

**Supplementary Table 1: Summary of Published or Posted E-cigarette Labeling Analyses (in chronological order)**

Study	Market(s) Publication Date/Product Year E-cigarettes Analyzed	Labeling Analysis Performed	Summary of Findings
Alliance Technologies (2009) [29]	U.S. market Report date: 9/23/2009 Regal cartridges for electronic cigarettes	Compared e-liquid nicotine concentration to the labeled amount.	The tested nicotine content was 1.3%, "...which was close to the stated nicotine concentration on the package." (p.3)
Alliance Technologies (2009) [30]	U.S. market Report date: 12/9/2009  Samples: <ul style="list-style-type: none"> <li>• Instead Zero</li> <li>• Electronic Cigarette Smoke Juice &amp; Vapor</li> <li>• Instead High Electronic Cigarette Smoke Juice &amp; Vapor</li> </ul>	Compared e-liquid nicotine concentration to the labeled amount.	<ul style="list-style-type: none"> <li>• The Zero solution contained no detectable nicotine.</li> <li>• The "high" solution contained nicotine estimated at 1.3%.</li> </ul>
Trtchounian & Talbot (2011) [10]	U.S. market Acquisition date not provided; websites were analyzed in March 2010.  Six products purchased via the Internet: <ul style="list-style-type: none"> <li>• NJOY® NCIG</li> <li>• Liberty Stix™</li> <li>• Crown Seven Hydro</li> <li>• Smoking Everywhere™ Gold and Platinum</li> <li>• VapCigs</li> </ul>	Evaluated 25 elements of labeling, product leakage, accuracy of online selling companies in filling orders, and truth in advertising.  Instructional manual including <ul style="list-style-type: none"> <li>• 11 elements of set-up</li> <li>• 5 elements of assembly</li> <li>• 9 warnings/precautions</li> </ul>	<ul style="list-style-type: none"> <li>• Used cartridges (after 200 puffs) contained variable amounts of liquid.</li> <li>• Three of five companies filled Internet orders incorrectly. "Most errors ...involved sending cartridges with the wrong strength of nicotine." (p.50)</li> <li>• Equipment and instruction manuals "...lack important information regarding contents, use and essential warnings." (p.52)</li> <li>• "Cartridges leak." (p.52)</li> <li>• "ENDS labelling, design features, print material and disposal need improvement." (p.51)</li> </ul>

Study	Market(s) Publication Date/Product Year E-cigarettes Analyzed	Labeling Analysis Performed	Summary of Findings
Trehy et al. (2011) * [9]	U.S. market 2009  Samples: <ul style="list-style-type: none"> <li>• NJOY®</li> <li>• Smoking Everywhere™</li> <li>• Johnson Creek™ Smoke Juice CIXI</li> <li>• Nicotrol® Inhaler (control)</li> </ul>	Compared the accuracy of nicotine content and labeled amount.	<ul style="list-style-type: none"> <li>• Labeling was not always accurate.</li> <li>• Eighteen of 30 samples had nicotine content lower than label.</li> <li>• Six of 30 samples had nicotine content higher than labeled, including 2 labeled for 0 mg nicotine that contained 12.9 mg and 21.8mg.</li> <li>• Nicotine is present in “vapor.”</li> <li>• Nicotine-related impurities varied by manufacturer.</li> </ul>
Commission on Human Medicines Working Group on Nicotine Containing Products (2011) [31]	U.K. market 5/20/2011  Samples: <ul style="list-style-type: none"> <li>• Regular High 18 mg</li> <li>• TAB high</li> <li>• Ultimo Cartridges Supersmoker Normal Exp</li> <li>• Gamucci Tobacco Flavour-Regular</li> </ul>	Compared e-liquid nicotine concentrations to the labeled contents of Nicotine Inhaler 15 mg inhaler.  Compared labeling for special precautions for disposal and other handling of e-cigarettes to the Nicotrol Inhaler.	<ul style="list-style-type: none"> <li>• Nicotine contents were:               <ul style="list-style-type: none"> <li>○ Regular high had 8.02%</li> <li>○ TAB high had 19.43%</li> <li>○ Ultimo Normal had 9.99%</li> <li>○ Gamucci Regular had 4.06%</li> </ul> </li> <li>• Diethylene glycol, propylene glycol monomethyl ether, benzene, nicotine, and a derivative of oxazepam were identified but not labeled.</li> <li>• “There are no long-term data on safety of the excipients/solvents used in the devices. The rate of delivery of nicotine/solvent solutions is not characterized and there is no quality assurance concerning what is delivered...into the subject.” (p. 17)</li> <li>• Choking risk labeling is absent for all four e-cigarettes. “Used cartridges may be a hazard to children, animals, and fish...” due to residual nicotine in used cartridges and the lithium battery. (p.15)</li> </ul>
Villa et al. (2012) * [32]	French market Date(s) of acquisition not provided  20 cartridge samples (unnamed)	Compared the e-liquid nicotine concentration to the labeled amount.	<ul style="list-style-type: none"> <li>• Most packages and websites had incomplete or unusable information on nicotine content.</li> <li>• Measured nicotine was generally higher than the labeled amount; some were twofold higher or more.</li> <li>• “The nicotine content of vials labelled 6 mg was as high as 112 mg (7mL; 16mg/mL).” (p.310)</li> </ul>

Study	Market(s) Publication Date/Product Year E-cigarettes Analyzed	Labeling Analysis Performed	Summary of Findings
Cheah et al. (2012) * [11]	Singapore market October 2010-March 2011  19 e-cigarettes and one e-pipe included three U.S. brands: <ul style="list-style-type: none"> <li>• V2,</li> <li>• E-joy</li> <li>• Smoking Everywhere™</li> </ul>	Evaluated package labeling for: <ul style="list-style-type: none"> <li>• Name of manufacturer</li> <li>• Nicotine content</li> <li>• Health statements and cautions</li> <li>• Addiction warnings</li> <li>• “For adult use only” label</li> </ul> Evaluated products to determine if cartridge leaks.	<ul style="list-style-type: none"> <li>• Labelling of constituents and health information on the...ENDS sampled was inadequate.” (p.2)</li> <li>• Misleading information on product labeling and packaging was “pervasive.” (p.7)</li> <li>• Eleven of 20 products had a labeled amount of nicotine; five contained less than labeled; two contained more than labeled.</li> <li>• One product labeled as 6 mg contained up to 12.3 mg/cartridge.</li> </ul>
Goniewicz, Kuma, et al. (2013) * [12]	Poland, U.S., and U.K. markets Acquisition date not provided  Poland - 11 brands: names unknown UK - four brands: <ul style="list-style-type: none"> <li>• Intellicig Evolution</li> <li>• SkyCig</li> <li>• Liberro</li> <li>• Gamucci 110228</li> </ul> US –NJOY® NPRO	Evaluated the relative differences between labeled and determined nicotine concentration.  Measured the amount of nicotine in original and used cartridges (after 300 puffs).	<ul style="list-style-type: none"> <li>• 50-60% of nicotine from a cartridge is vaporized.</li> <li>• Five of 20 cartridges and 4 of 20 refill solutions were labeled precisely.</li> <li>• One of 20 cartridges labeled as nicotine free contained measureable nicotine.</li> <li>• Three of 20 cartridges had more than the labeled amount of nicotine by 6 to 25%.</li> <li>• Five of 20 refill solutions had more than the labeled amount of nicotine by 4 to 28%.</li> </ul>
Kirschner et al. (2013) * [33]	U.S. market Smoke shop and internet purchases Acquisition date not provided  Five products tested in triplicate: <ul style="list-style-type: none"> <li>• Ecig Express®</li> <li>• Titan Fluid (coffee)</li> <li>• Titan Tornado Fluid (red bull)</li> <li>• Provape Premium e-juice from two different lots</li> <li>• Hangsen Desert Ship</li> </ul>	Evaluated the accuracy of nicotine labeling and pH of products.	<ul style="list-style-type: none"> <li>• E-liquids contained 14.8 - 87.2 mg/mL of nicotine</li> <li>• Four products contained less than the labeled nicotine amount; one contained 40% more than the label claim.</li> <li>• “None of the 6 samples tested were provided in child-resistant containers.”</li> </ul>

Study	Market(s) Publication Date/Product Year E-cigarettes Analyzed	Labeling Analysis Performed	Summary of Findings
Etter et al. (2013) [34]	<p>U.S. &amp; Western Europe markets Analysis in March &amp; April 2012</p> <p>20 bottles of 10 different brands: 19 purchased from internet retailer and one from Chinese manufacturer Dekang</p> <p>Three products were made/purchased in U.S.:</p> <ul style="list-style-type: none"> <li>• Ecig Express®</li> <li>• Vapor4Life</li> <li>• Johnson Creek™</li> </ul>	<p>Evaluated:</p> <ul style="list-style-type: none"> <li>• The accuracy of nicotine content labeling.</li> <li>• Impurities: nicotine degradation products, nicotine impurities, diethylene glycol, and ethylene glycol.</li> </ul>	<ul style="list-style-type: none"> <li>• Eighteen of 20 samples had 93-112% of the labeled nicotine content. One sample had 121% of the labeled nicotine content.</li> <li>• "...half of the e-liquids in our analysis could be acceptable as medicinal products...the other half...contained up to five times the maximum amount of impurities specified in the European Pharmacopoeia."(p.1674)</li> <li>• Regarding nicotine and nicotine-related substances, there were "differences in quality between brands (and)...across models within the same brands." (p. 1674)</li> <li>• Bottles of e-liquid contain up to 720 mg of nicotine.</li> </ul>
Cameron et al. (2013)*[35]	<p>U.S. market Date not provided</p> <p>Seven e-liquid samples tested in triplicate:</p> <ul style="list-style-type: none"> <li>• Vapour liquid (high)</li> <li>• No brand, hand-labeled liquid (high)</li> <li>• Smart smoke liquid (high)</li> <li>• Smart smoke liquid (med)</li> <li>• Smart smoke liquid (low)</li> <li>• BE112 prefilled cartridges (super high)</li> <li>• Vapor prefilled cartridge (high)</li> </ul>	<p>Compared the nicotine content in e-liquids to the labeled amount (note: five of seven samples were qualitatively labeled and the "expected" ranges of mg of nicotine were "based on information from the manufacturer's website").</p>	<ul style="list-style-type: none"> <li>• All samples (based on the mean of 3 tests for each product) had nicotine in amounts equivalent to or lower than the labeled or expected amount.</li> <li>• One sample had a nicotine level 32% lower than the labeled amount.</li> <li>• "Samples ranged from pre-packaged and sealed with concentration levels printed on the labels to blank bottles with hand-written labels with no concentration level, warning statements or directions for use." (p.1 )</li> <li>• "Our results confirm e-cigarette solutions contain nicotine doses that are potentially lethal in adults and children." (p. 1)</li> </ul>

Study	Market(s) Publication Date/Product Year E-cigarettes Analyzed	Labeling Analysis Performed	Summary of Findings
Goniewicz, Hajek, & McRobbie (2013) * [36]	U.K. market Internet searches conducted 9/5/2012  Five UK brands (seven products) with high internet popularity: <ul style="list-style-type: none"> <li>• “Non-disposable”:               <ul style="list-style-type: none"> <li>○ Green Smoke</li> <li>○ E-lites E200</li> <li>○ Vapouriz Tank</li> <li>○ Smokers Angel (Halo) King size, High</li> <li>○ Vapestick Max</li> </ul> </li> <li>• Disposable:               <ul style="list-style-type: none"> <li>○ Totally Wicked</li> <li>○ Vapouriz</li> </ul> </li> </ul>	Evaluated: <ul style="list-style-type: none"> <li>• The degree to which the labelling of the nicotine content is informative for the consumer.</li> <li>• Nicotine content of cartridges.</li> <li>• Nicotine released to “vapor” after 150 &amp; 300 puffs (1.8 sec. duration, 70mL, 10 sec. intervals; 20 series of 15 puffs with 5-min. intervals between series).</li> <li>• Risk of user exposure to toxic levels of nicotine.</li> <li>• Consistency of nicotine delivery across batches of the same product.</li> <li>• Nicotine remaining in used cartridges after 300 puffs.</li> </ul>	<ul style="list-style-type: none"> <li>• “The nicotine content of cartridges within the same batch varied by up to 12% ...and the mean difference between different batches of the same brand ranged from 1%... to 20%... for five brands and 31%...for the sixth.” (p.1)</li> <li>• Brands labelled as containing 1.8 to 2.4% nicotine contained 12.8 to 33 mg nicotine.</li> <li>• All of the cartridges in this sample were sealed.</li> <li>• “Our finding that the nicotine content of e-liquid has little...relationship to nicotine content in vapour... suggests that a pharmaceutical level of accuracy of labelling...is...unlikely to be informative for the user.” (p.6)</li> <li>• Disposable e-cigarettes “delivered nicotine to vapour within the range of the re-chargeable ECs.” (p. 6)</li> <li>• Used cartridges contained 19 to 91% of their original nicotine.</li> <li>• “...there is little concern that e-cigarettes can harm their users by delivering toxic nicotine levels.” (p. 6) “...e-liquid refills...should...use child-proof packaging.” (p. 6)</li> </ul>

\* Six teams identified one or more samples that were outside the batch acceptance criteria (75%-125% of the labeled claim for all samples) for pharmaceutical inhalation solutions in the U.S.[37]