



e-Cigarettes: Poison or Panacea?



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Poll: 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?

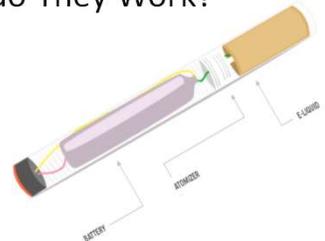
- Formally: electronic nicotine delivery systems (ENDS)
- Battery powered, cigarette-shaped
- Vaporize nicotine liquid ("e-juice") so it can be inhaled
- Introduced in 2006-2007 as "cigalikes" ("slims")
- Initially available at convenience stores



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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 so of tobacco cigarettes
- Now rechargeable and refillable w cartridges



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“Vape pens” and Refillables

- e-Cigarette vaping systems, refillable and rechargeable vape pens (mods, eGos, PVs, 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. 10-15,000+ in the US



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Poll: How Big a US Market in 2015?

- A: \$500 million
- B: \$1.3 billion
- C: \$3.2 billion
- D: \$4.8 billion
- E: No one knows

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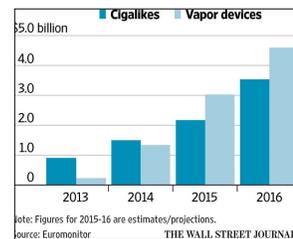
Growth of e-Cigarettes

- \$500 million in US sales in 2012, 0.5% of tobacco products
- Growing 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 may have slowed, however, especially among cigalikes (but still growing)

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Continued Projected US Growth?

- Vape devices expected to pass cigalikes
- 2016 may not be true (projected)
- Still dwarfed by \$100 billion conventional cigarette sales



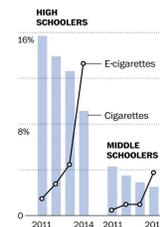
Why Would e-Cig Growth Slow?

- Customer dissatisfactions, esp. cigalikes?
- Inventory backlogs?
- New state (and now Federal) laws?
- Rising safety concerns?
- Public health publicity?

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Teen e-Cig Use Triples from 2013-14

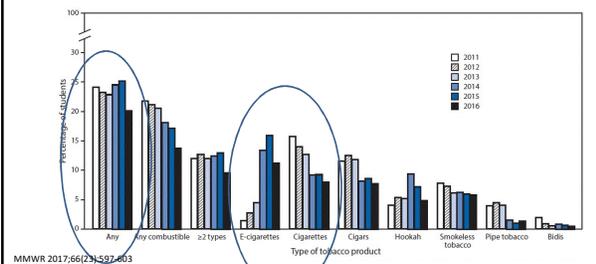
- Based on 2011-2014 National Youth Tobacco Surveys
- Significant *increase* in e-cigarette (and hookah) use
- Significant *decrease* in cigarette use
- **Overall, no change in tobacco use!**



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

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Latest High School Data: Good News!



Child e-Cig Use Hugely Important

- Vast majority of smokers start as minors
- Very few smokers start after 18
- The potential exists for starting with 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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Poll: Which of the Big Ts has NO e-Cig?

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

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Big Tobacco and e-Cigarettes

- NJOY was an early, independent cigalike
- Lorillard launched Blu in 2012; then sold it to Imperial when Reynolds American bought Lorillard in 2014
- 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 with the others

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7-11 Field Trip!

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



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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7-11 Field Trip #2

- Mark Ten, by Altria, now integrated into combustibile display
- Starting to dominate the shelves
- Come with replacement cartridges and charger



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MarkTen

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



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7-11 Field Trip, contd.

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



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NJOY

- One of the original cigalikes, expanded into vape pens and e-juice
- “Not a tobacco company”
- In and now out of Chapter 11 bankruptcy



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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 their products

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Poll: 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



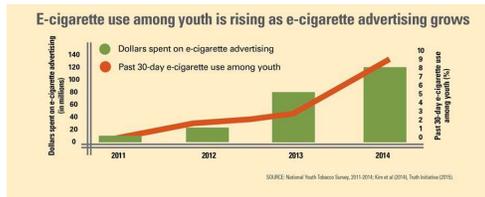
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Who are the Targets of Flavored e-Cigs?



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Marketing and Use by Kids



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Harms and Benefits

- 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 Goes into Them?

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



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What Comes out of Them?

- Ctr. for Environmental Health report found that most produced "high levels" of formaldehyde and acetaldehyde only (not of others)
- British study in *AJM* found e-cig only and NRT only users had "substantially reduced" carcinogens compared to smokers and mixed



Shahab L, et al. Ann Intern Med. Doi: 10.7326/M16-1107

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Are They as Dangerous as Cigarettes?

- If you smoke them: no, they are *very 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
- 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. JAMA 2014;311:202-3.

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e-Cigarettes: Yes or No?

And for what?



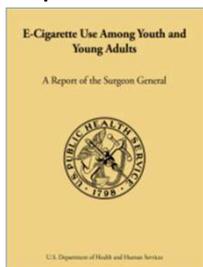
US Authorities' Recommendations

- 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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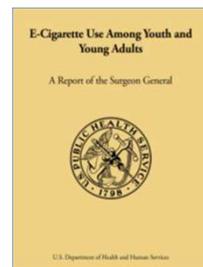
Surgeon General's Report, 2016

- e-Cigs most commonly used tobacco in kids
- Nicotine is dangerous to youth
- e-Cig aerosol is not harmless
- e-Cigs marketed w seductive flavors



SG-recommended Actions

- Prevent access by kids
- Price and tax policies
- Regulation of marketing
- Educational initiatives
- Retail licensure
- Clinicians: caution



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 (now going down)
- Twice as many who used e-cigs intend to smoke
- Easy to use and put in your pocket
- Nicotine much more addictive in kids: gateway?



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Bad: Kids Smoking Initiation

- Evidence starting to emerge that kids are starting smoking with e-cigarettes and then moving to combustibles; vaping as risk factor for smoking
- Some longitudinal studies show vaping as independent predictor of smoking initiation
- Vaping may change perception of risk of smoking

Miech, et al. *Tob Control* 2017;0:1-6. doi: 10.1136/tobaccocontrol-2016-053291

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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
- 2016 Cochrane review judged evidence positive, at least against e-cig placebos, but low quality
- All brands explicitly deny use as smoking cessation tool; none FDA approved

Hartmann-Boyce J, et al. *Cochrane Database of Systematic Reviews* 2016, Issue 9. Art. No.: CD010216. DOI: 10.1002/14651858.CD010216.pub3

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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
- 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 (not a great study)

Al-Delaimy WK, et al. *E-cigarette use in the past and quitting behavior in the future.* *JGIM* 2016;30:1513-19.

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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?

Durmond MP. *Electronic cigarettes: Perhaps the devil unknown is better than the devil known.* *Ann Intern Med* 2015;163:651-2.

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FDA Regulations, Effective 8/8/16

- Announced May 2016, after a 2-year wait
- Restricts sales to age 18+, no giveaways, vending
- Safety bottles for e-juice
- Registers manufacturers (incl some vape shops)
- Requires retroactive review of most products by 2018*
- Requires health warnings on all packages and ads
- Prohibits "modified risk" products unless authorized

*Congress has delayed and may repeal this provision!

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Problems with FDA Rule

- S-L-O-W: took two years til final rule
- Some provisions don't take effect for 3 years
- Caused flood of products on the market pre 8/8
- May be delayed by legal maneuvers, new Congress
- 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 except for a few large chains?
 - e-Cigarettes only at convenience stores?
 - Combustible cigarettes out of business?

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Vape Shop Tour: Update

- My local vape shop **CLOSED** in early 2017



Cool (or Crazy?) Idea:

e-Cigs as a Disruptive Technology

- Ultimate in harm reduction
- Regulate e-cig nicotine content, humectants, additives
- Regulate tobacco 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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Are We Unintentionally Doing Harm?

- Public health, doctors warning against them
- Some states taxing them
- FDA regulating them
- What if they *are* much better for you and we're missing the boat???
- Are we missing a chance to "end smoking as we know it"?

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

- A. Never recommend e-cigarettes for anyone
- B. Recommend them only for smoking cessation in selected patients who fail conventional nicotine replacement therapy
- C. Recommend them as a possible harm reduction strategy for some smokers who won't quit
- D. 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 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

- 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.
- Kalkhoran S and Glantz SA. E-cigarettes and smoking cessation in real-world and clinical settings: a systematic review and meta-analysis. *Lancet Resp Med* 2016 doi:1.106/S2213-2600(15)00521-4.
- Shahab, et al. Nicotine, carcinogen, and toxin exposure in long-term e-cigarette and nicotine replacement therapy users. *Ann Intern Med* 2017. doi:10.7326/M16-1107.

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Discussion



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Q&A



Thanks!

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