

e-Cigarettes: Poison or Panacea?

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Dr. Kamerow is a family physician and preventive medicine specialist who is widely quoted and highly rated as a speaker and columnist on health policy, childhood obesity, preventive medicine, and evidence-based practice. He is an associate editor of *The BMJ*, a global medical journal for which he writes a regular column on health policy. In addition, he recently published a book of essays called *Dissecting American Health Care: Commentaries on Health, Policy, and Politics*. Dr. Kamerow spent 12 years as a chief scientist in health services and policy research at RTI International, a large, nonpartisan research institute. Prior to that, he spent more than 20 years in the U.S. Public Health Service, leading a range of clinical, health policy, and research activities, such as the U.S. Preventive Services Task Force (USPSTF) and the National Guideline Clearinghouse. He retired as an assistant surgeon general in 2001. He is a graduate of Harvard College, Cambridge, Massachusetts; University of Rochester School of Medicine, New York; and Johns Hopkins University School of Public Health (now the Johns Hopkins Bloomberg School of Public Health), Baltimore, Maryland.

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Learning Objectives

1. Recognize and distinguish between various types of electronic cigarettes.
2. Evaluate current research regarding health risks associated with electronic cigarettes, including their effectiveness as a tool for smoking cessation.
3. Establish a plan to counsel patients regarding health risks associated with electronic cigarettes, including their effectiveness as a tool for smoking cessation.

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Audience Engagement System

The image displays three sequential screenshots of the Audience Engagement System app. Step 1 shows the home screen with a navigation bar at the bottom containing icons for Home, Search, My CME, and Profile, along with 'Log In' and 'About This App' buttons. Step 2 shows a list of CME activities with details such as '7am', '7am', '7am', and '7am'. Step 3 shows the details for a specific CME activity titled 'CME01 Adult Coronary Syndromes: Unchain My Heart', including a description and a 'Log In' button.

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AES: What's the Story on e-Cigarettes?

- A. They come in kid-friendly flavors
- B. They can help you stop smoking
- C. They can impede smoking cessation
- D. They're better for you than cigarettes
- E. We don't really know what's in them
- F. All of the above

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Overview

- What are e-cigarettes and how do they work?
- History: "cigalikes," "vape pens," "tanks"
- Growth and usage
- Field trips, "Big Tobacco," and FDA
- Harms and benefits
- What should family doctors do?
- Discussion

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What are e-Cigarettes?

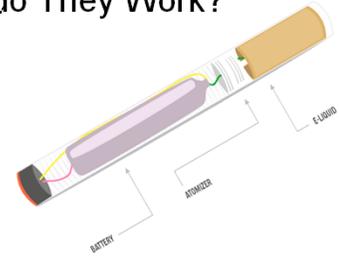
- Formally: electronic nicotine delivery systems (ENDS)
- Battery powered, cigarette-shaped
- Vaporize nicotine liquid ("e-juice") so it can be inhaled
- Introduced in 2006-2007 as "cigalikes" ("slims")
- Initially available at convenience stores



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How do They Work?

- Three parts to all e-cigs:
 - Battery
 - Liquid nicotine
 - Vaporizer/atomizer
- Parts may be replaceable and/or rechargeable



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Cigalikes

- Individual disposables for under \$10 (I paid \$7.50)
- In bulk on the web for \$5
- One disposable is equivalent to a pack or more of tobacco cigarettes



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"Vape pens" and Refillables

- e-Cigarette vaping systems, refillable and rechargeable vape pens (mods, eGos, vaporizers, PVs, APVs, etc)
- e-Juice comes in multiple flavors and concentrations



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Tanks, Mods, Box Mods

- Lots of names, shapes, sizes, but they all work the same way:
Flavored liquid nicotine is vaporized and inhaled



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The e-Cigarette Family



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Vape Shops

- Usually solo or local chain
- Sell a range of vaping eqpt
- e-Juice from different sources
- Kit with battery, juice, charger for \$35-\$110 ++
- Est. 10,000+ in the US



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AES: How Big a Market in 2016?

- A: \$500 million
- B: \$1 billion
- C: \$2.5 billion
- D: \$4 billion
- E: No one knows

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Growth of e-Cigarettes

- \$500 million in US sales in 2012, 0.5% of tobacco products
- Grew fast: estimated to be \$4.1 billion in 2016. "Vaping" was OED's 2014 word of the year!
- Big Tobacco joined the market, spiking sales
- Growth rate seems to have slowed, however, especially among cigalikes (but still growing)

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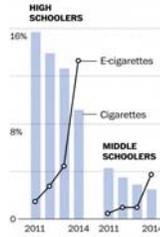
Why Would e-Cig Growth Slow?

- Customer dissatisfaction, esp. cigalikes?
- Inventory backlogs?
- New state (and now Federal) laws?
- Rising safety concerns?
- Measurement artifact?

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Teen e-Cig Use Triples from 2013-14

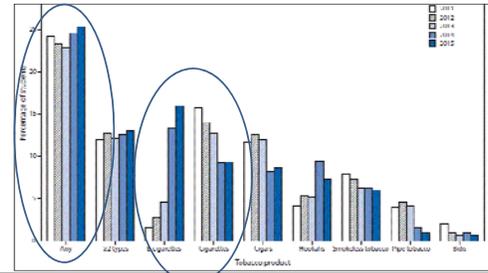
- Based on 2011-2014 National Youth Tobacco Surveys
- Significant *increase* in e-cigarette (and hookah) use
- Significant *decrease* in cigarette use
- **Overall, no change in tobacco use!**



Amaze RA, et al Tobacco use among middle and high school students. MMWR 2015;64:381-5.

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Latest High School Survey Data



MMWR 2016;65:361-367

Child e-Cigarette Use Hugely Important

- Vast majority of smokers start as minors
- Very few smokers start after 21
- The potential exists for starting w e-cigarettes and moving to combustibles
- Flavors of e-cigarettes make them easy to start
- **PUBLIC HEALTH PEOPLE ARE FREAKED OUT!**

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AES: Which of the Big Ts has NO e-Cig?

- A. Altria
- B. Lorillard (now Imperial)
- C. RJ Reynolds
- D. None of the above

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Big Tobacco and e-Cigarettes

- NJOY was an early, independent cigalike
- Lorillard launched Blu in 2012; originally only a disposable, now multiple versions
- RJ Reynolds entered in 2013 with Vuse “digital vapor cigarettes”
- Finally, Altria bought Green Smoke and began introducing Mark Ten in 2014; distribution now has caught up to the others

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7-11 Field Trip!

- Visited my local 7-11
- Plenty of e-cigs available
- Literature also
- Integrated into the tobacco cigarette displays
- Sold “behind the counter” (in DC)



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7-11 Field Trip, contd.

- Vuse (RJR) has multiple varieties and prices
- “Designed and assembled by the tobacco experts at RJR”
- “Perfect puff every time”



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Vuse

- I paid \$10
- Single e-cig, but is rechargeable *and* refillable
- Comes w USB charger
- Multiple flavors available



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7-11 Field Trip, contd.

- Blu has varieties and refills and lots of space
- Disposables, tanks, and rechargeables
- “Take back your freedom”



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blu

- Now owned by Imperial, after RJR acquired Lorillard
- Very aggressive marketing:
 - “Slim. Charged. Ready to go”
- Distinctive blue “ash”



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blu



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7-11 Field Trip #2

- Mark Ten, by Altria, is the most recent e-cig from Big T to hit the market.
- Starting to dominate the shelves, especially with their XL brand



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MarkTen

- Altria purchased Green Smoke
- “FourDraw technology”
- Rechargeable, 2 sizes
- Available in classic, menthol, fusion, mint
- MarkTen XL most popular



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7-11 Field Trip, contd.

- NJOY has been squeezed down a bit
- “Proudly independent of Big Tobacco”
- Now makes refillable vape pens as well



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NJOY

- One of the original cigalikes, but has now expanded to vape pens and e-juice
- “Not a tobacco company”
- Going up against Big T



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Vape Shop Field Trip!

- Large selection
- Snide about disposables
- Ex-smoker
- Down-played dangers of e-juice



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Vape Shops vs. Convenience Stores

- No one knows how many vape shops there are (est. 10,000+) or how much they sell
- Mom and Pop or small chains
- Convenience stores are the province of Big Tobacco: 300,000 stores is the goal
- Altria and RJR spent more than \$150 million in 2014 alone to roll out products

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AES Question

Current e-Cig Marketing Restrictions?

- A. None allowed
- B. Same as cigarettes: no TV or radio, limited billboards and print
- C. No TV, but print and billboards allowed
- D. No current restrictions

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Marketing with the Stars: No Restrictions



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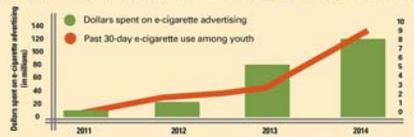
Free Promotion from the Stars



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Marketing and Use by Kids

E-cigarette use among youth is rising as e-cigarette advertising grows



SOURCE: National Youth Tobacco Survey, 2011-2014. Kim et al (2015). Youth Tobacco (2015).

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Benefits and Harms

- Harms
 - What's in them?
 - How are they being used?
- Benefits
 - Better than tobacco cigarettes?
 - NRT for smoking cessation
 - Harm reduction?

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What's Goes into Them?

- MarkTen pretty standard: "tobacco-derived nicotine, propylene glycol, glycerol, water and additional flavors"
- Vape shop e-liquid: WHO KNOWS?



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What Comes Out of Them?

- Ctr. for Environmental Health commissioned outside labs to test 97 e-cig products with smoking machines (9/15)
- Found that most produced "high levels" only of formaldehyde and acetaldehyde (not of others)
- Others: lower urine toxicant levels from e-cigs than combustibles



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Are They as Dangerous as Cigarettes?

- If you smoke them: no, they are *likely* safer than tobacco products if the ingredients are as stated:
 - Far fewer carcinogenic particles
 - Less inflammation
 - Better indoor air quality

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How Much Nicotine is in Them?

- Impossible to say
 - Different measures (percent or weight)
 - Different smoking styles
 - Different batches of e-juice
 - Different strengths available, both in vape shops and even in cigalikes, including (supposedly) 0 mg
- Summary: variable

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How About e-Juice?

- Nasty stuff: serious poison, esp. in large quantities: attractive small bottles
- Up to 36mg/mL of nicotine, easily absorbed orally or even cutaneously
- Poison center calls up from 1 to 215/mo from 2010 to 2014: kids *and* adults
- First death has now been reported: IV nicotine suicide



Chatham-Stephens K, et al. Calls to poison centers for exposures to electronic cigarettes. MMWR 2014;63:292-3.

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E-Cigarettes: Yes or No?

And for what?

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US Authorities' Recommendations

- USPSTF: Insufficient evidence to recommend for smoking cessation
- CDC: Potential for harm and benefit
- AAFP: Ban marketing, do more research
- FDA: Adults only, not approved for smoking cessation

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RCP Report: "Huge Potential"

- e-Cigs more popular than NRT
- ≤5% of the harm of cigarettes
- Gateway evidence is weak
- "Appear to be effective" in smoking cessation
- Endorsed, but regulations needed



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How are e-Cigs being Used?

- Kids
 - Bad: experimentation
 - Bad: smoking initiation
- Adults
 - Good: smoking cessation
 - Good/Bad?: harm reduction
 - Bad: smoking maintenance, initiation

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Bad: Kids Experimentation

- Anecdotes: e-cigs cool
- 79K to 263K ↑ in 3 yrs
- Twice as many who used e-cigs intend to smoke
- Easy to use and put in your pocket
- Nicotine much more addictive in kids



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Bad: Kids Smoking Initiation

- Evidence starting to emerge that kids are starting smoking w e-cigarettes and then moving to combustibles
- Most is correlational at this point, some bi-directional, but this is a big concern

Leventhal et al, *JAMA* 2015;314(7):700-707

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Good: Smoking Cessation

- A few retrospective studies and small trials
 - Historical: as good as NRT
 - Trial: as good as NRT, better than placebo
 - Vs. nicotine inhaler: preferred
- Cochrane review judged evidence positive but low quality
- All brands explicitly deny use as smoking cessation tool; none FDA approved

McRobbie H, et al. Electronic cigarettes for smoking cessation and reduction. *Cochrane Library* 2014. DOI:10.1002/14651858.CD010216.pub2

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Bad: Smoking Maintenance

- Major public health cessation strategy: make it hard to smoke
- e-Cigarettes make this easier, allow maintenance of smoking: “dual use”
- True extent of this threat unknown; one recent study found smokers using e-cigs may be at *increased* risk for not being able to quit smoking

Al-Delamji WK et al. E-cigarette use in the past and quitting behavior in the future. *AJPH*. 2015;105:1213-15.

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Harm Reduction: Good or Bad?

- First tenet of harm reduction: alternative is less harmful than the established harm. *Probably true.*
- Second tenet: use of alternative leads to decreased use of the established harm. *May be true.*
- Is it better to substitute e-cigarettes for conventional cigarettes, even without the intention of quitting?

Drummond MP. Electronic cigarettes: Perhaps the devil unknown is better than the devil known. *Ann Intern Med* 2015;163:61-2.

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FDA Regulations, Effective 8/8/16

- Announced May 2016, after a 2-year wait
- Banning sales to <18s, no giveaways, vending
- Safety bottles for e-juice
- Registering manufacturers (incl some vape shops)
- Requiring premarket review of all products (since '07)
- Requiring health warnings on all packages and ads
- Prohibiting “modified risk” products unless authorized

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Problems with FDA Rule

- S-L-O-W: took two years until final rule
- Caused flood of products on the market pre 8/8
- Some provisions don't take effect for 3 years
- May be delayed by legal maneuvers
- No flavor restrictions
- No effect on marketing/advertising (not FDA's job—FTC is “looking at it”)

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The Post-FDA Rule World

- Vape shops are scared: “vapocalypse” if they have to register their products, submit to inspections, etc
- Big tobacco presumably loves it, because they've got the resources to respond to regulations
- What will the landscape look like in 5-10 years?
 - Vape shops out of business (or only a few large chains)?
 - e-Cigarettes only at convenience stores?
 - Conventional cigarettes out of business?

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Cool (or Crazy?) Idea: e-Cigs as a Disruptive Technology

- Ultimate in harm reduction
- Regulate e-cig nicotine content, humectants, additives
- Regulate conventional cigarette nicotine content *down* to send people fleeing to e-cigs
- *Increase* taxes on tobacco cigarettes
- Result: millions of lives saved, cigarettes out of business

Cobb NK and Abrams DB. The FDA, e-cigarettes, and the demise of combusted tobacco. *NEJM* 2014;371:1469-71

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What Should Family Doctors Do? Kids

- Clearly e-cigarettes are a disaster for kids
- Ask all kids about “vaping” and/or “e-cigarette use”
- Make sure parents know about the growth of e-cigarette use in kids and how easy it is to conceal
- Alert all vapers about e-juice safety issues, esp. for young children
- Push for local restrictions on flavors, marketing

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AES Question

What Should Family Doctors Do About e-Cigarettes in Adults?

- Never recommend e-cigarettes for anyone
- Recommend them only for smoking cessation in selected patients who fail conventional nicotine replacement therapy
- Recommend them as a possible harm reduction strategy for some smokers who won't quit
- Recommend them for all smokers to put cigarettes out of business

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What Should Family Doctors Do? Adults

- Recommend e-cigarettes:
 - Not at all (unproven)
 - For cessation? (as NRT)
 - Partial substitution? (harm reduction)
 - Total substitution? (harm reduction)
- Which e-cigarettes? Vape shops?
- Safety issues, esp with e-juice

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Practice Recommendations

- Revise your “smoking” questions to specifically include “vaping” and e-cigarettes: *and ask all kids!*
- Warn your patients who vape (or have family members who do) about the safety issues and likely harms
- Consider whether there *MAY* be a class of patients for whom you *recommend* e-cigarettes

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Suggested Readings

- Abrams DB. Promise and peril of e-cigarettes. *JAMA* 2014;311:135-6.
- Gostin LG and Glasner AY. e-Cigarettes, vaping, and youth. *JAMA* 2014;312:595-6.
- Barter T. Electronic cigarettes: Aggregate harm. *Ann Intern Med* 2015;163:60-1.
- Drummond BM. Electronic cigarettes: Perhaps the devil unknown is better than the devil known. *Ann Intern Med* 2015;163:61-2.

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Discussion



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Questions

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Thanks!

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99406-Smoking and tobacco use cessation counseling visit; intermediate, greater than 3 minutes up to 10 minutes

99407-; intensive, greater than 10 minutes

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