



# E-cigarettes

Nicotine Dependence Center  
Mayo Clinic

Tom Gauvin, MA, CTTS

# ENDS:

Electronic Nicotine  
Delivery Systems

*aka*

“E-cigarettes”



## Goals and objectives

- Describe the E-cigarette, and have an understanding of ingredients
- Discuss the Federal Court's posture on E-cigarettes
- Identify the Authority of the FDA in regulating E-cigarettes
- List current trends and possible consequences of E-cigarette use

# “Vaping”



...shop.com  
ior, non-flammable,  
venient and cheaper  
than traditional  
cigarettes.

Looks like a cigarette, feels like a cigarette,  
taste like a cigarette, but it isn't a cigarette.  
It's just a much better way to smoke!  
Better & healthier!

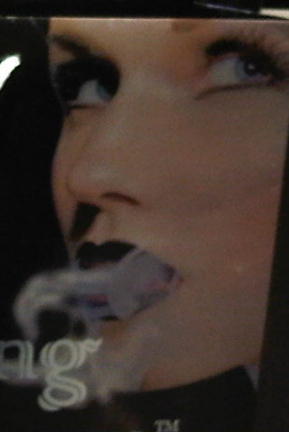


# Smoking Everywhere™

Electronic Cigarette



[www.SmokingEverywhere.com](http://www.SmokingEverywhere.com)  
1-800-613-0337



GIFT  
CERTIFICATES  
AVAILABLE  
FOR PURCHASE





# LIBERTY

## STIX BRAND

It looks like a traditional cigarette,  
It tastes like a traditional cigarette,  
but it's not a traditional cigarette

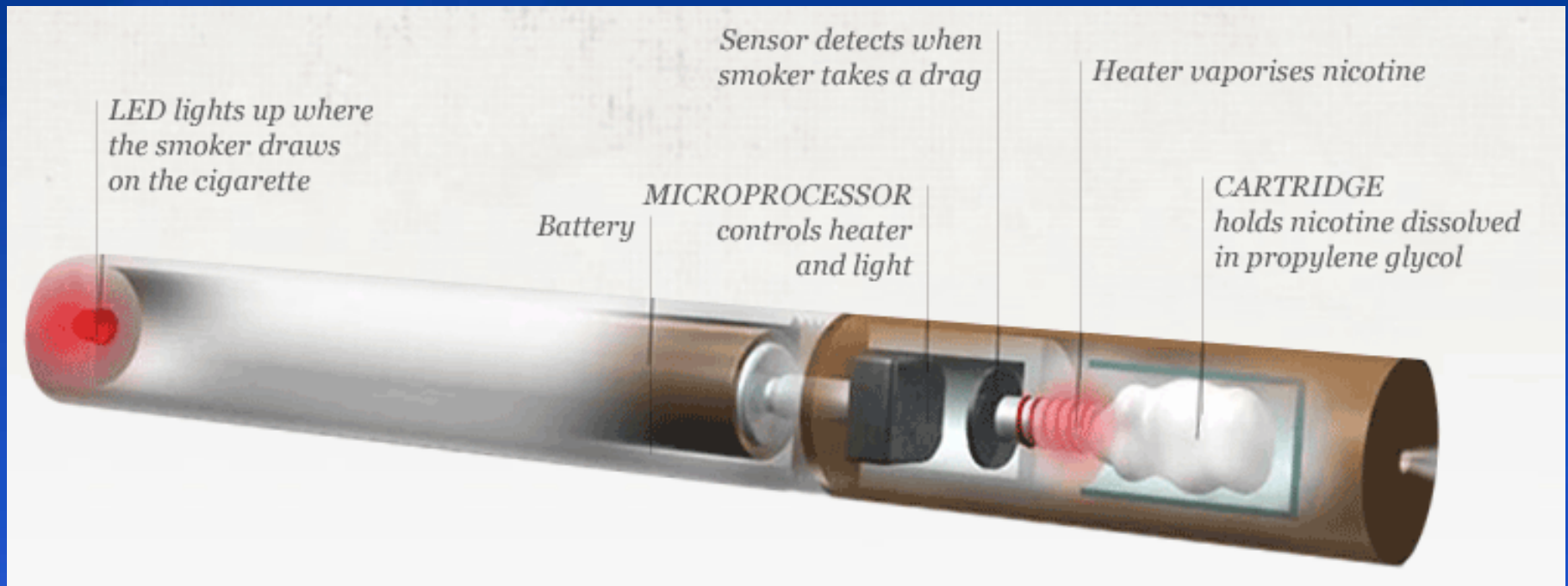
*Same, Same, But Different*

With Liberty Stix, You Have the Freedom To  
Smoke Anywhere, No Carbon Monoxide, No Tar,  
No Cancer causing agents!

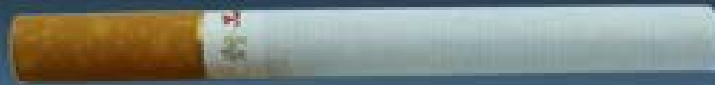
# ENDS

A battery-powered device that provides inhaled doses of vaporized nicotine solution. It is used as an alternative to smoked tobacco products, such as cigarettes, cigars, or pipes.

# ENDS: Basic Structure

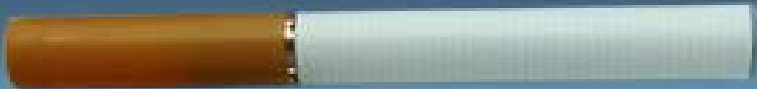






Cigarette

8.5(D)\*89(L)mm



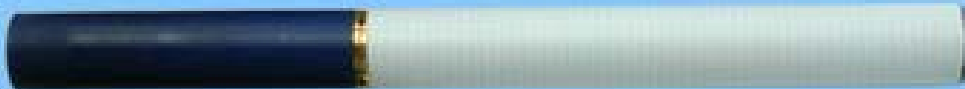
KR-808A

8.5(D)\*98(L)mm



KR-808

9.2(D)\*110(L)mm



KR-308

9.2(D)\*110(L)mm



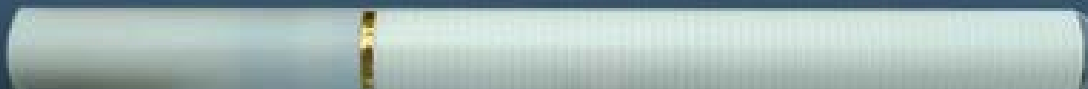
KR-308

9.2(D)\*110(L)mm



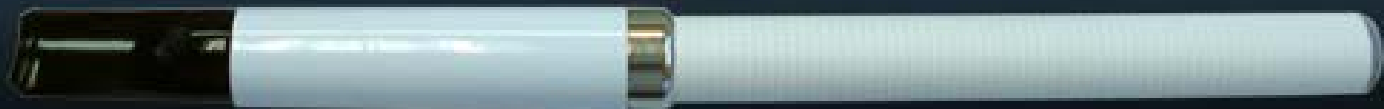
KR-308

9.2(D)\*119(L)mm



KR-208

9.2(D)\*153(L)mm



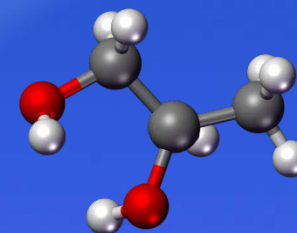
KR-108



# ENDS – Liquid Solution Composition

Substance	Recipe 1	Recipe 2	Recipe 3	Recipe 4	Recipe 5
Propylene glycol	85%	80%	90%	80%	<65%
Nicotine	6%	4%	2%	0.1%	<3%
Glycerol	2%	5%	-	5%	<20%
Tobacco essence	-	4%	4.5%	1%	<5%
Essence	2%	-	1%	1%	<5%
Organic acid	1%	-	-	2%	<1%

**Propylene glycol:** pharmaceutical solvent, food additive, moisturizer (cosmetics & toothpaste), hand sanitizer, non-toxic antifreeze, deodorants, aircraft de-icer.



[en.wikipedia.org](http://en.wikipedia.org)

## “E-Juice” or “Smoke Juice”

- Total nicotine = 720 mg
- Lethal nicotine dose =
- 40–60 mg (0.5-1.0 mg/kg)





PREV

# Totally Wicked 30ML

NEXT



## Propylene glycol

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Made in the heartland of Wisconsin and shipped to your doorstep

The finest liquid for any e-cigarette is

### America's Smoke Juice™

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## Vegetable glycerine



### SWISS DARK - One of six amazing new flavors

# RED OAK™

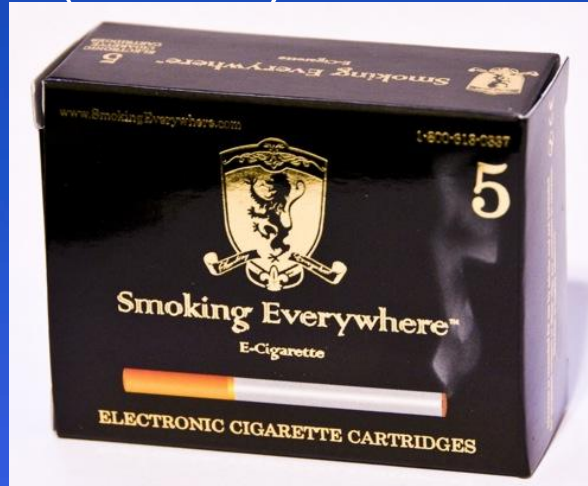
A PG-Free Smoke Juice From Johnson Creek

Vapor so intense,  
You can skip the chocolates.





- In 2009, FDA's Center for Drug Evaluation, Division of Pharmaceutical Analysis (DPA) analyzed:
  - 2 samples of electronic cigarettes & components from two leading brands
    - 18 of the flavored, nicotine, and no-nicotine cartridges
  - Nicotine inhaler (control)







- DPA's analysis:
  - Diethylene glycol in one cartridge @ 1%
    - Ingredient used in antifreeze & toxic to humans
  - Tobacco-specific nitrosamines (TSNA's) in 1/2 of samples
    - Human carcinogen
  - Tobacco-specific impurities detected in a majority of the samples tested
    - May be harmful to humans
      - Anabasine
      - Myosmine
      - $\beta$ -nicotyrine



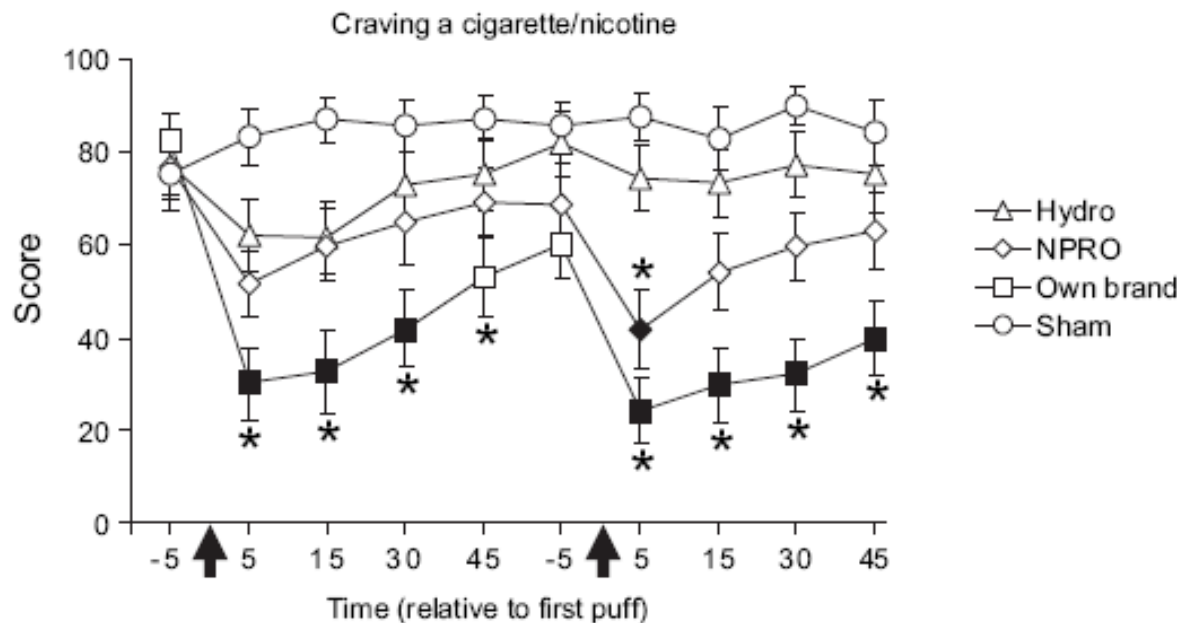
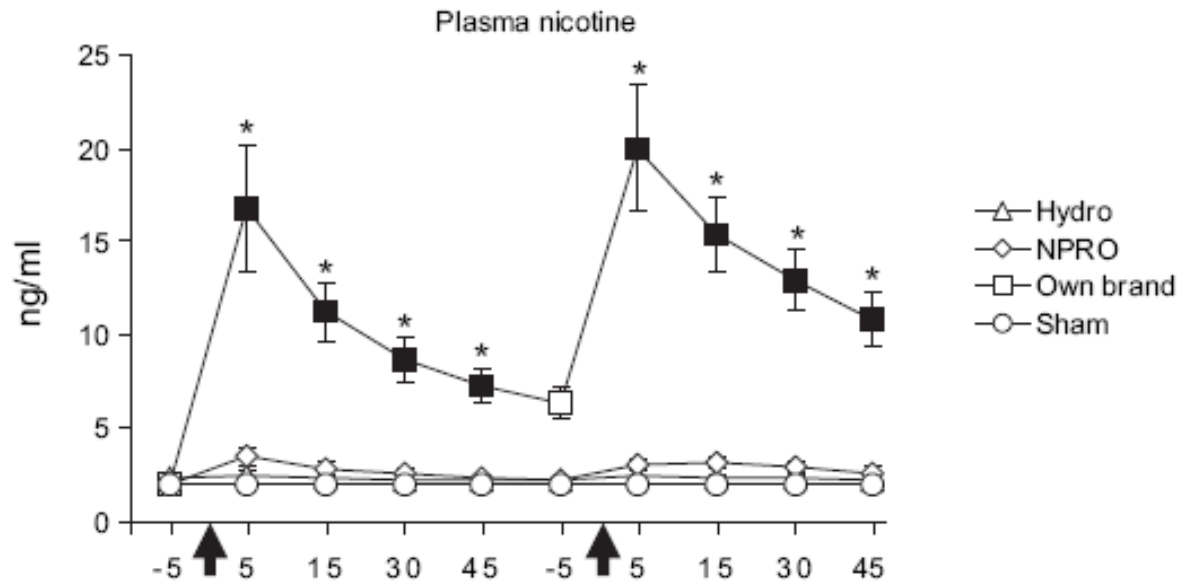




- E-cigarette cartridges labeled as “no nicotine”
  - Low levels of nicotine present in all cartridges tested, except one.
- 3 different E-cigarette cartridges
  - Same label
  - Markedly different amount of nicotine with each puff.
  - Range: from 26.8 to 43.2 mcg nicotine/100 mL puff
- One high-nicotine cartridge delivered 2 x as much nicotine as the nicotine inhaler



# Crown 7 Hydro



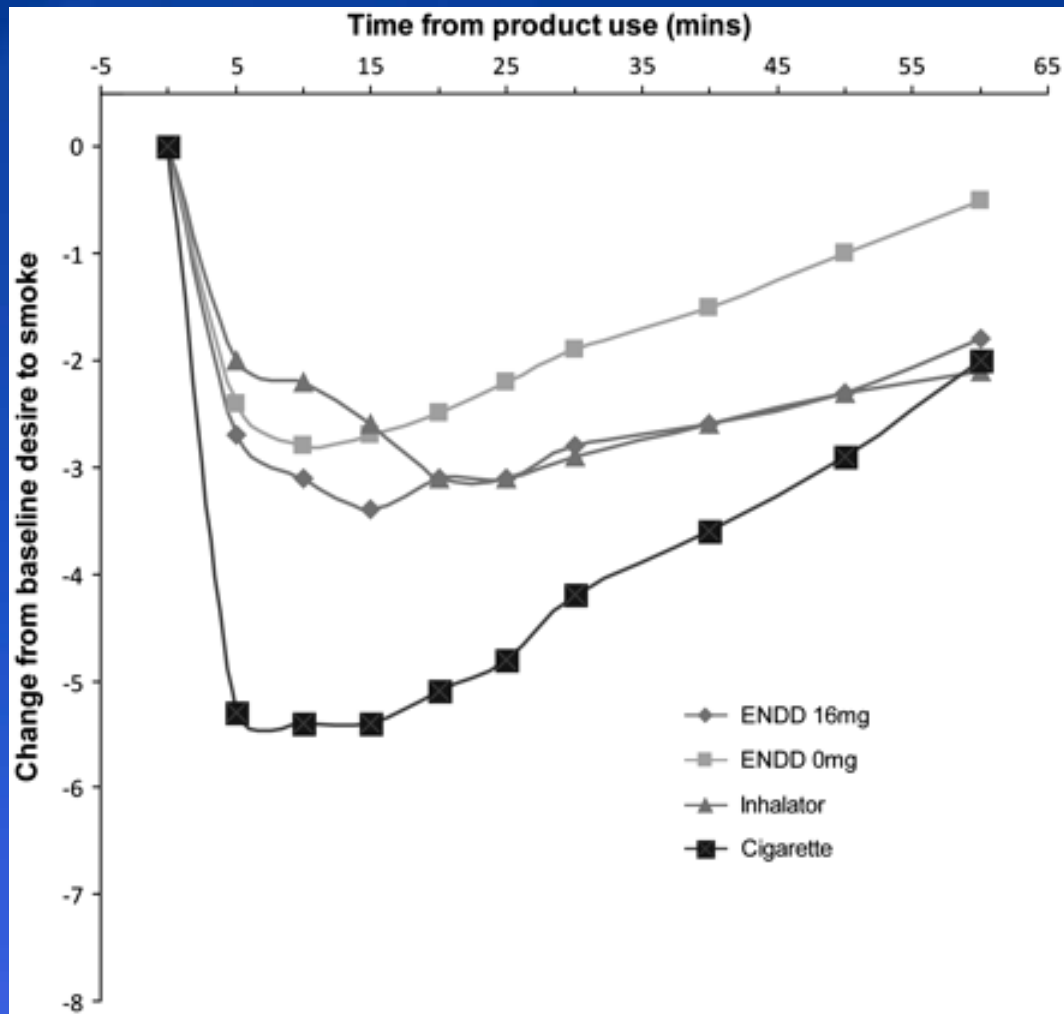
# Njoy NPRO



Eissenberg T. Tob Control. 2010 Feb;19(1):87-8..

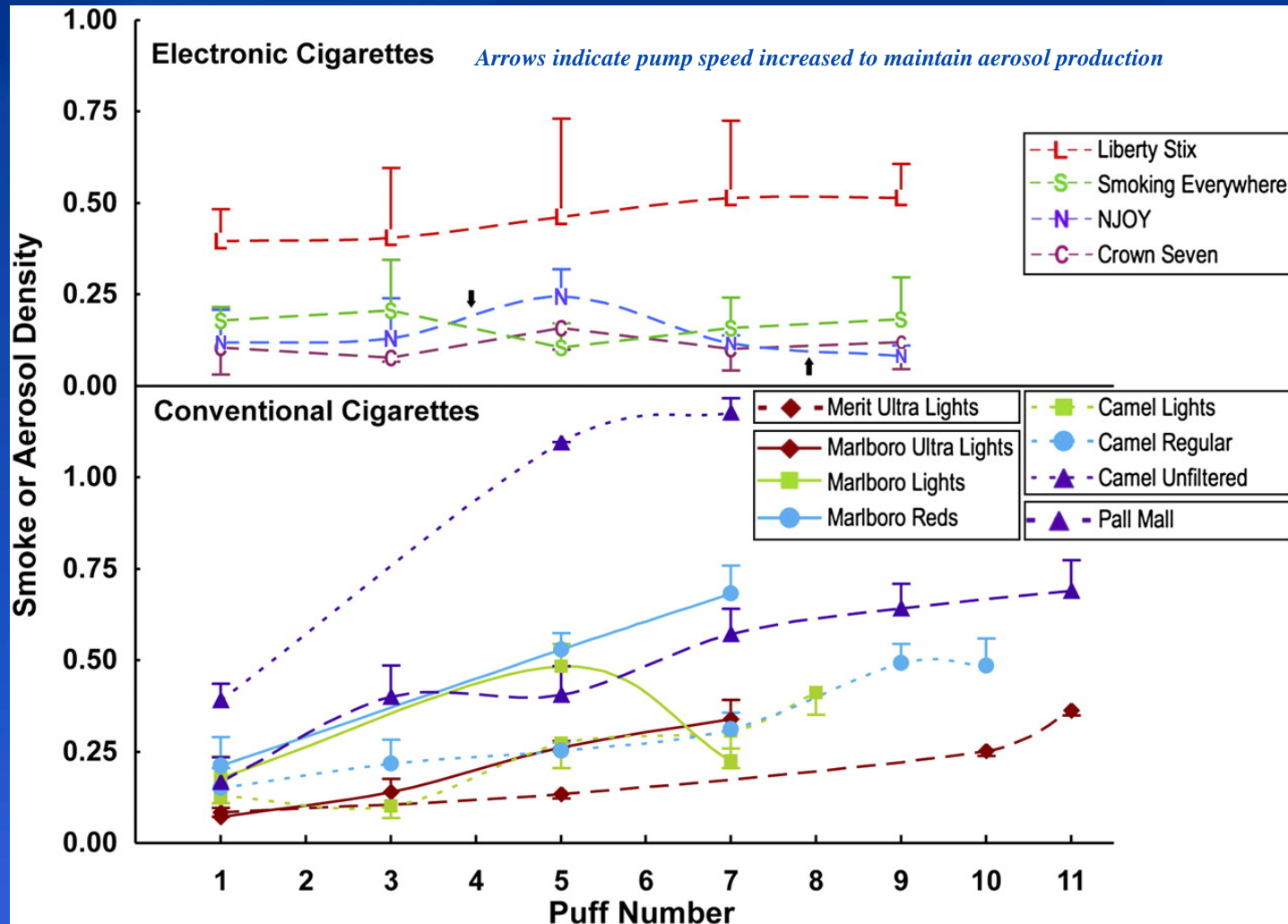
# ENDS: Effect on desire to smoke

Bullen C, et al. *Tob Control* 2010;19:98-103 doi:10.1136/tc.2009.031567



40 participants were randomised to use ENDS containing 16 mg nicotine, 0 mg nicotine, nicotine inhalator or usual cigarette on each of four study days 3 days apart, with overnight smoking abstinence before use of each product.

# ENDS: Aerosol density compared with cigarettes



Trtchounian A et al. Nicotine Tob Res 2010;12:905-912

# Legal Status of ENDS (examples in 2009)

- **California:** Ban vetoed
- **Oregon:** AG reached a settlement in August with retailers and distributors not to sell them
- **New Hampshire:** Bill to ban sales to minors
- **New Jersey:** Bill to subject to the cigarette restrictions
- **New York:** Restricted in public places/banned sales to minors



# January, 2010


## Judge Orders F.D.A. to Stop Blocking Imports of E-Cigarettes From China

By DUFF WILSON

Published: January 14, 2010

A federal judge on Thursday ordered the [Food and Drug Administration](#) to stop blocking the importation of electronic [cigarettes](#) from China and indicated that the devices should be regulated as tobacco products rather than drug or medical devices.

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 PRINT

## Implications if the ruling stands...

- E-cigarettes can be imported and sold.
- E-cigarettes will not be regulated as a drug or device.
- On appeal a stay of the lower court order was issued February 2010 pending full appeal.
- Appeal denied April 2011... FDA will not pursue further

## Phillip Morris Entering the ENDS Market?

- Philip Morris has been in negotiations with Ruyan Group
  - Manufacturer of the original *e-cigarette*
- Motivation?
  - Shut the industry down
  - Launching its own *e-cigarette*
- *Stay tuned...*



**RuyanChina.com**

# ENDS

- Pros...
  - Low carcinogen exposure
  - No second-hand smoke production
  - May motivate smokers to quit smoking
- Cons...
  - No evidence for its safety with long-term use (compared with pharmaceutical NRT)
  - No evidence for efficacy as an aid to quitting smoking
  - Low and inconsistent levels of nicotine aerosol delivery and nicotine blood levels
  - Impurities in commercial solutions (including TSNA's and other tobacco impurities)



# ENDS: Where should the tobacco control community stand?

- Additional study to confirm safety
- Additional study of efficacy to treat tobacco dependence
- Until then...
  - restrict manufacturer claims regarding proven safety
  - usefulness as an aid to stop smoking

# ENDS Summary

- ENDS- “e-cigarettes”- electronic nicotine delivery systems
- Deliver nicotine solution by heating and vaporizing for inhalation
- Safety concerns have been raised
- Low level of nicotine delivery in limited tests
- No evidence to support use as a treatment to help smokers stop smoking
- Legal status in the US– regulated as tobacco

MAYO  
CLINIC



Tobacco



Medication

