




UNM

COLLEGE *of* PHARMACY

New Mexico Poison & Drug Information Center



Presentation to Tobacco Settlement Revenue Oversight Committee

Lynda S. Welage, Dean, College of Pharmacy

Susan Smolinske, Director, New Mexico Poison and Drug Information
Center

Poisoning Facts



- 2-4 Million poisoning per year in US
- 438,000 hospitalizations
- 41,600 deaths
- Second highest cause of unintentional injury deaths
- Annual cost of poisoning is \$4.4 billion

Mission of NMPDIC



The mission of the New Mexico Poison & Drug Information Center (NMPDIC) is to improve the health of New Mexicans by reducing morbidity and mortality associated with poisoning, adverse drug interactions and medication errors.

Service Components

- Poison Information
- Drug Information
- DOH All Hazards

Poison Center Enhanced Data Collection Project

E-cigarettes

- Collect extensive brand name information
- Special attention to new RJR VUSE product
- Surveillance for new product designs
 - Vaporizer pens
 - Open vs closed systems
 - Flavorings
 - Bud cartomizers
- Concentration of nicotine

Electronic cigarette Facts



RJ Reynolds has asked poison centers to collect enhanced data on exposures

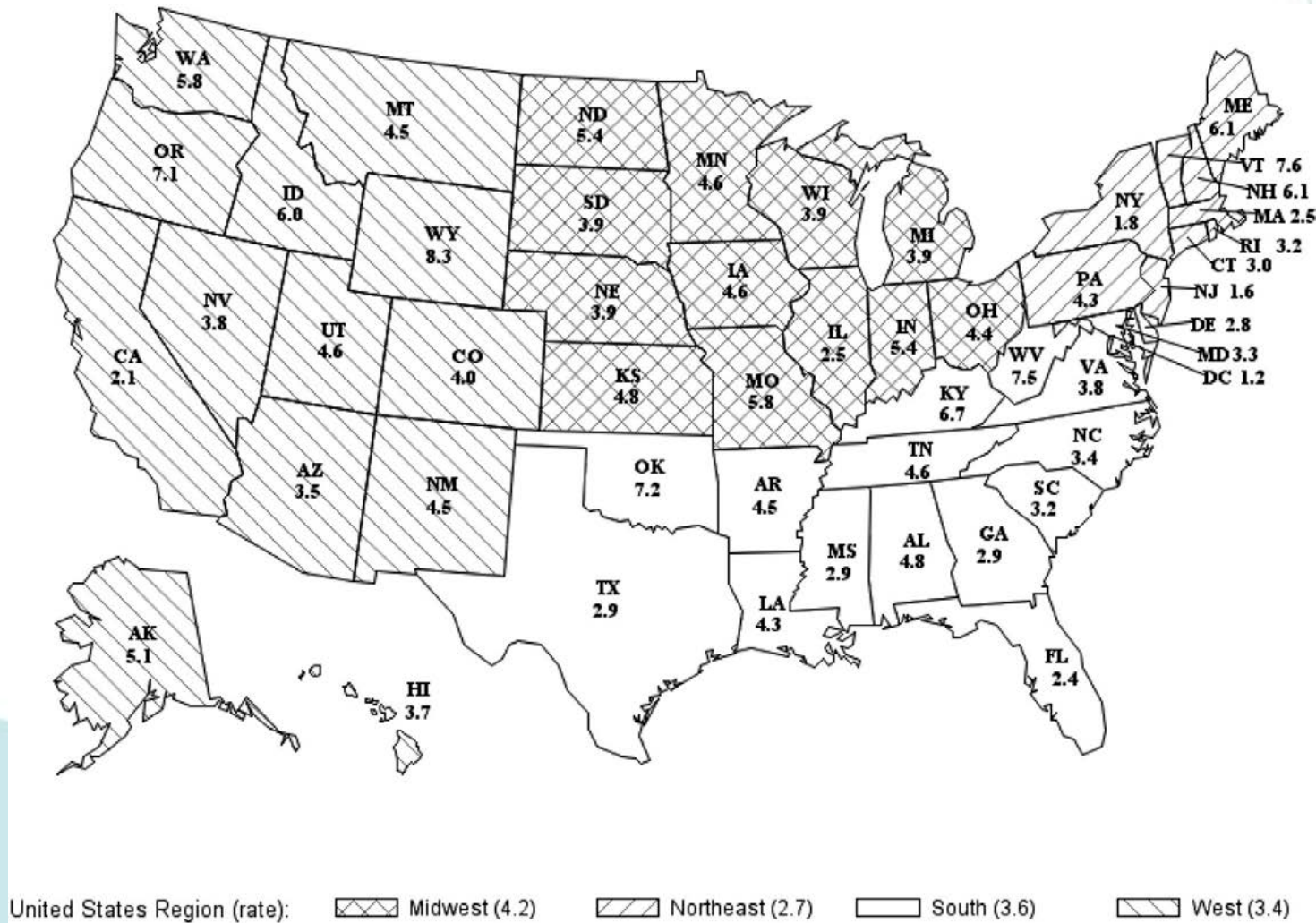
Tobacco/cigarette calls have increased 25% since 2014

- National explosion of e-cigarette calls to Poison centers
- 1 death in a toddler in NY
- NMPDIC calls increased 7-fold from 2010 to 2014 (9 to 61)
- NMPDIC calls decreased in 2015 (48) after passing of child-resistant packaging rules in NM
- NMPDIC calls in 2016 (41) remained steady

Background

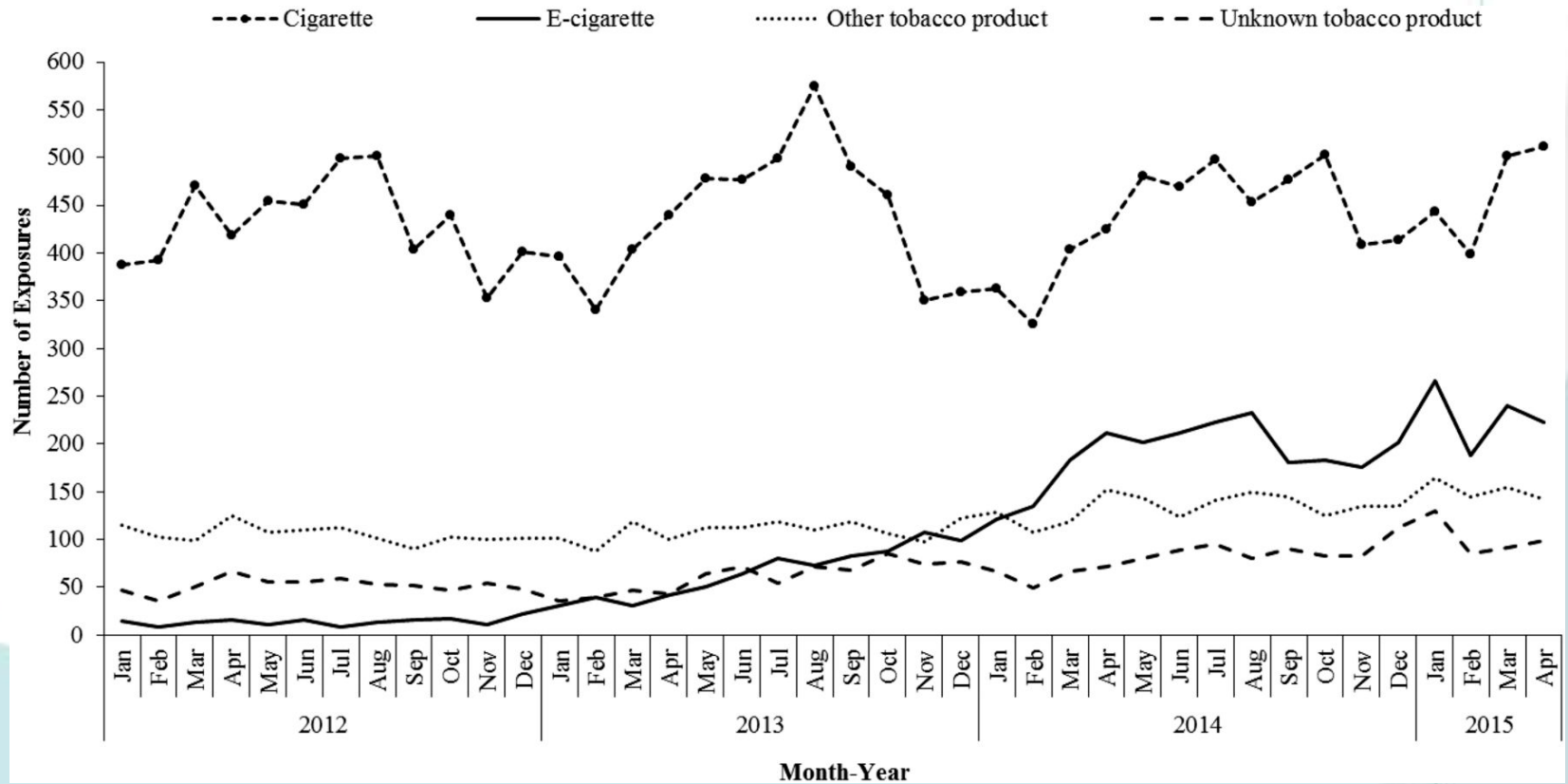
- Poison centers are reporting an increase in calls about exposures to E-cigarettes and the liquid nicotine used in the E-cigarette devices.
- In 2015, poison centers received reports of 3,590 exposures to electronic cigarettes and liquid nicotine (out of 2,231,381 total exposure cases).
 - Just over one-half of these reported exposures have occurred in children under the age of 6 years.
 - Moderate and major effects have been documented in NPDS.

Nicotine and tobacco product exposure rate per 10 000 children younger than 6 years by state and region, NPDS, January 2012 to December 2014.



Alisha Kamboj et al. Pediatrics 2016;137:e20160041

Monthly number of nicotine and tobacco product exposures among children younger than 6 years by product type and year, NPDS, January 2012 to April 2015.



Alisha Kamboj et al. Pediatrics 2016;137:e20160041

Impact of Enhanced Coding on NMPDIC

- Acknowledged:
 - This is more work for poison center specialists
 - This requires more quality control time

However

- 1 case handled = 1 person helped
- 1 case coded correctly can = hundreds of people not poisoned in the future
- FDA will be very interested in our data
 - Medwatch reports can be submitted

E-cigarette devices

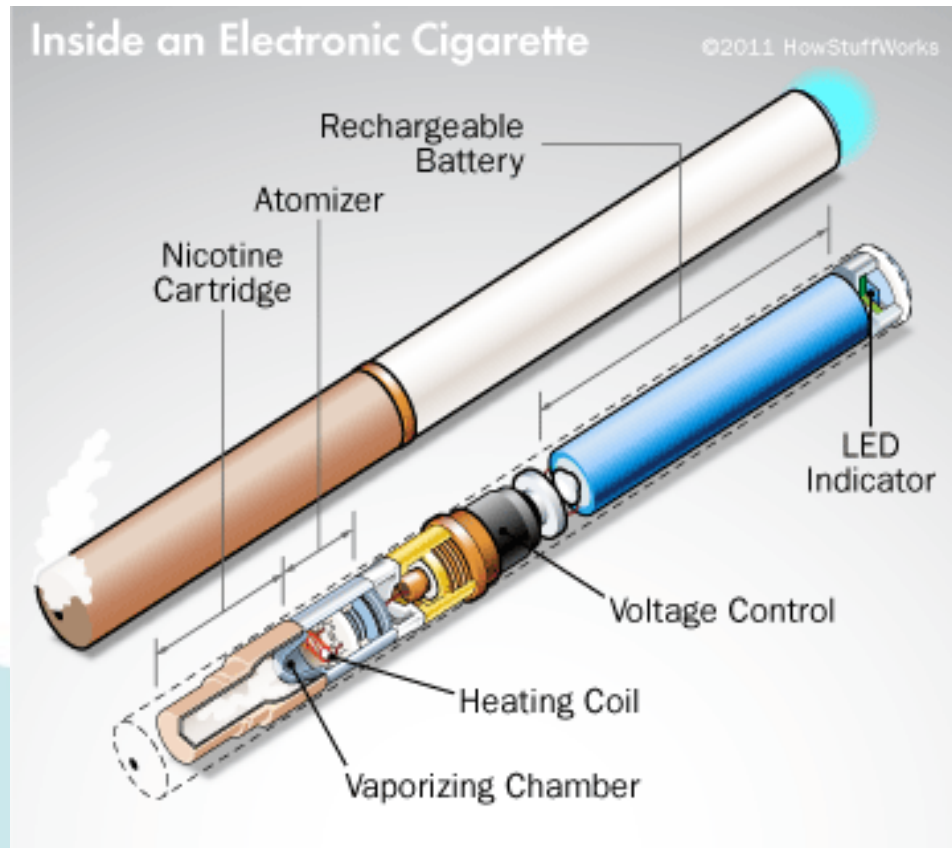


Top: www.smokelesscigarettebrands.com
Bottom: www.nipa.org

Closed vs. Open Systems

- Closed systems typically:
 - Inexpensive, disposable, look most like cigarettes
 - Easiest to use for those new to E-cigarettes
 - Acts as an entry into the use of open systems
- Open systems add options:
 - Wider range of flavor choices
 - May be more attractive to children and teens
 - Can mix flavors
 - Can customize how the device works
 - More battery power, alterations in how liquid is vaporized
 - Add more heat to use non-nicotine liquids
 - Some would like to ban open systems – **Poison center data needed**

How E-Cigarettes Work



Individuals can modify: voltage control, heating coil, vaporizing chamber. Kits sold to facilitate this.

Disposable (Closed) E-cigarette Devices



Closed System: E-cigarette Cartridges



Coded as an E-cigarette device since used for a closed system.

Open System: E-cigarette Liquid Refills

- Strengths can vary significantly
- Code concentration information in Dose Field
 - *In addition* to exposure dose information (need both if known)
 - Also include conc. information in Verbatim and Narrative

E-LIQUID NICOTINE STRENGTH GUIDE	
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



Nicotine Liquid

BUD Cartomizer



Top: www.ecigaretteb2c.com
Bottom: www.newhealthadvisor.com

Flavored Liquid Nicotine

- Enter flavor and brand information in Verbatim and Narrative Fields (AAPCC Generic Code just asks if flavored/not flavored)



Rapidly Growing Business

- More retail E-cigarette brands coming
 - More push back from on-line retailers; makes on-line information confusing and inconsistent

A Great Way to Try e-Cigs

Available in Magnificent Menthol, Classic Tobacco and Cherry Crush, blu disposables e-cigs help you take back your freedom.



- **Simple One-Piece Construction**
Assembled and ready to go, right out of the box
- **Lasts Even Longer**
Each disposable is equal to approx. 2 packs of tobacco cigarettes
- **Stronger Battery**
Gives more vapor per puff and a stronger throat hit

- More brands showing up with inconsistent labeling (used to get consumers to buy them)
 - No government standard for terminology used for these products
 - E-cigarette, Vapor Pen, E-Hookah
 - Code by what the caller says the product is
 - Makes Verbatim Field especially important as there may be a problem with a particular product

Vaporizer Pens

- No Product entries in Poisindex (**except** for marijuana)
 - Code for the device by substance inhaled (unless marijuana)
 - Use Verbatim Field and Narrative to capture device information
- If E-nicotine liquid, use the E-cigarette liquid nicotine codes
 - Code conc. information in dose section if known
 - Use Verbatim Field for description and include in Narrative



VAPEN DUO



DUAL WAX AND OIL SUPPORT

MAX OIL

INCLUDES 2X VAPEN MOUTHPIECES
ONE FOR OIL AND ONE FOR WAX

Vapen DUAL Pen Vaporizer
Regular Price \$99.95
ON SALE NOW
SALE PRICE Only \$69.95

Quantity: Vapen Color:

Choose a Free Herb Grinder or Upgrade

Mega-Plastic Grinder Free
Card Grinder Add \$1.00
Large Metal Grinder Add \$5.00

FLAVORED e-JUICE
NICOTINE OPTIONAL
ADD \$5.99

Add Tasty Puff Vape E-Juice for \$5.99
16 Flavors to Choose from.
Nicotine content is optional.
Add E-Juice

CBD OIL - ADD \$30
Add 420 CBD OIL for \$30 -10ML dropper bottle
Contains 30mg Hemp Based Cannibidiol Oil
10 Flavors to choose from





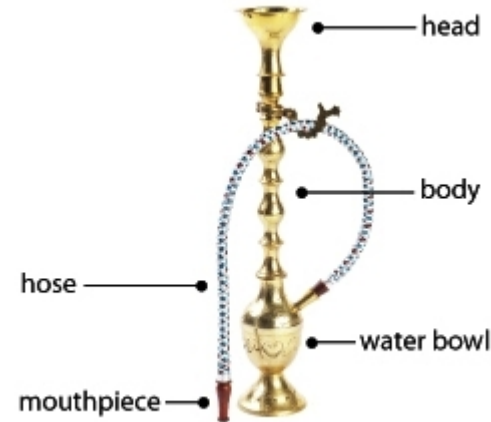
High Buys: The Snoop Dogg microG Herbal Vaporizer



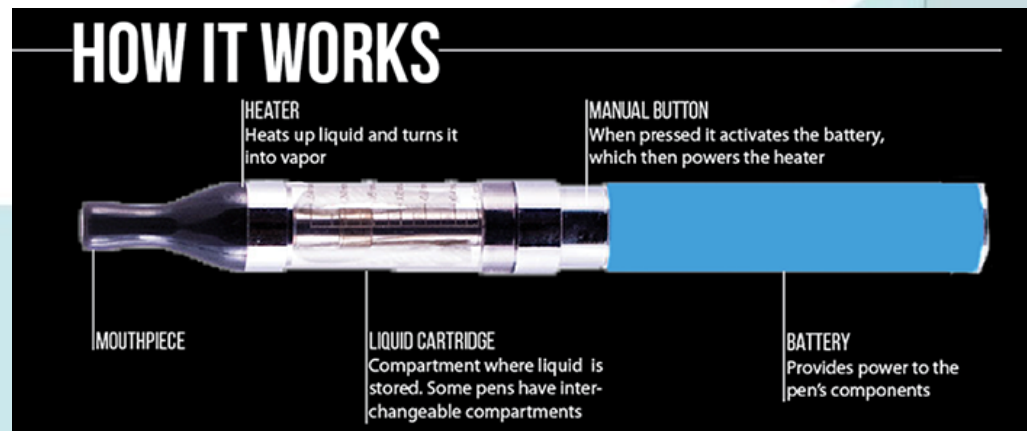
Code as Marijuana Pen, use Verbatim & Narrative to designate marijuana formulation

Electronic Hookah (aka Hookah Pen)

- Traditional Hookah
 - Tobacco used
 - Tar and smoke produced
 - Frequently, multiple users



Electronic Hookah Hookah, Pen



E-Hookah Electronic Pen

- Target buyers are young users, therefore:
 - Colorful and “trendy” in design
 - Fruity, candy-like flavors common
 - Promoted for “vaping” flavors only



www.dhgate.com



Electronic Hookah Appearance

- May look just like an E-cigarette
- May not look like an E-cigarette
- May be closed (e.g., disposables) or open system design



Closed System Disposable Hookahs



Contents Electronic Hookah

- Usually flavored E-juice without nicotine
 - Social enjoyment; not cigarette replacement
- Some contain nicotine
- Some can be altered to contain other drugs (open systems)



Tobacco used in traditional Hookah

Electronic Hookah Coding

- The Product listing in Poisindex, with the associated Product Code, is the way to differentiate the device
 - Unlike nicotine and marijuana, no specific AAPCC Generic Codes are available for the electronic Hookah devices

	Product Code	AAPCC Generic Code
Hookah	3111210	0208673 Other Types of Tobacco Product
Hookah (Slang Term)	3116997	0077980 Miscellaneous Unknown Drugs
Hookah, Electronic	7779908	0077980 Miscellaneous Unknown Drugs
Hookah, Electronic	7792719	0208562 Nicotine (Excluding Tobacco Products)
Hookah, Electronic Pen	7792735	0083000 Marijuana
Electronic Hookah Pens, Marijuana	As above	As above
Hookah Pens	7779908	0077980 Miscellaneous Unknown Drugs
Electronic Hookah Pens, Unknown	As above	As above
Hookah Pens	7792719	0208562 Nicotine (Excluding Tobacco Products)
Electronic Hookah Pens, Nicotine	As above	As above

“Advanced” Personal Vaporizers

- “Advanced” Personal Vaporizers vs. E-cigarettes
 - Bigger, do not look like traditional cigarette, longer battery live, more flavors and features, promoted as “more consistent nicotine delivery”
 - Liquid heated with warm air instead of directly heating the E-liquid
- No current Poisindex entries for “Advanced” Personal Vaporizers
 - Code by substance inhaled
 - Use Verbatim Field and Narrative to capture device information

Palm Vaporizer - Herbal Vape



Personal Vaporizers (cont.)

- No current Poisindex entry for PUFFiT (code as marijuana)
 - Use Verbatim Field and Narrative to capture device information
- For marijuana vapor exposures, need to determine the type of device used
 - E-cigarette, Vapor Pen, Advanced Personal Vaporizer (and type)



The image is a screenshot of a website article. At the top, there is a navigation bar with the logo "THE Cannabist" and several promotional banners for "BLUEBIRD BOTANICALS" and "HEMP CBD OIL". Below the navigation bar, there is a main content area. On the left, there is a large image of a hand holding a black and silver PUFFiT vaporizer. Below the image, the text reads "(Ben Livingston, The Cannabist)" and "Stealth PUFFiT vaporizer mimics asthma inhaler (review)". On the right side of the article, there are several sections: "FOLLOW THE CANNABIST" with social media icons for Twitter, Facebook, Google+, Tumblr, Pinterest, Instagram, and RSS; "SUBSCRIBE TO OUR PODCAST" with icons for iTunes, Pocket Casts, Stitcher, and RSS; "GET THE CANNABIST NEWSLETTER" with an email address input field and a "Sign up" button; and "STRAIN OF THE DAY" featuring a photo of "Jilly Bean" cannabis buds.

E-cigars and E-Pipes

- Similar variations and features (disposable or reusable, closed or open, liquid nicotine/flavor only/other drug) as E-cigarettes



Refillable e-Pipe Kit with
Free e-Cigar*
& e-Juice

BUY NOW

Single
disposable=
20 traditional
cigars!

*while
supplies
of e-cigars
last





Disposables



VARIETY TOBACCO FLAVOUR

HABANA GOLD CUBAN



Hookah E-cigar

Soft nozzle
Experience More Realistic



UR-Cigar M
Soft nozzle

Common E-cigar
Hard nozzle

DHgate.com essential

Holmez

Modern Smoking Pipe



Stainless Steel
CHG girls



Constituents of e-cigarette liquids

- Nicotine
- Propylene glycol
- Ethylene glycol
- Diethylene glycol
- Polyethylene glycol
- Glycerin (prolongs duration of aerosol)
- Flavorings (thujone, vanillin, diacetyl, cinnamaldehyde)
- Carcinogens also found in tobacco (nitrosamines, PAH, formaldehyde)
- Adulterants (tadalafil, caffeine, vitamins)
- Metals (copper, cadmium, tin, silver, iron, silicate, aluminum)

Health Concerns

- Nicotine poisoning
- Propylene glycol inhalation (compare to theatrical smoke)
- Formaldehyde generation from propylene glycol
- Toxic constituents in tobacco-derived e-cigarette liquids
- Presence of known inhalation toxins from flavorings (diacetyl, acetylpropionyl)
- Use of the “dripping” technique
- Adulterants present in e-cigarette liquids
- Fire/explosion hazard from lithium batteries

Nicotine poisoning dose-response

- **Adult lethal dose 0.5-1g** (Mayer B. How much nicotine kills a human? Tracing back the generally accepted lethal dose to dubious self-experiments in the nineteenth century. Arch Toxicol. 2014 Jan;88(1):5-7.)
- **Pediatric lethal dose 6-13 mg/kg**
- **Significant toxicity 3 mg/kg**

- **E-cig liquids contain 0, 3, 6, 12, 18, 24, 30, 48, 100 mg/mL**
 - In a 10 kg child 30 mg is the significantly toxic dose
 - 10 mL of the 3 mg strength
 - 0.3 mL of the 100 mg (6 drops)
- **There is one pediatric death reported in 18 month old**
 - Entire container of originally 100 mg strength, diluted to unknown
 - Product available with child-resistant cap, not purchased
 - Product left without lid on during chaotic move/packing



Aerosol particles persist
up to 4 hours

Deposition on surfaces
can cause third-hand
exposure



Toxic constituents in tobacco-derived e-cigarette liquids

- Nitrates (100%)
 - Nitrosamines (lower 1-2 orders of magnitude compared to tobacco)
 - Nitrosamines can form from third-hand exposure on gas appliances
 - Phenols (catechol, cresol) (higher in TDE compared to other ecig)
-
- Farsalinos KE et al. Nicotine levels and presence of selected tobacco-derived toxins in tobacco flavored electronic cigarette refill liquids. *Int J Environ Res Public Health*. 2015 Mar 24;12(4):3439-52

Risks of exposures to diacetyl and acetyl propionyl flavorings

- Found in heated microwave popcorn
- Inhalation results in decline in FEV₁
- bronchiolitis obliterans (white out lung) (rare)
- Workers had 2.6 times the expected rate of respiratory symptoms(chronic cough, shortness of breath and 3.3 times the expected rate of airway obstruction
- This is an avoidable risk for e-cigarettes

Propylene glycol

- Metabolized to pyruvic and lactic acid, acetic acid and propionic aldehyde
- Oxidation at high temps can do the same
- Can cause intoxication (1/3 potent as ethanol)
- One of the constituents involved in theatre mist toxicity

Theatre mist comparison

- Aerosol persists 3-4 hours
- Mild respiratory irritation
 - Cough
 - Throat irritation
- Risk for asthmatics unclear
- 3-4 X risk for respiratory, eye, skin
- Those within 10 ft. of fog had 5% less FEV1 and FVC than those further away
- Glycol smoke associated with systemic effects
 - Headache
 - Dizziness
 - drowsiness




E-rectile Dysfunction Product?!?







The screenshot shows a product page for 'Cialis flavor E-liquid'. On the left, there is a Google badge and product details: 'Cialis flavor E-liquid', 'E-liq', 'Cialis flavor E-liquid', 'Category: Root > E-liquids', 'From 11,20 €', 'Condition: New', 'Rating(s) and review(s): Cialis flavor E-liquid', 'Average: 4 / 5', and 'Based on 6 rating(s) and 5 user review(s)'. Below this is a 'Notice' section with a 'Save vaping! Support European Free Vaping Initiative' banner. The main product image shows a white bottle of e-liquid on a wooden surface. To the right, the product name 'CIALIS FLAVOR E-LIQUID' is displayed. Below the image, there are smaller thumbnails. On the right side of the page, there is a 'Price Lowered' banner, a promotional message 'By Vaping, Improve Your Sexual Capacity!', and a form with dropdown menus for 'Milliliters' (10 ML), 'Nicotine' (0 mg (no ni)), and 'Base type' (Ice blade (f)). The 'Reference' is 'E-liq', 'Quantity' is '1', and 'Availability' is 'In stock'. The price is '11,20 €' with a '-30%' discount from '46,00 €'.

DIRECT Dripping

A HIGH-TEMPERATURE, HIGH-FORMALDEHYDE EMISSION ELECTRONIC CIGARETTE USE METHOD

How to use your 306 atomizer and drip tip



 <p>1 The 306 atomizer ships with a black cover piece attached.</p>	<p>2 Screw the 306 on to any 510 threaded device such as an eGo battery.</p>  <p>3 Then remove the cover piece by pulling it off.</p>	<p>6 Add a few drops of your favorite e-liquid, vape and repeat!</p> 
 <p>4 What you now have is an exposed 306 atomizer.</p>	<p>5 Attach any compatible 306 drip tip of choice.</p> 	

Why drip?

- Better control of rate of liquid delivery to the heater coil
- Greater vapor yield
- Greater throat “hit”
- More consistent flavor
- Way to test new flavors without wasting liquid

So what's the problem?

- Higher temperatures generated as liquid evaporates between drips
- Higher aldehyde formation
- Temperature increases with each puff
- 10-20 puffs = formaldehyde of 1 or more cigarettes

Case report nmpdic

- 27-year-old male presented to the Emergency Department after attempting to use an e-cigarette that subsequently exploded while in his mouth, lodging the mouth piece in the posterior soft palate.
- Patient drove himself to healthcare facility, presenting with pain, noted edema, pain while swallowing, and tachycardia.
- Physical examination revealed upper lip edema with apparent linear burn and chipped upper teeth. The visible wound was black, described as "charred-like" skin.
- Imaging revealed a metallic-appearing foreign body lodged in his vertebrae with evidence of fractures.
- Removal of foreign body was successfully completed.

U.S. Fire Administration Electronic Cigarette Fires and Explosions October 2014

- Twenty-five separate incidents of explosion and fire involving an e-cigarette were reported in the US media between 2009 and August 2014
- Two injuries were serious burns
- 80% occurred while battery was charging
- Shape and construction of e-cigarettes can make them more likely than other products with lithium-ion batteries to behave like “flaming rockets” when a battery fails
- No regulation, code or law applies to the safety of the electronics or batteries in e-cigarettes. No UL testing is required. Not in CPSC regulations.

Conclusions

- More research needed to assess risk of second and third hand exposure to excipients in e-cigarettes
- Dripping delivery methods should be discouraged
- Use only the charging device provided by the product
- Wipe surfaces of gas appliances frequently
- Avoid sweet or tobacco flavorings
- Avoid use in presence of children
- Encourage use of child-resistant packaging for tank refills
- Cartridge types are safer around small children
 - Risk is very high of accidental ingestion for tank types