

ELECTRONIC NICOTINE DELIVERY SYSTEMS: PRODUCT CHARACTERISTICS AND SAFETY

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HEALTH RISK FROM SMOKING TOBACCO









Source: <http://www.coolrisk.com/risk-cartoons/relative-risks>

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ELECTRONIC NICOTINE DELIVERY DEVICES

ENDS type	Product characteristics	Popular brands
Rechargeable 	<ul style="list-style-type: none"> • various sizes from cigarette size, to compact flashlight size • various colors and styles • requires battery with a charger • requires replacing or refilling nicotine cartridges 	E-Lites, NJoy, SkyCig, Ever Smoke, v2, Pure, Green Smoke, Premium, South Beach Smoke
Disposable 	<ul style="list-style-type: none"> • for a short time use • cheap; widely available from gas stations or super markets • convenient as no refill solution or cartridge is needed • might be the starting point for many users 	Blu, E-Tron, Fling, Green Smoke, Krave, Logic, Misitic, OneJoy, Pro Smoke, White Cloud
eGo 	<ul style="list-style-type: none"> • high-capacity battery operated • last longer than a typical rechargeable models • requires refilling the tank with nicotine solution • often recommended for heavy smokers by retailers 	Apollo, Aqua Vapor, Desire, Joyetech, Panda, Kik Sticks, Sharp Smoker, Totally Wicked, Vision
Personal Vaporizers 	<ul style="list-style-type: none"> • large size and heavy weight • battery power output control allows the user to adjust the output of the voltage going to the heating element, which has a direct effect on the temperature of the heating element • usually not recommended by retailers for beginning users 	BombShell, SS Double, Ploom Pax, Helix, lolite, Puffit by Discrete Vape, Thermo Vape, Vapir Variable Volt v2, Vetta,
E-cigar 	<ul style="list-style-type: none"> • looks like authentic Cuban cigars • disposable 	The Cuban by Logic, Apollo E-cig, Swisher, Maduro by Cigr8, Veppo Antonio Villard, NEXgen
E-pipe 	<ul style="list-style-type: none"> • looks like pipe • includes bowl and manual switch • requires refilling with nicotine solution 	Dragon CEO, King, TECC VAPE Lucena, ePuffer, Smok Chrome, DSE601, Touch Sense, Tall 18650

FIRST GENERATION OF E-CIGARETTES



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SECOND GENERATION OF E-CIGARETTES



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THIRD GENERATION OF E-CIGARETTES

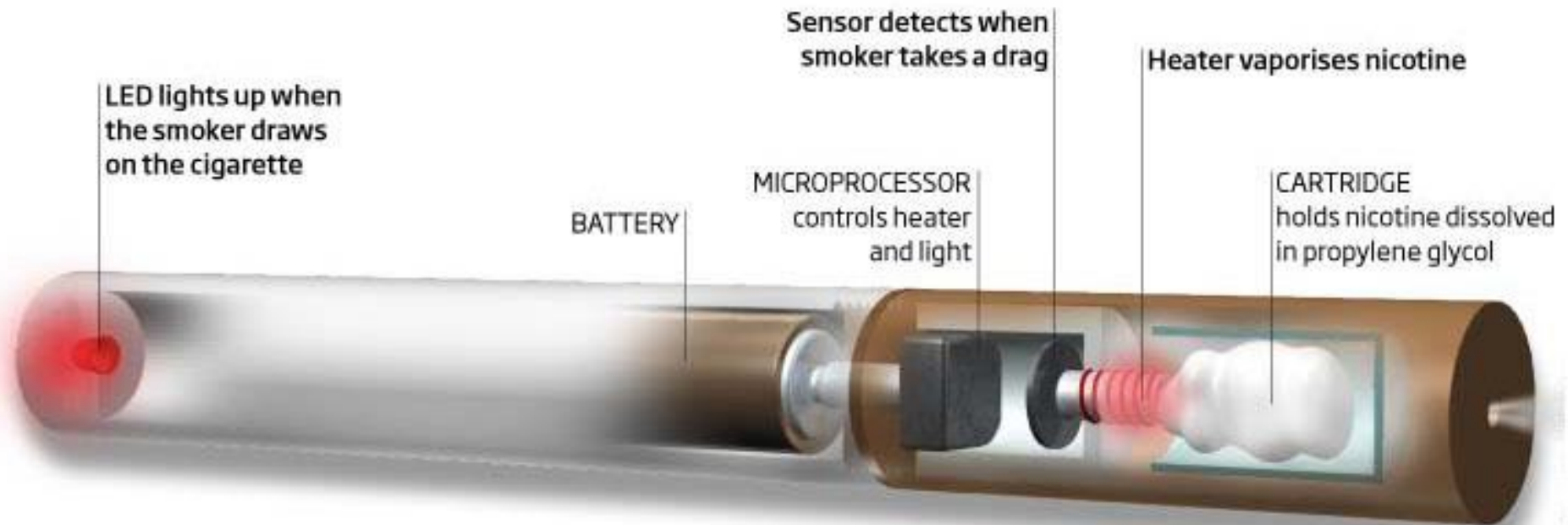


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ANATOMY OF E-CIGARETTE



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CARTRIDGES

Nicotine amounts by strength:



Extra Strong: 24-36 mg

Full Flavored: 16-18 mg

Light: 10-12 mg

Ultra Light: 6-8 mg

Zero-nicotine: 0 mg

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E-LIQUID (E-JUICE)



Strength:
EXTRA STRONG, STRONG
LIGHT, SUPER LIGHT
ZERO (0)

Flavors:
TOBACCO
MENTHOL
CAPPUCINO
CITRUS
CHERRY
CANDY

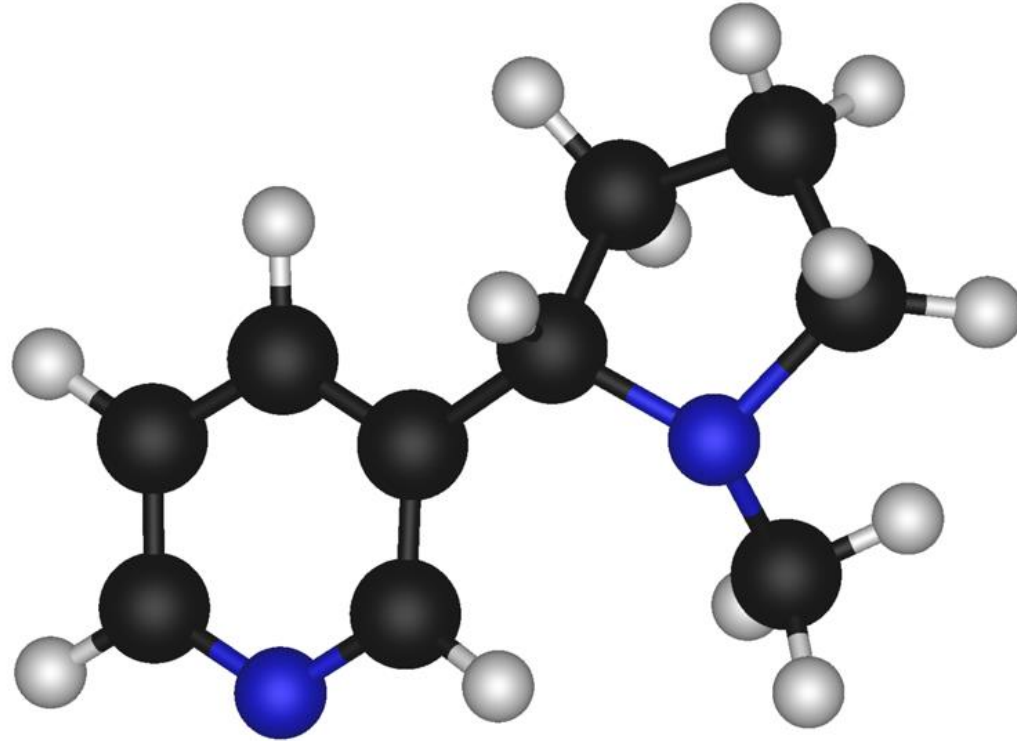


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DOES E-CIGARETTE DELIVER NICOTINE?



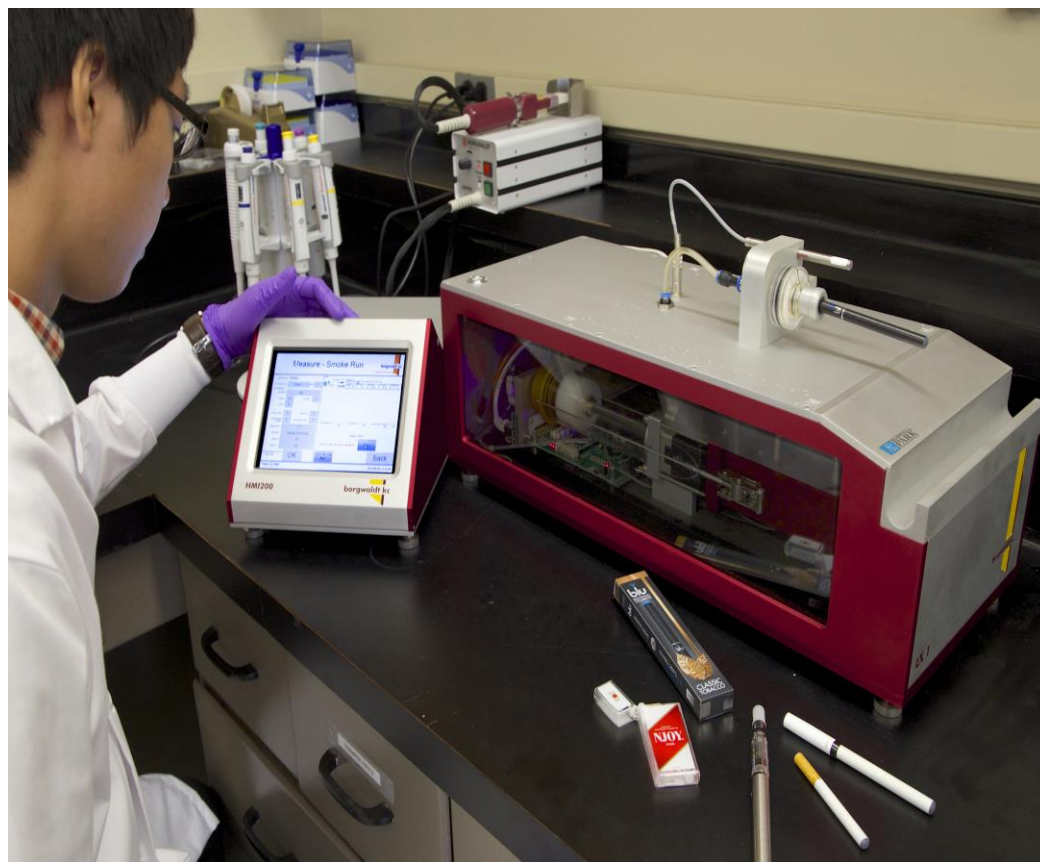
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NICOTINE DELIVERY FROM E-CIGARETTES

E-cigarettes generate vapor that contains nicotine, but e-cigarettes brands and models differ in efficacy and consistency of nicotine vaporization.

In e-cigarettes which vaporize nicotine effectively, the amount inhaled from 15 puffs is lower compared with smoking a conventional cigarette.



Sources: Goniewicz et al. *Nicotine Tob Res.* 2013
Goniewicz et al. *Addiction.* 2014

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NICOTINE AND TOBACCO

Common adverse effects of Tobacco smoking

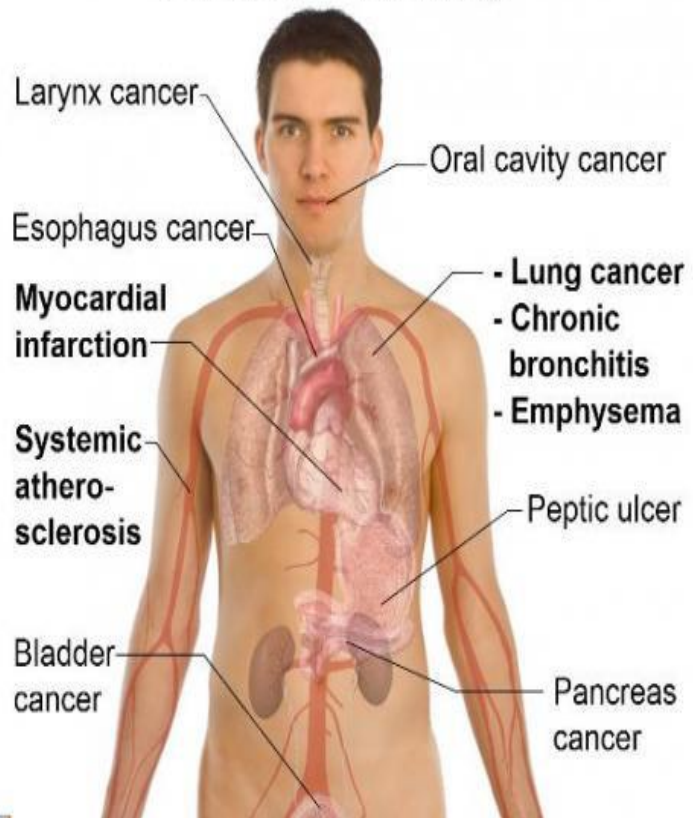


Image Courtesy: Wikimedia Commons

Tobacco, not nicotine, is responsible for most of the adverse health effects of smoking

The main adverse effect of nicotine is addiction, which sustains tobacco use.

Because most smokers are nicotine-dependent, they continue to expose themselves to toxicants from tobacco

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DOES E-CIGARETTE DELIVER TOXICANTS?



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HARM REDUCTION STRATEGY

**LESS "TAR"
THAN ALL
LEADING LONGS***

COMPARE L&M LONG LIGHTS

MG. "TAR"	
L&M Long Lights	8
Winston Longs	19
Winston Light 100s	13
Benson & Hedges 100s	17
Benson & Hedges 100s Lts.	11
Marlboro 100s	17
Marlboro Lights 100s	12
Golden Lights 100s	9
Pall Mall Gold 100s	19
Virginia Slims	16
Merit 100s	11
Vantage Longs	11

TASTE L&M LIGHTS. ONLY 8 MG. "TAR"

Warning: The Surgeon General Has Determined That Cigarette Smoking Is Dangerous to Your Health.

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NEW

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TRIPLE FILTER
CHARCOAL TECHNOLOGY

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Kent ha desarrollado la última innovación en filtración: 3TEK -Tritek, el nuevo filtro triple que le proporciona el balance perfecto entre sabor y suavidad.

EXCLUSIVE KENT

ADVERTENCIA : "El tabaco puede producir cáncer"
Ministerio de Salud - Chile

SURGEON GENERAL'S WARNING: Quitting Smoking Now Greatly Reduces Serious Risks to Your Health.

**Reduced
carcinogens.**

OMNI Kings: 15 mg. "tar," 1.0 mg. nicotine; Lights 100s: 12 mg. "tar," 0.8 mg. nicotine, av. per cigarette by FTC Method.

Discover the Difference.

80% less secondhand smoke.
May present less risk of cancer, chronic bronchitis and possibly emphysema.*

eclipse

The difference is worth discovering.
eclipse.rjrt.com

Log on to find retailers near you and get a special introductory offer.

* Eclipse is not perfect. For instance, we do not claim that Eclipse presents smokers with less risk of cardiovascular disease or complications with pregnancy. As for cancer, however, all cigarettes present some health risk, including Eclipse.

SURGEON GENERAL'S WARNING: Quitting Smoking Now Greatly Reduces Serious Risks to Your Health.

INTENSIVE: 100 mg. "tar," 0.8 mg. nicotine; LIGHT: 7 mg. "tar," 0.5 mg. nicotine, av. per cigarette by FTC Method. As measured by FTC. For more product information, visit www.rjrt.com.

ACCORD
LIGHTER KIT
Less Smoke Around You
Virtually No Lingering Odor. No Ashes



Smokefree Satisfaction*

Ariva

20 Dissolvable Tobacco Pieces

JAVA

A Smokeless Tobacco Product

UNDERAGE SALE PROHIBITED

Source:
tobacco.stanford.edu

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E-CIGARETTES AS HARM REDUCTION STRATEGY



In contrast to reduced risk cigarettes no combustion takes place in e-cigarettes

In contrast to smokeless tobacco products e-cigarettes are not tobacco products

E-cigarettes are assumed to be safer than tobacco cigarettes

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SAFETY OF E-CIGARETTES

Are electronic cigarette **safe** or just **safer** than tobacco cigarettes?

Safer = less harmful



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TOXICANTS IN VAPOR

Toxic compound	Conventional cigarette [μg]	Electronic cigarette [μg per 15 puffs]	Conventional vs. electronic cigarette
Formaldehyde	1.6-52	0.20-5.61	9
Acetaldehyde	52-140	0.11-1.36	130
Acrolein	4.6-14	0.07-4.19	4
Toluene	6.4-9.0	0.02-0.63	23
NNN	0.012-0.37	0.00008-0.00043	145
NNK	0.009-0.08	0.00011-0.00283	30
Cd	0.03-0.35	0.001-0.022	16
Ni	0.003-0.60	0.011-0.029	15

Goniewicz et al. Tob Control 2014

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CONCLUSIONS

- E-cigarettes overall have fewer chemicals than conventional cigarettes but contain carcinogenic carbonyls, metal particles, and traces of TSNA.
- E-cigarettes generate vapor that contains nicotine.
- Performance variation between brands results in variation in the amount of chemicals e-cigarette users are exposed to.
- E-cigarettes vary in their toxicity.
- After switching from tobacco to electronic cigarettes nicotine exposure is unchanged while exposure to selected tobacco smoke toxicants is substantially reduced.
- E-cigarettes may be useful in reducing the harm of cigarette smoking in those who are unable to quit smoking.

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