HEALTH RISK FROM SMOKING TOBACCO

Smoking significantly lowers your risk of dying of anything else

Source: http://www.coolrisk.com/risk-cartoons/relative-risks
<table>
<thead>
<tr>
<th>ENDS type</th>
<th>Product characteristics</th>
<th>Popular brands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rechargeable</td>
<td>• various sizes from cigarette size, to compact flashlight size&lt;br&gt;• various colors and styles&lt;br&gt;• requires battery with a charger&lt;br&gt;• requires replacing or refilling nicotine cartridges</td>
<td>E-Lites, NJoy, SkyCig, Ever Smoke, v2, Pure, Green Smoke, Premium, South Beach Smoke</td>
</tr>
<tr>
<td>Disposable</td>
<td>• for a short time use&lt;br&gt;• cheap; widely available from gas stations or super markets&lt;br&gt;• convenient as no refill solution or cartridge is needed&lt;br&gt;• might be the starting point for many users</td>
<td>Blu, E-Tron, Fling, Green Smoke, Krave, Logic, Misitin, OneJoy, Pro Smoke, White Cloud</td>
</tr>
<tr>
<td>eGo</td>
<td>• high-capacity battery operated&lt;br&gt;• last longer than a typical rechargeable models&lt;br&gt;• requires refilling the tank with nicotine solution&lt;br&gt;• often recommended for heavy smokers by retailers</td>
<td>Apollo, Aqua Vapor, Desire, Joyetech, Panda, Kik Sticks, Sharp Smoker, Totally Wicked, Vision</td>
</tr>
<tr>
<td>Personal Vaporizers</td>
<td>• large size and heavy weight&lt;br&gt;• 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&lt;br&gt;• usually not recommended by retailers for beginning users</td>
<td>BombShell, SS Double, Ploom Pax, Helix, Iolite, Puffit by Discrete Vape, Thermo Vape, Vapir Variable Volt v2, Vetta,</td>
</tr>
<tr>
<td>E-cigar</td>
<td>• looks like authentic Cuban cigars&lt;br&gt;• disposable</td>
<td>The Cuban by Logic, Apollo E-cig, Swisher, Maduro by Cigr8, Veppo Antonio Villard, NEXgen</td>
</tr>
<tr>
<td>E-pipe</td>
<td>• looks like pipe&lt;br&gt;• includes bowl and manual switch&lt;br&gt;• requires refilling with nicotine solution</td>
<td>Dragon CEO, King, TECC VAPE Lucena, ePuffer, Smok Chrome, DSE601, Touch Sense, Tall 18650</td>
</tr>
</tbody>
</table>
FIRST GENERATION OF E-CIGARETTES
SECOND GENERATION OF E-CIGARETTES

eGo Type
THIRD GENERATION OF E-CIGARETTES
ANATOMY OF E-CIGARETTE

LED lights up when the smoker draws on the cigarette

Sensor detects when smoker takes a drag

Heater vaporises nicotine

BATTERY

MICROPROCESSOR controls heater and light

CARTRIDGE holds nicotine dissolved in propylene glycol

UNDERSTAND PREVENT & CURE CANCER

ROSWELL PARK CANCER INSTITUTE
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
E-LIQUID (E-JUICE)

Flavors:
- TOBACCO
- MENTHOL
- CAPPUCINO
- CITRUS
- CHERRY
- CANDY

Strength:
- EXTRA STRONG, STRONG
- LIGHT, SUPER LIGHT
- ZERO (0)
DOES E-CIGARETTE DELIVER NICOTINE?
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
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.
DOES E-CIGARETTE DELIVER TOXICANTS?

- Butane Lighter Fluid
- Cadmium Batteries
- Stearic Acid Candle Wax
- Acetic Acid Vinegar
- Hexamine Barbecue Lighter
- Toluene Industrial Solvent
- Nicotine Insecticide
- Methane Sewer Gas
- Arsenic Poison
- Carbon Monoxide
- Methanol Rocket Fuel
- Ammonia Toilet Cleaner

Understanding, Preventing, & Curing Cancer

Roswell Park Cancer Institute
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.
Are electronic cigarette **safe** or just **safer** than tobacco cigarettes?

**Safer = less harmful**
## TOXICANTS IN VAPOR

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

Goniewicz et al. Tob Control 2014
CONCLUSIONS

• E-cigarettes overall have fewer chemicals than conventional cigarettes but contain carcinogenic carbonyls, metal particles, and traces of TSNAs.

• 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.