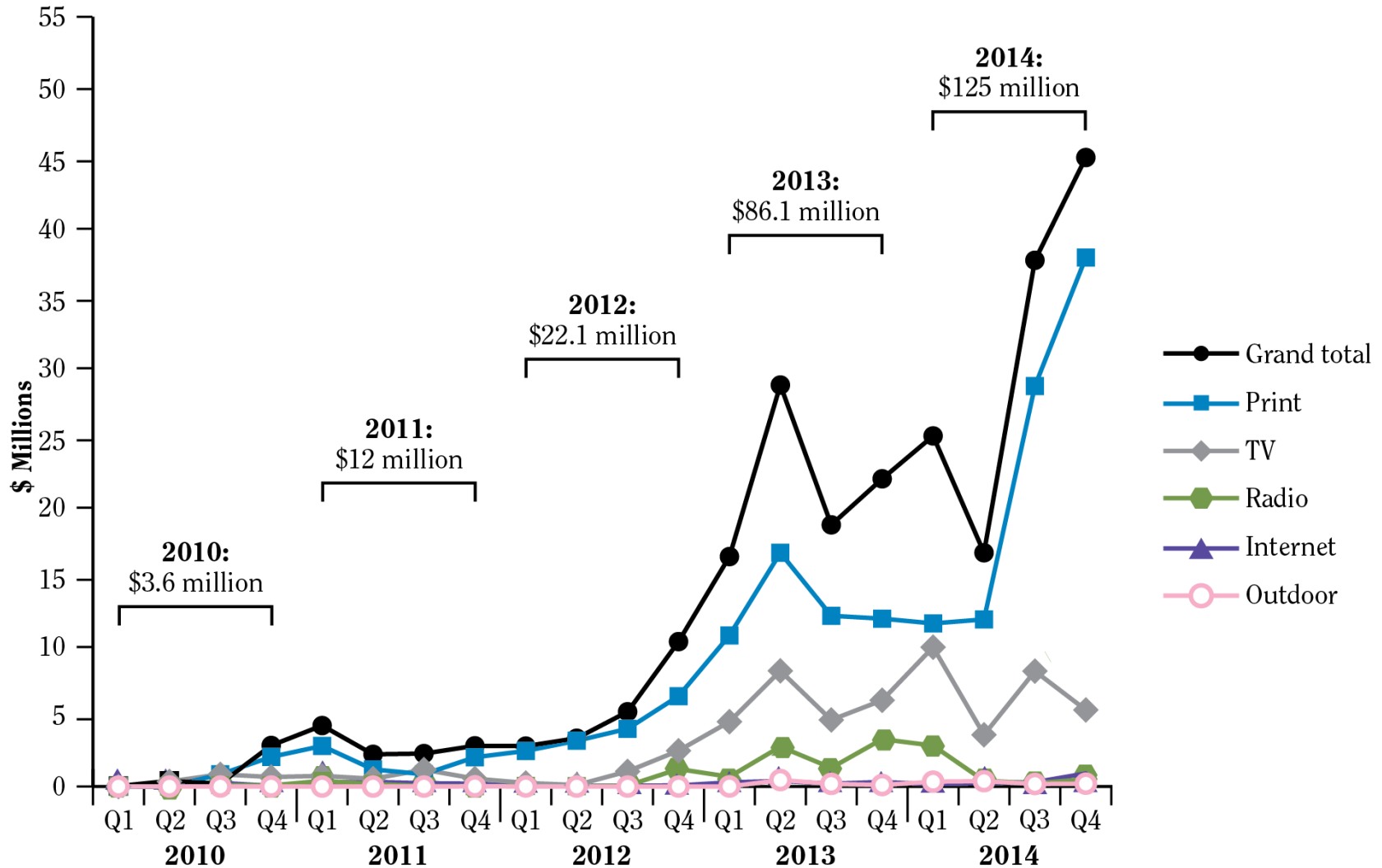
In 2014, among U.S. middle and high school students who used an e-cigarette in the past 30 days,

**63.3% (1.58 million)**

had used a

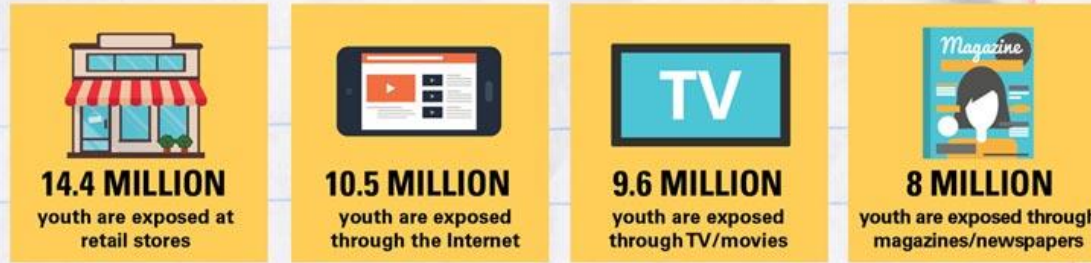
**flavored e-cigarette.**

# Figure 4.5. Quarterly Promotional Spending for E-Cigarettes, 2010-2014

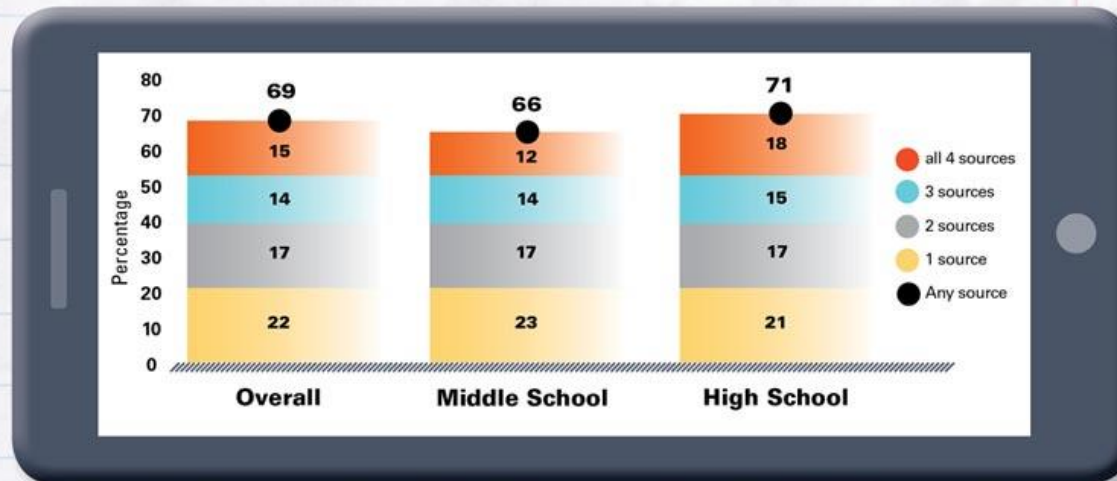


# Youth are exposed to e-cigarette advertisements from multiple sources.

## Sources of e-cigarette advertisement exposure



## US students exposed to e-cigarette advertisements, by school type and number of sources of exposure



\* Percentages may not add up exactly to any source due to rounding.

SOURCE: National Youth Tobacco Survey 2014.



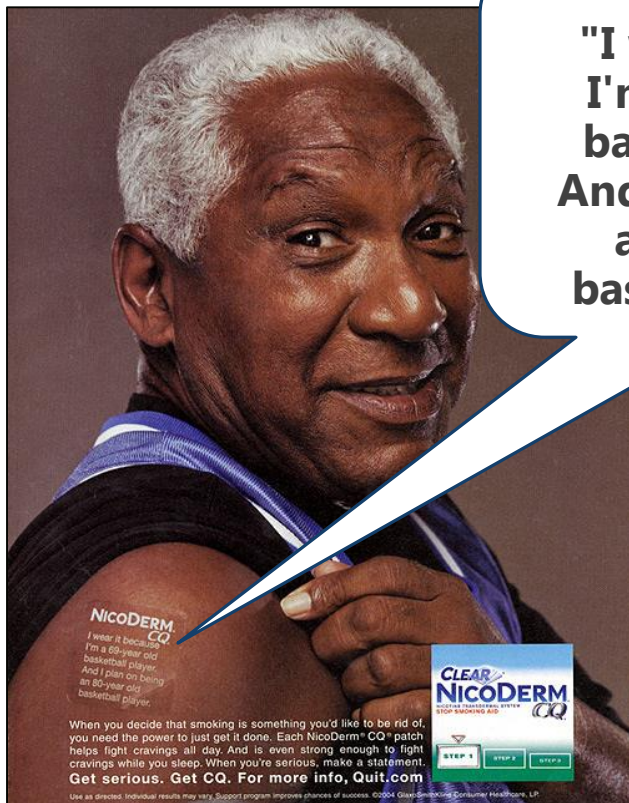
# E-cigarette Advertising Via Television





# Marketing for Nicotine Replacement Therapy

Text on patch:  
**"I wear it because I'm a 69-year old basketball player. And I plan on being an 80-year old basketball player."**

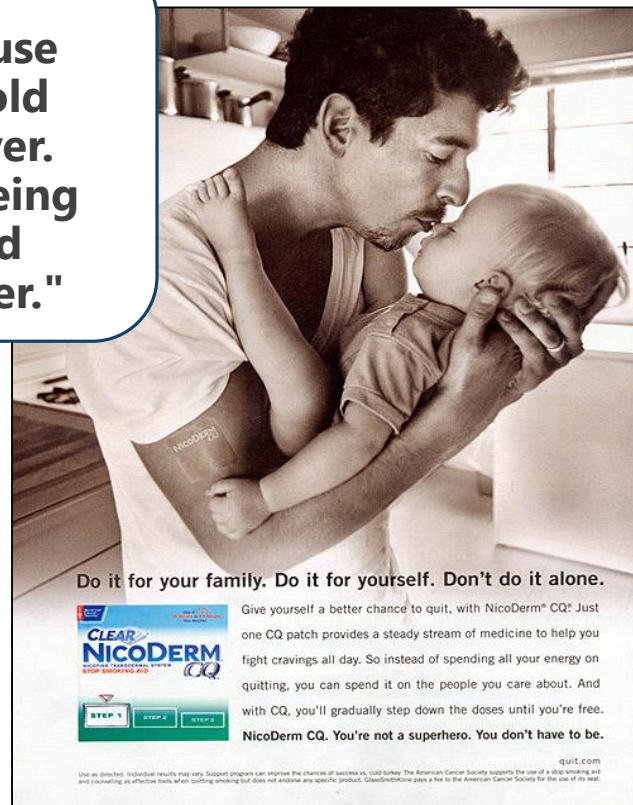


**NicoDERM CQ**  
I wear it because I'm a 69-year old basketball player. And I plan on being an 80-year old basketball player.

**CLEAR NICODERM CQ**  
NICO-TINYLORACETAMINE SYSTEM  
STOP-SMOKING AID

When you decide that smoking is something you'd like to be rid of, you need the power to just get it done. Each NicoDerm® CQ® patch helps fight cravings all day. And is even strong enough to fight cravings while you sleep. When you're serious, make a statement. **Get serious. Get CQ. For more info, Quit.com**

Use as directed. Individual results may vary. Support program improves chances of success. ©2004 GlaxoSmithKline Consumer Healthcare, LP



**Do it for your family. Do it for yourself. Don't do it alone.**

**CLEAR NICODERM CQ**  
NICO-TINYLORACETAMINE SYSTEM  
STOP-SMOKING AID

Give yourself a better chance to quit, with NicoDerm® CQ®. Just one CQ patch provides a steady stream of medicine to help you fight cravings all day. So instead of spending all your energy on quitting, you can spend it on the people you care about. And with CQ, you'll gradually step down the doses until you're free. **NicoDerm CQ. You're not a superhero. You don't have to be.**

quit.com

Use as directed. Individual results may vary. Support program can improve the chances of success. Use only. The American Cancer Society supports the use of a stop-smoking aid and encourages an effective team when quitting smoking, but does not endorse any specific product. GlaxoSmithKline pays a fee to the American Cancer Society for the use of its seal.

# Marketing for E-cigarettes

The collage features several marketing elements for Blu e-cigarettes:

- Top Left:** A magazine cover celebrating a 50th anniversary, featuring three women in bikinis.
- Top Center:** A close-up of a woman's midriff wearing a black bikini bottom with the Blu logo and the text "SLIM. CHARGED. READY TO GO. AVAILABLE NATIONWIDE! Visit us at [blucigs.com/store-locator](http://blucigs.com/store-locator)".
- Top Right:** A woman in a green dress with a "MISSED CONNECTION" advertisement overlaid. The ad reads: "READY TO SATISFY Hey Smoker - We've crossed paths before, and it's time we meet again. I'm all about satisfying like a cigarette without the baggage. I've changed for the better. FIND ME AT: [www.blucigs.com/PLUS](http://www.blucigs.com/PLUS)".
- Bottom Left:** Four shirtless men in red shorts holding large packs of Blu e-cigarettes. The background is a red carpet event with logos for SKYY VODKA, XI, NJOY, OUT, SUBARU, IT GETS BETTER PROJECT, Gillette, and Cottonelle.
- Bottom Right:** A screenshot of a social media post from NJOY dated June 25, 2013. The post promotes a contest where users identify their "new self" using a smartphone camera. The post includes engagement metrics (1 share, 23 people like this) and sponsored ads for Verizon Wireless and Sprint.
- Bottom Far Right:** A product shot of Blu e-cigarette packs and a device. Text includes "NEW & IMPROVED", "Get MORE with PLUS+", "Bigger Battery, Lasts 2x Longer", "Pre-filled blu tanks™", "Rapid Battery Charging", and "Enhanced Flavor and Draw".

**3**

**Health Effects**



# Is there a potential benefit for E-cigarettes?

## Answer: Under certain circumstances



Complete long term substitution by established smokers

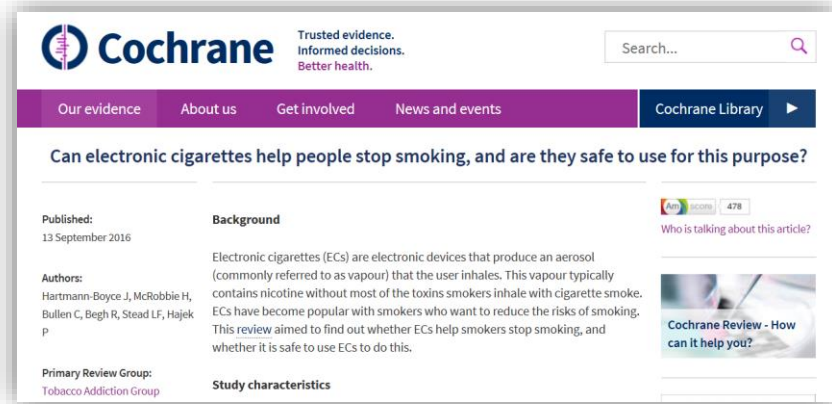


Assist in rapid transition to a society with little or no use of combustible products



Short-term use if shown to produce successful & permanent cessation of combustible products

# E-Cigarette Use As A Smoking Cessation Tool in Adults



“The long-term safety of e-cigarettes is unknown.”



“There is evidence from two trials that e-cigarettes help smokers to stop smoking in the long term compared with placebo e-cigarettes. However, the small number of trials, low event rates and wide confidence intervals around the estimates mean that our confidence in the result is rated 'low' by GRADE standards.”



“Overall, the USPSTF found the evidence on the use of ENDS as a smoking cessation tool in adults, including pregnant women, and adolescents to be insufficient.”

# E-Cigarettes Potential for Harm if:



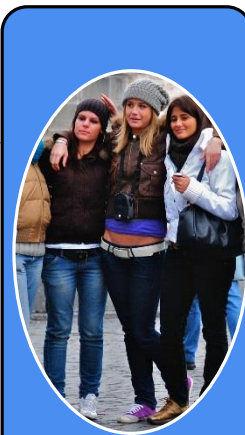
Leads to initiation of combustible tobacco use among non-smokers, particularly children



Leads to relapse among former smokers



Diminishes the chances that a smoker will quit



Discourages smokers from using proven quit methods



Exposes children, pregnant women, and non-users to secondhand aerosol



Glamorizes or renormalizes tobacco use



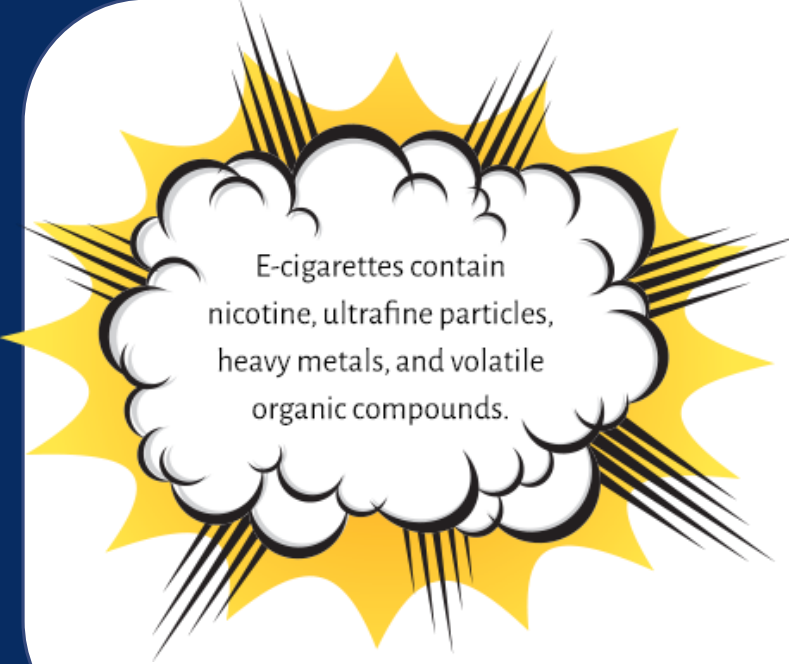
Results in poisonings among users or non-users





# Major Conclusion

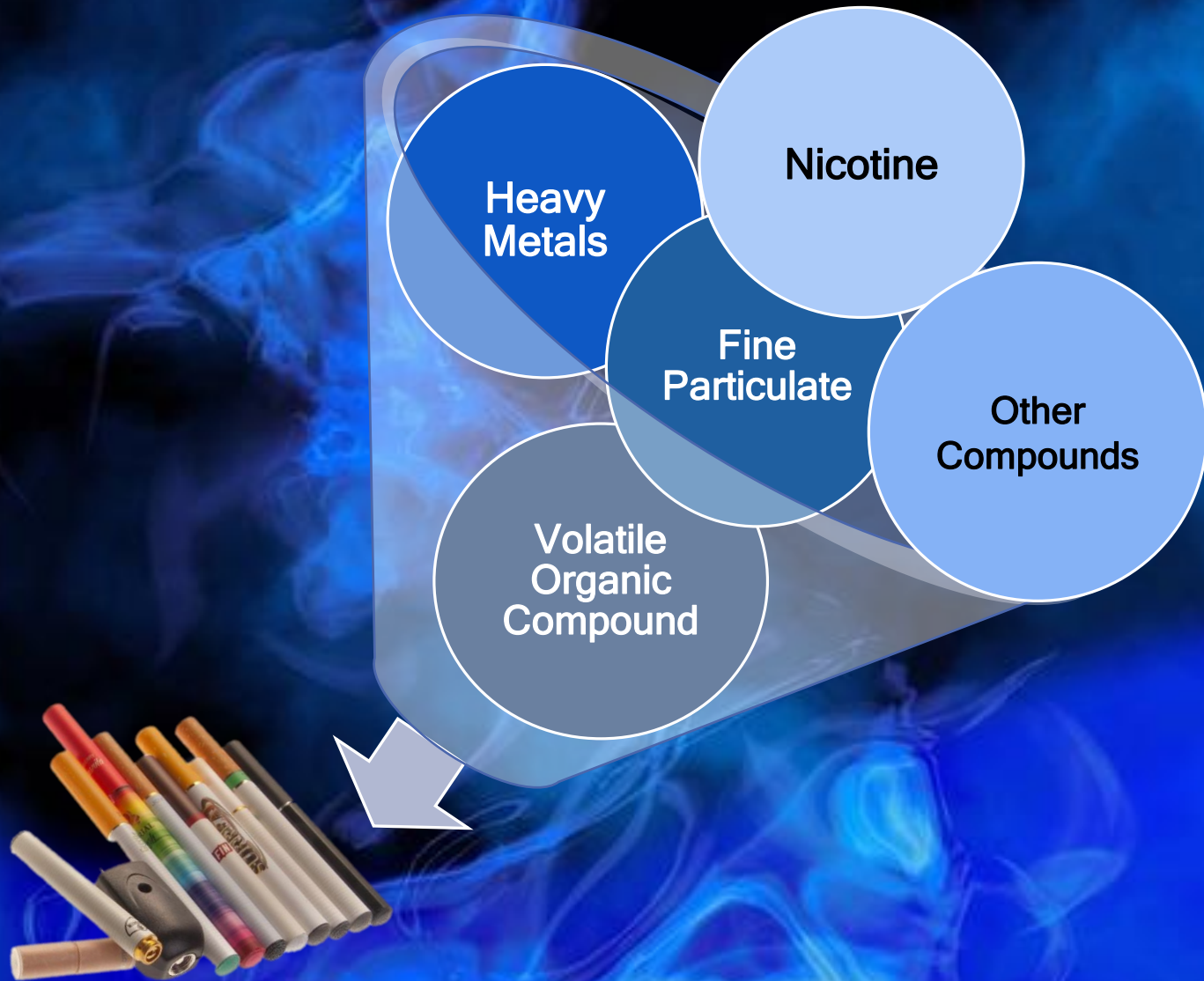
#5



E-cigarettes contain  
nicotine, ultrafine particles,  
heavy metals, and volatile  
organic compounds.

“E-cigarette aerosol is not harmless. It can contain harmful and potentially harmful constituents, including nicotine. Nicotine exposure during adolescence can cause addiction and can harm the developing adolescent brain.”

# E-Cigarette Aerosol Harmful & Potentially Harmful Ingredients





# Nicotine Poses Unique Dangers to Young People



## E-Cigarette Use Among Youth and Young Adults

A Report of the Surgeon General



U.S. Department of Health and Human Services

### Chapter 3 Conclusion 1, 2, & 5

1. Nicotine exposure during adolescence can cause addiction and can harm the developing adolescent brain.

2. Nicotine can cross the placenta and has known effects on fetal and postnatal development. Therefore, nicotine delivered by e-cigarettes during pregnancy can result in multiple adverse consequences, including sudden infant death syndrome, and could result in altered corpus callosum, deficits in auditory processing, and obesity.

5. Ingestion of e-cigarette liquids containing nicotine can cause acute toxicity and possibly death if the contents of refill cartridges or bottles containing nicotine are consumed.

# Public Service Announcement

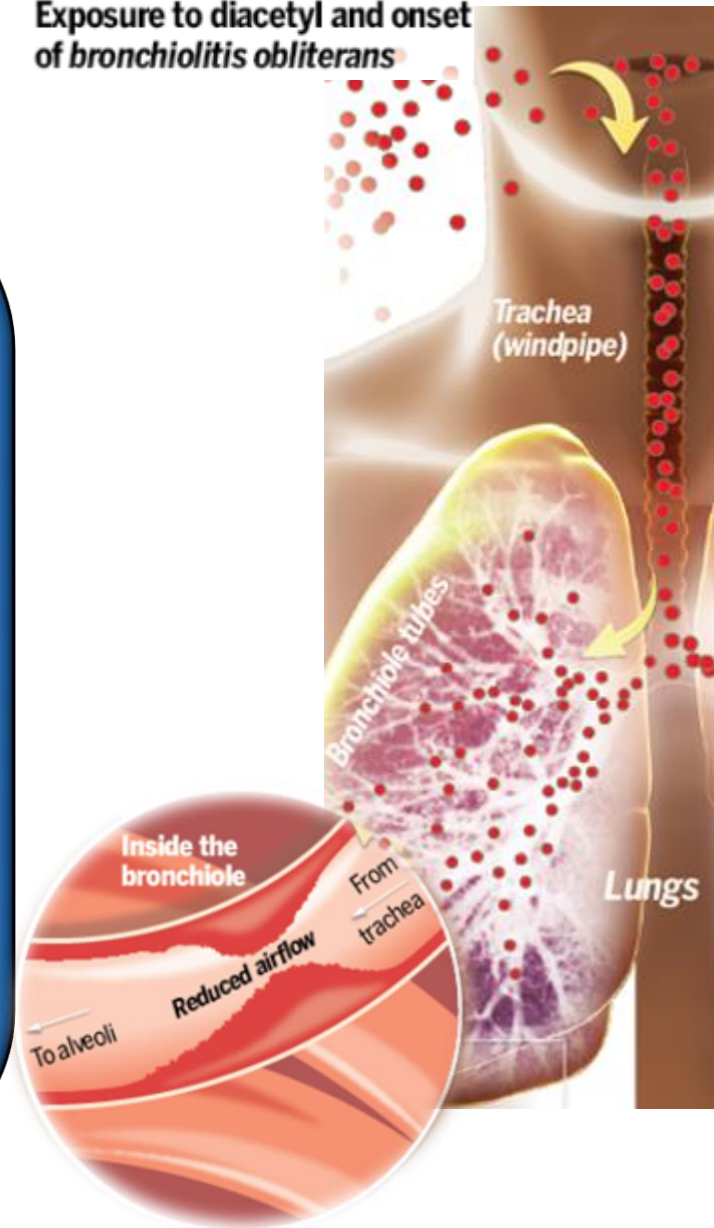




# Flavorings

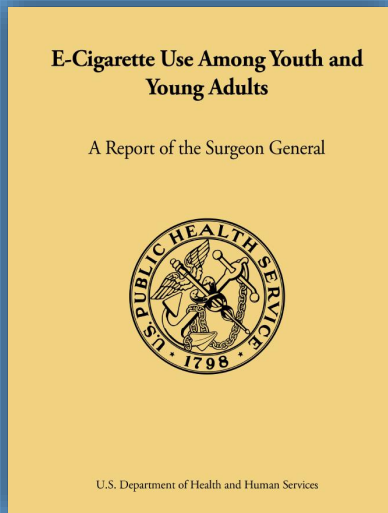
- Some e-cigarette manufacturers claim flavorings are safe because they meet the FDA definition of “Generally Recognized as Safe (“GRAS”)
- GRAS status does not apply to products that are not food
- 75% of the flavors tested contained diacetyl, according to recent studies
- Diacetyl is associated with bronchiolitis obliterans and other severe respiratory diseases known as “popcorn lung”

Exposure to diacetyl and onset of bronchiolitis obliterans





# The Surgeon General's Report



## Chapter 2 Conclusion 8.

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E-cigarette products can be used as a delivery system for cannabinoids and potentially for other illicit drugs.

# Percentages of Middle & High School Students Who Reported Ever Using an E-Cigarette



Approximately 1 / 3 of students who had ever used an e-cigarette (**32.5%**) reported having used (at least once) an e-cigarette for a substance other than nicotine.



Use of e-cigarettes for a substance other than nicotine was higher among males compared with females, & non-Hispanic white and Hispanic students compared with non-Hispanic black students.



The proportion of e-cigarette users who used an e-cigarette for a substance other than nicotine was similar among middle (**33.7%**) & high (**32.2%**) school students.

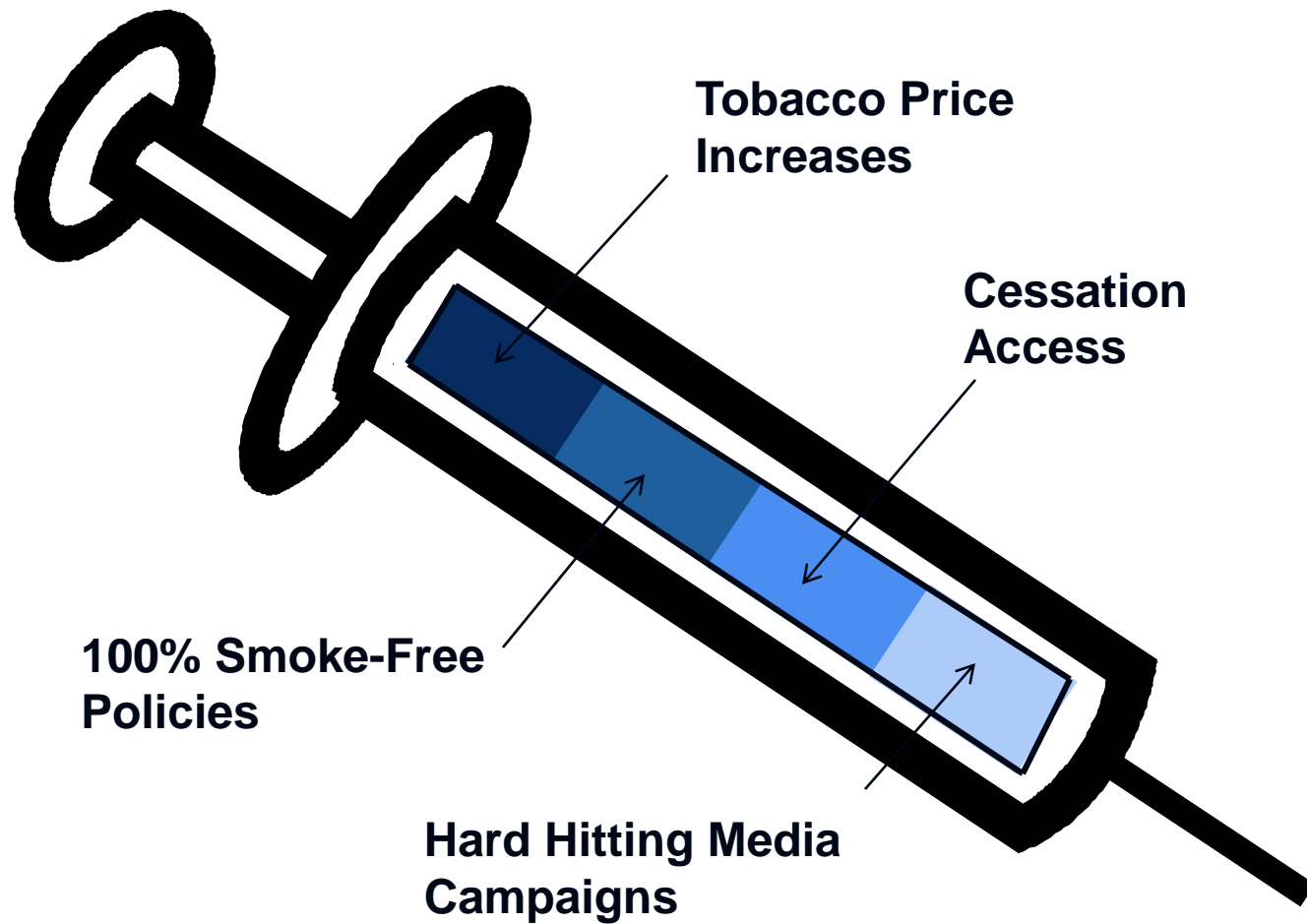
**4**

# Policy Options

# Barriers to Reducing Tobacco Use



# “Tobacco Control Vaccine”





# Major Conclusion

#7



“Action can be taken at the national, state, local, tribal, and territorial levels to address e-cigarette use among youth and young adults. Actions could include incorporating e-cigarettes into smoke-free policies, preventing access to e-cigarettes by youth, price and tax policies, retail licensure, regulation of e-cigarette marketing likely to attract youth, and educational initiatives targeting youth and young adults.”

# Call to Action

The Surgeon General issues this Call to Action on e-cigarettes, specifically focusing on youth and young adults, to accelerate policies and programs that can reduce e-cigarette use among young people.

It highlights the need to implement proven strategies that will prevent potentially harmful effects of e-cigarette use among young people.

## The Call to Action on E-Cigarette Use Among Youth and Young Adults

The Surgeon General issues this Call to Action on e-cigarettes, specifically focusing on youth and young adults, to accelerate policies and programs that can reduce e-cigarette use among young people. This Call to Action comes amid the dramatic increase in e-cigarette use among our nation's youth and young adults. It highlights the need to implement proven strategies that will prevent potentially harmful effects of e-cigarette use among young people. The previous chapters explained what we know and do not know about e-cigarettes and reviewed policy options. Gaps in scientific evidence still exist, and this Call to Action is being issued while these products and their patterns of use are changing quickly. However, policies and strategies are available that can clearly reduce the public health threat posed by e-cigarette use among young people.

*Use of e-cigarettes is increasing rapidly among young people, even among those who have never smoked cigarettes.*

This Call to Action presents six goals and related strategies that should guide efforts to reduce e-cigarette use among youth and young adults. To achieve these goals, we must work together, which means working with individuals and families; civic and community leaders; public health and health care professionals; e-cigarette manufacturers and retailers; voluntary health agencies; researchers; and other stakeholders.

### Stakeholders Who Can Take Action

- Individuals, parents, and families
- Teachers, coaches, and other youth influencers
- Civic and community leaders
- Public health and health care professionals
- Researchers
- Federal government
- State, local, tribal, and territorial governments
- E-cigarette manufacturers, distributors, and retailers
- Voluntary health agencies, non-governmental organizations, and other community- and faith-based organizations

### Goal 1. First, Do No Harm

Since 1964, reports from the U.S. Surgeon General have led the way in identifying the harms of tobacco use and detailing the most effective ways to reduce the dangerous effects of tobacco use. For example, reports from 1994 and 2012 outlined proven strategies to prevent and reduce tobacco use among youth and young adults (U.S. Department of Health and Human Services [USDHHS] 1994, 2012). Building on these and other past reports, this Call to Action considers the harms of e-cigarette use among youth and young adults and stresses the importance of strategies that will protect young people from the adverse consequences of these new products.





# Stakeholders Who Can Take Action



Individuals, parents, and families



Teachers, coaches, and other youth influences



Civic and community leaders



Public health and health care professionals



Researchers



Federal government



State, local, tribal, and territorial governments



E-cigarette manufacturers, distributors, and retailers



Voluntary health agencies, non-governmental organizations, and other community and faith based organizations

# Public Health Actions to Address E-Cigarettes

## Federal Regulation

### *Family Smoking Prevention and Tobacco Control Act*

- Signed into law on June 22, 2009
- Granted FDA the authority to regulate tobacco products
- Enhances the ability to intensify policy to reduce tobacco industry influence
  - Manufacturing
  - Marketing
  - Sale

## State, Local, Tribal

### *Potential Sub-National Action:*

- Including e-cigarettes in smokefree indoor air policies
- Restricting youth access to e-cigarettes in retail settings
- Licensing retailers
- Establishing specific package requirements
- Setting price policies

# New Regulatory Framework

- ✓ Further limits youth access;
- ✓ Bans tobacco company sponsorship of sporting and entertainment events;
- ✓ Prohibits the sale of tobacco-branded merchandise such as clothing and jewelry;
- ✓ Prohibits false and misleading advertising and labels, such as “light” and “mild”.

# Family Smoking Prevention and Tobacco Control Act (2009)



# New FDA Manufacturer Requirements:



Registering manufacturing establishments and providing product listings to the FDA



Reporting ingredients, and harmful and potentially harmful constituents



Requiring premarket review and authorization of new tobacco products by the FDA

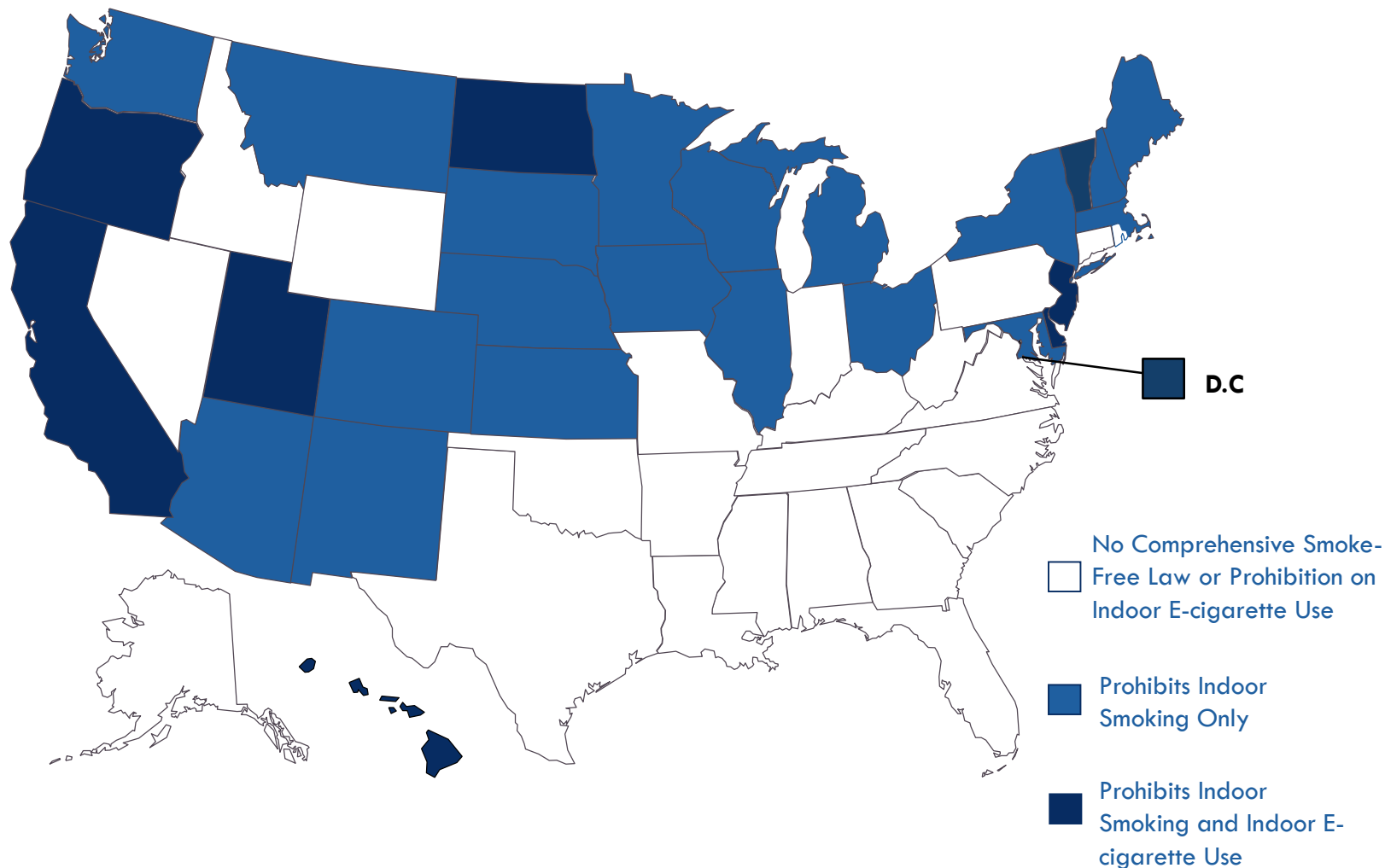


Placing health warnings on product packages and advertisements

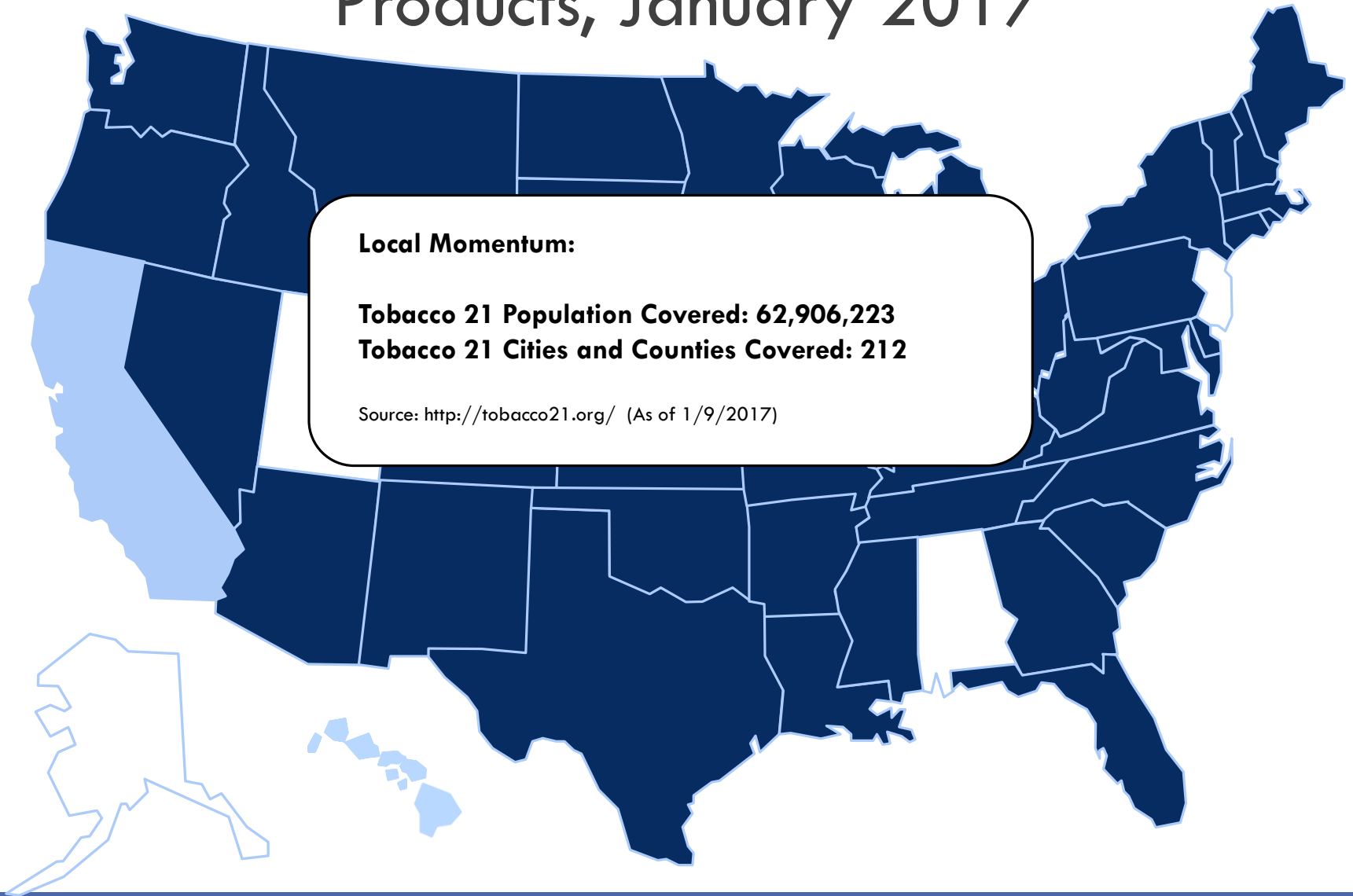


Not marketing newly deemed tobacco products (including e-cigarettes) with modified risk claims unless authorized by the FDA.

# States with & without laws prohibiting smoking & use of e-cigarettes in indoor areas of private worksites, restaurants, & bars - United States, December 2016



# Minimum Age of Sale for Tobacco Products, January 2017



21



19



18

# Summary

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- ✓ E-cigarettes are now the most commonly used tobacco product among U.S. youth.
- ✓ Youth use of tobacco products in any form, including e-cigarettes, is unsafe.
- ✓ Adults must quit smoking cigarettes completely to realize potential benefits of e-cigarettes. However, e-cigarettes are not currently an FDA-approved quit aid.
- ✓ The tobacco product landscape continues to diversify, and it's critical to modernize tobacco control strategies to adapt to these changes.
- ✓ Multiple different stakeholders can take action to implement policies and strategies that can clearly reduce the public health threat posed by tobacco use, including e-cigarettes.



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**Office on Smoking and Health**

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[www.cdc.gov/tobacco](http://www.cdc.gov/tobacco)



For more information, contact CDC  
1-800-CDC-INFO (232-4636)  
TTY: 1-888-232-6348 [www.cdc.gov](http://www.cdc.gov)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

