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## ***ERIE COUNTY LEGISLATURE***

92 Franklin Street - 4th Floor  
Buffalo, New York 14202

TO: Members of the Erie County Legislature

FROM: Karen M. McCarthy, Clerk

DATE: February 19, 2015

SUBJECT Documents Received Regarding LL Intro. 9-2 (2014) "A Local Law in Relation to the Regulation of Electronic Cigarettes ("E-Cigarettes")

The attached letters were received on February 19, 2015 regarding LL Intro. 9-2 (2014) "A Local Law in Relation to the Regulation of Electronic Cigarettes ("E-Cigarettes") that were distributed at the Public Hearing.

Thank you.



**Testimony of the American Cancer Society Cancer Action Network  
On the Erie County E-Cigarette Smoke-Free Proposal**

**Dr. Thomas Mang, Volunteer and**

**Associate Professor**

**Oral and Maxillofacial Surgery**

**School of Dental Medicine**

**University at Buffalo**

**February 19, 2015**

Good afternoon, my name is Dr. Thomas Mang and I am testifying on behalf of the American Cancer Society Cancer Action Network.

The American Cancer Society Cancer Action Network (ACS CAN) endorses including all electronic smoking devices in smoke-free laws.

There are serious questions about the safety of inhaling e-cigarette aerosol. E-cigarettes have not been subject to thorough, independent testing. According to the Food and Drug Administration (FDA), because e-cigarettes have not been fully studied, consumers currently don't know the potential risks of e-cigarettes when used as intended, how much nicotine or other potentially harmful chemicals are being inhaled during use, or whether there are any benefits associated with using these products.<sup>i</sup> Some studies have shown that e-cigarettes can cause short-term lung changes and irritations, but the long-term health effects remain unknown. Some studies have found the aerosol to contain heavy metals, volatile organic compounds and tobacco-specific nitrosamines, among other ingredients. Additionally, FDA tests found nicotine in some e-cigarettes that claimed to contain no nicotine.

The Centers for Disease Control and Prevention (CDC) reported in 2014 that including e-cigarettes in smoke-free laws can "preserve clean indoor air because [e-cigarette] aerosol can contain harmful and potentially harmful constituents, including nicotine and other toxins...." It went on to say that e-cigarette aerosols are "not as safe as clean air. Nicotine is a psychoactive chemical with known harms and irritant effects."<sup>ii</sup>

The dramatic increase in both awareness and use of e-cigarettes adds even more urgency for the FDA to regulate these products, and for local communities to prohibit their use in public places where smoking already is prohibited. Use of e-cigarettes among high school students tripled from 2011 to 2013.<sup>iii</sup> Many e-cigarettes resemble traditional cigarettes, and they are available in fruit and candy flavors that appeal to youth. The familiar appearance and enticing flavors could actually encourage youth to try traditional cigarettes.

Eliminating public use of e-cigarettes will help to prevent the tobacco industry from using these devices to create a new smoking norm, while possibly luring the next generation of young people to a deadly addiction. Prohibiting the use of e-cigarettes in public places where smoking is prohibited will also eliminate confusion with enforcement of existing smoking policies.

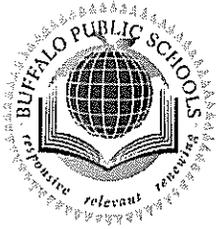
Communities across the country are amending their policies to prohibit the use of e-cigarettes wherever smoking is prohibited. I respectfully encourage you and the Erie County Legislature to protect our community by extending the smoke-free protections already provided to include all electronic smoking devices to better protect the public health of the citizens of Erie County. ACS CAN remains steadfastly committed to improving health by reducing the use of tobacco products.

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<sup>i</sup> U.S. Food and Drug Administration (FDA), <http://www.fda.gov/newsevents/publichealthfocus/ucm172906.htm>, accessed January 26, 2015.

<sup>ii</sup> Centers for Disease Control and Prevention (CDC), "State Laws Prohibiting Sales to Minors and Indoor Use of Electronic Nicotine Delivery Systems—United States, November 2014," *Morbidity and Mortality Weekly Report*, 63(49), December 12, 2014.

<sup>iii</sup> National Youth Tobacco Survey



## Buffalo Public Schools

## Health Related Services

Assunta Ventresca

Director

428 City Hall, Buffalo, New York 14202

Phone: (716) 816-3912 Fax: (716) 851-3698

“Putting Children and Families First to Ensure High Academic Achievement for All”

Erie County Public Hearing on Electronic Cigarette Bill

February 19, 2015

Remarks from:

- Assunta Ventresca, Director Health Related Services, Buffalo Public School District

More than a quarter of a million youth who had never smoked a cigarette used electronic cigarettes in 2013, according to a Centers for Disease Control and Prevention study published in the journal *Nicotine and Tobacco Research*. This number reflects a three-fold increase, from about 79,000 in 2011, to more than 263,000 in 2013. A national study showed that e-cigarettes are now more popular among teens than regular cigarettes.

Youth who had never smoked conventional cigarettes but who used e-cigarettes were almost twice as likely to have intentions to smoke conventional cigarettes as those who had never used e-cigarettes. Tobacco use is the leading preventable cause of disease and death in the United States, and **nearly all tobacco use begins during youth** and young adulthood.

Tobacco use among Buffalo Public Schools (BPS) middle and high school students is low according to the 2013 BPS *Youth Risk Behavior Survey* report. However, youth using a tobacco product is a concern because even one-time use of tobacco is associated with increased long-term risks for becoming a regular user.

Nicotine is highly addictive. About three out of every four teen smokers become adult smokers, even if they intend to quit in a few years. Smoking by youth can cause serious and potentially deadly health issues. Youth who smoke are in danger of addiction to nicotine; reduced lung function; reduced lung growth; and early cardiovascular damage. The 2014 Surgeon General's report found that nicotine use can have adverse effects on adolescent brain development and could result in lasting deficits in cognitive function; therefore, nicotine use by youths in any form is unsafe.

Comprehensive smoke-free laws protect children from the harmful effects of secondhand exposure. Smoke-free policies result in diminished social acceptability of smoking. Restrictions on e-cigarette use in public might help support tobacco-free norms.

Children should not have to breathe chemicals, whether they come out of a conventional or e-cigarette. No one should smoke e-cigarettes indoors that are free of other forms of tobacco smoke pollution. Smoke-free laws create an environment that encourages smokers to quit and discourages children from smoking.

I urge you to include electronic cigarettes in the Erie County's Clean Indoor Air law. This legislation will protect children's right to breathe clean air in public places and prevent a new generation of youth tobacco users addicted to nicotine.

Thank you.

Vision: Healthy School  
Communities

Comm. 4D-3  
Page 4 of 27

# Innokin Technology Co., Ltd.

Building 6, XinXinTian Industrial Park, Xinsha Road Shajing  
Baoan District, Shenzhen, China P.R.C. 518104

## E-Cigarette Aerosol Analysis Samples Received 1/30/2015

Analysis Report  
(0115-545R)

### *HPLC/UV Analysis*

Acetaldehyde

Acrolein

Formaldehyde



**Enthalpy Analytical, Inc.**

Phone: (919) 850 - 4392 / Fax: (919) 850 - 9012 / [www.enthalpy.com](http://www.enthalpy.com)  
800-1 Capitola Drive Durham, NC 27713-4385

I certify that to the best of my knowledge all analytical data presented in this report:

- Have been checked for completeness
- Are accurate, error-free, and legible
- Have been conducted in accordance with approved protocol, and that all deviations and analytical problems are summarized

This analytical report was prepared in Portable Document Format (.PDF) and contains 13 pages.

*Jennifer B. Feller*

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QA Review Performed by: Jennifer B. Feller

Report Issued: 2/11/2015



# Summary of Results



Report for: Innokin Technology Co., Ltd.  
 Client Project: na  
 Sample Type: eCigarettes

Project Code: 0115-545  
 Project Start Date: 1/30/15  
 Analysis Method: ENT302

Lowest Standard Value, ug/sample	5.46	5.48	5.46
Minimum Detection Limit (MDL) ug/sample	0.546	0.552	0.546

EA Sample ID	Puff Count Intervals	Smoke Reg.	Client ID	Carbonyls	Compound Mass (ug/25 Puffs)		
				Mass Loss (mg)	Acetaldehyde	Acrolein	Formaldehyde
				eCig device			
E01	1-25	55 / 4 Sq	Gladius / iTaste VV 3.8 Volts	77.4	1.25 J	< 0.552 ND	< 0.546 ND
E01	1-25	55 / 4 Sq	Gladius / iTaste VV 3.8 Volts	76.3	1.21 J	< 0.552 ND	0.900 J
<b>Average</b>				<b>76.9</b>	<b>1.23 J</b>	<b>&lt; 0.552 ND</b>	<b>0.723 J</b>
F01	1-25	55 / 4 Sq	Gladius / iTaste VV 4.2 Volts	135.3	4.58 J	1.67 J	12.0
F01	1-25	55 / 4 Sq	Gladius / iTaste VV 4.2 Volts	138.2	4.66 J	1.38 J	14.4
<b>Average</b>				<b>136.7</b>	<b>4.62 J</b>	<b>1.53 J</b>	<b>13.2</b>
G01	1-25	55 / 4 Sq	Gladius / iTaste VV 4.6 Volts	180.5	20.0	7.20	64.6
G01	1-25	55 / 4 Sq	Gladius / iTaste VV 4.6 Volts	176.4	27.5	7.48	95.0
<b>Average</b>				<b>178.5</b>	<b>23.7</b>	<b>7.34</b>	<b>79.8</b>
H01	1-25	55 / 4 Sq	Gladius / iTaste VV 5.0 Volts	178.9	22.6	5.19 J	68.1
H01	1-25	55 / 4 Sq	Gladius / iTaste VV 5.0 Volts	188.1	26.8	5.29 J	77.8
<b>Average</b>				<b>183.5</b>	<b>24.7</b>	<b>5.24 J</b>	<b>72.9</b>

ND: Reported value is less than the minimum detection limit.

J: Reported value is less than the LOQ and is considered an estimated value.

Report for: Innokin Technology Co., Ltd.  
 Client Project: na  
 Sample Type: eCigarettes

Project Code: 0115-545  
 Project Start Date: 1/30/15  
 Analysis Method: ENT302

Lowest Standard Value, ug/sample	5.46	5.48	5.46
Minimum Detection Limit (MDL) ug/sample	0.546	0.552	0.546

EA Sample ID	Puff Count Intervals	Smoke Reg.	Client ID	Carbonyls	Compound Mass (ug/25 Puffs)		
				Mass Loss (mg)	Acetaldehyde	Acrolein	Formaldehyde
				eCig device			
I01-01	1-25	55 / 4 Sq	CE4-1.8 Ohm / iTaste VV 3.8 Volts	71.7	137	< 0.552 ND	155
I01-01	1-25	55 / 4 Sq	CE4-1.8 Ohm / iTaste VV 3.8 Volts	148.6	253	11.5	372
<b>Average</b>				<b>110.1</b>	<b>195</b>	<b>5.73</b>	<b>263</b>
I01-02	1-25	55 / 4 Sq	CE4-1.8 Ohm / iTaste VV 4.2 Volts	190.6	491	31.7	754
I01-02	1-25	55 / 4 Sq	CE4-1.8 Ohm / iTaste VV 4.2 Volts	208.9	360	15.0	485
<b>Average</b>				<b>199.7</b>	<b>425</b>	<b>23.4</b>	<b>619</b>
I01-03	1-25	55 / 4 Sq	CE4-1.8 Ohm / iTaste VV 4.6 Volts	249.7	628	25.2	857
I01-03	1-25	55 / 4 Sq	CE4-1.8 Ohm / iTaste VV 4.6 Volts	251.6	663	40.0	957
<b>Average</b>				<b>250.7</b>	<b>646</b>	<b>32.6</b>	<b>907</b>
I01-04	1-25	55 / 4 Sq	CE4-1.8 Ohm / iTaste VV 5.0 Volts	249.3	771	53.0	1,239
I01-04	1-25	55 / 4 Sq	CE4-1.8 Ohm / iTaste VV 5.0 Volts	142.6	2,036	593	2,480
<b>Average</b>				<b>196.0</b>	<b>1,404</b>	<b>323</b>	<b>1,860</b>

ND: Reported value is less than the minimum detection limit.

# Narrative Summary



## Enthalpy Analytical Narrative Summary

<b>Company</b>	Innokin Technology Co., Ltd.
<b>Analysts</b>	AMP
<b>Parameters</b>	ENT302

<b>Client Proj</b>	na
<b>Job #</b>	0115-545
<b># Samples</b>	2 eCigarette Devices

### Sample Handling

To generate the samples for the aerosol testing study, the eCigarettes were fully charged and then smoked on the SM450 20-port linear analytical smoking machine, "Big Enos." The eCigarettes were smoked for 25 puffs using a 55 mL/4 second square-wave puff profile once every 30 seconds. Before and after the 25 puffs, the devices were weighed and samples recovered. Two replicates were smoked for each sample. The samples used for the study are listed below.

Enthalpy ID	Volts	Sample ID
E01	3.8	Gladius Tank & iTaste VV Battery
F01	4.2	
G01	4.6	
H01	5.0	
I01-01	3.8	CE4-1.8 Ohm & iTaste VV Battery
I01-02	4.2	
I01-03	4.6	
I01-04	5.0	

### Analysis

The aerosol samples were prepared and analyzed following the analytical procedures in Enthalpy SOP ENT 302 for HPLC/UV analysis. After preparation, the samples were analyzed for acetaldehyde, acrolein, and formaldehyde.

To calculate the sample concentration in ug/g, first the amount of each compound expressed as micrograms (ug) in each sample was calculated by multiplying the analysis sample concentration (ug/mL) by the effective trapping solution volume (36.75 mL). Once the sample amount (ug) was calculated, the sample concentration in ug/g was calculated by dividing the ug of each compound in the sample by the weight loss (mg) of the device and converting from mg to g.



## Enthalpy Analytical Narrative Summary (continued)

### Analysis (continued)

To calculate the limit of quantitation (LOQ) amounts (ug), the lowest calibration standard concentration (ug/mL) used in creating the calibration curve is used as the sample analysis concentration. For example, acetaldehyde has a low standard of 0.149 ug/mL. This is multiplied by the effective sample trapping volume (36.75 mL) to give an LOQ amount of 5.46 ug. If the calculated sample amount is less than the LOQ amount but greater than the MDL amount, the sample result has a flag of "J" appended to the sample result. An MDL study confirmed that the MDL values are one tenth of the LOQ values.

Samples were analyzed using the Agilent Model 1100, High Performance Liquid Chromatograph "Groucho" equipped with an Ultraviolet (UV) Detector operating at 365 nm and an appropriate column.

### Summary

The study with the CE4-1.8 Ohm tank was undertaken to reproduce the recent NEJM study which found that high levels of formaldehyde were produced by this device. When the CE4-1.8 Ohm & iTaste VV Battery were set to 5.0 volts, the high levels of formaldehyde reported in the NEJM were confirmed by this study. The vapor produced by the CE4 (top coil atomizer) was evaluated by Enthalpy Analytical (EA) staff and it was determined that voltages above 4.2 volts produced a burnt and acrid tasting vapor that was not suitable for use. It should be noted that samples collected above 4.2 volts are likely not representative of normal usage for this device. The Gladius Tank & iTaste VV Battery were also evaluated by EA staff and found not to produce "burnt" tasting vapor at 5.0 volts.

The TWA limit (8-hours exposure) defined by NIOSH (0.75 ppm, i.e. 0.92 mg/m<sup>3</sup>)<sup>1</sup> for formaldehyde was used as a guide to define potentially "acceptable" levels of formaldehyde in eCigarette aerosols. The average resting respiratory rate for an adult is 15 breaths per minute while the tidal volume is 0.5 L.<sup>2</sup> Within 8 hours (480min), the total volume of air inhaled is 3.6 m<sup>3</sup> ([0.5L x 15breaths/min x 480min] / 1000L/m<sup>3</sup>). The NISOH limits for 8 hour occupational exposure allow daily inhalation of approximately 3.3 mg of formaldehyde.



## Enthalpy Analytical Narrative Summary (continued)

### Summary (continued)

The amount of formaldehyde produced by the Innokin Gladius tank system at 5 volts (refer to the tables of results) coupled with the iTaste VV battery was found to be 73 ug in 25 puffs. This gives a per puff amount of 3.1 ug per puff. Given that the NIOSH TWA limit for 8-hours exposure is 3.3 mg, the user could inhale 1000 puffs or over 7 mL of e-liquid and still remain under the NIOSH 8 hour exposure limit. In contrast, the average delivery of formaldehyde from a pack of conventional cigarettes is estimated at 3 mg,<sup>3</sup> which is approximately equal to the NIOSH 8 hour exposure limit.

### QC Notes

Acetaldehyde and acrolein were not detected in the blanks above the minimum detection limit (MDL). Formaldehyde was detected in the laboratory blanks but below the LOQ; these results have been blank corrected.

Calibration and sample chromatograms are available upon request.

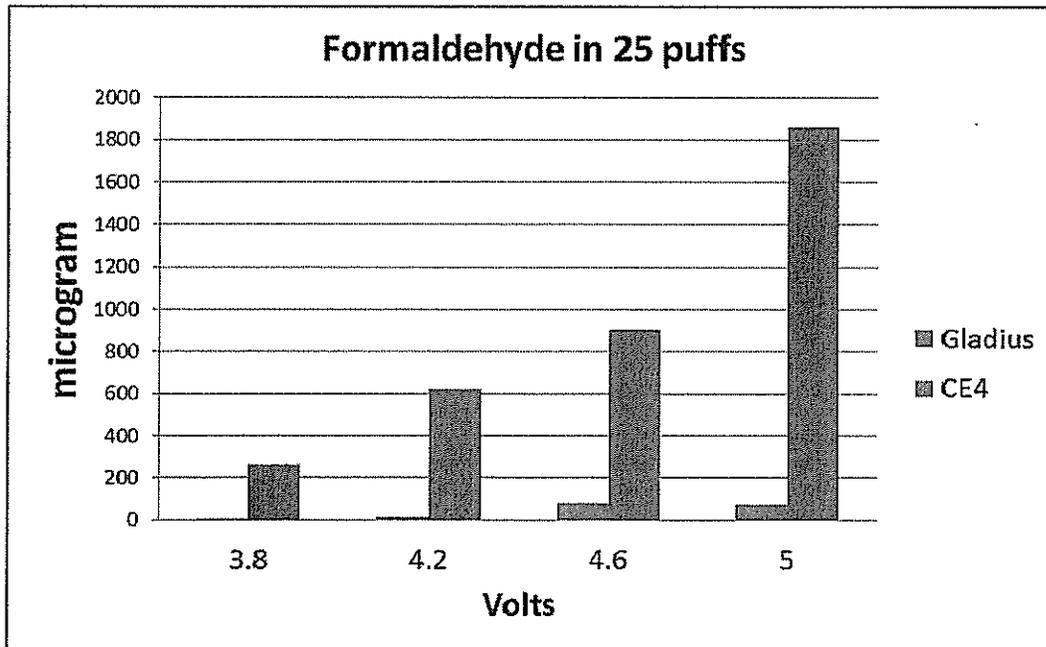


Figure 1 - Comparison of Gladius / iTaste VV to CE4 / iTaste VV

1) [https://www.osha.gov/OshDoc/data\\_General\\_Facts/formaldehyde-factsheet.pdf](https://www.osha.gov/OshDoc/data_General_Facts/formaldehyde-factsheet.pdf)

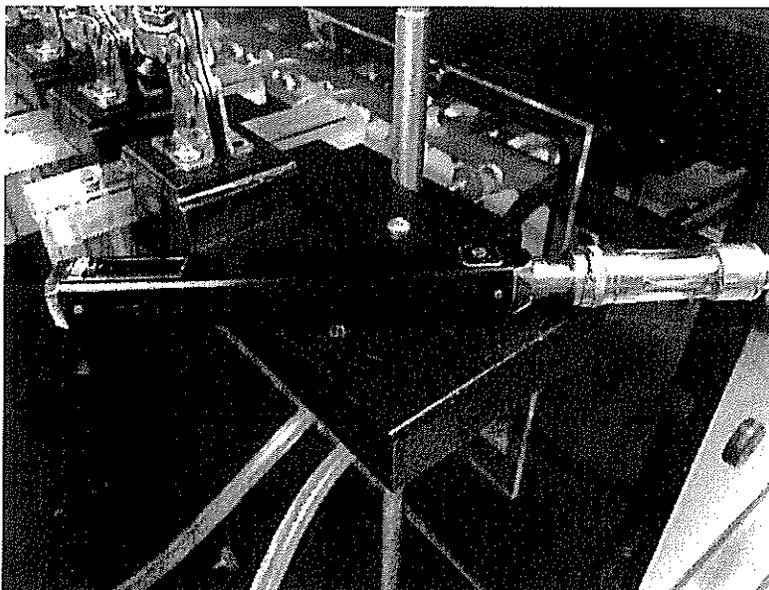
2) Barrett, K. E. & Ganong, W. F. (2012). Ganong's review of medical physiology. London, UK: McGraw-Hill Medical.

3) Counts ME, Morton MJ, Laffoon SW, Cox RH, Lipowicz PJ. Smoke composition and predicting relationships for international commercial cigarettes smoked with three machine-smoking conditions. Regul Toxicol Pharmacol 2005;41:185-227

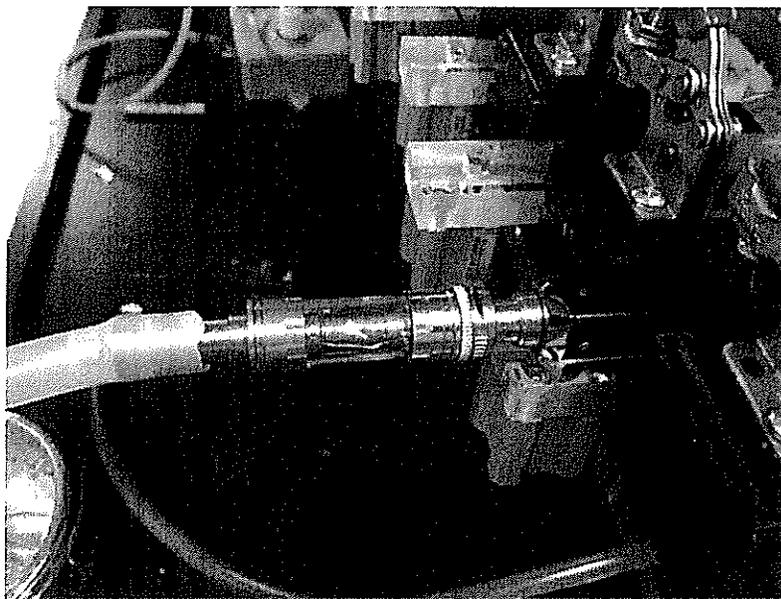


# Enthalpy Analytical Narrative Summary (continued)

## Study Photographs



Gladius Tank & iTaste VV Battery



Gladius Tank & iTaste VV Battery with automatic device activation (button pushing) on an SM450 smoking machine.



## General Reporting Notes

The following are general reporting notes that are applicable to all Enthalpy Analytical, Inc. data reports, unless specifically noted otherwise.

- Any analysis which refers to the method as “*Type*” represents a planned deviation from the reference method. For instance a Hydrogen Sulfide assay from a Tedlar bag would be labeled as “EPA Method 16-*Type*” because Tedlar bags are not mentioned as one of the collection options in EPA Method 16.
- The acronym *MDL* represents the Minimum Detection Limit. Below this value the laboratory cannot determine the presence of the analyte of interest reliably.
- The acronym *LOQ* represents the Limit of Quantification. Below this value the laboratory cannot quantitate the analyte of interest within the criteria of the method.
- The acronym *ND* following a value indicates a non-detect or analytical result below the MDL.
- The letter *J* in the Qualifier or Flag column in the results indicates that the value is between the MDL and the LOQ. The laboratory can positively identify the analyte of interest as present, but the value should be considered an estimate.
- The letter *E* in the Qualifier or Flag column indicates an analytical result exceeding 100% of the highest calibration point. The associated value should be considered as an estimate.
- The acronym *DF* represents Dilution Factor. This number represents dilution of the sample during the preparation and/or analysis process. The analytical result taken from a laboratory instrument is multiplied by the DF to determine the final undiluted sample results.
- The addition of *MS* to the Sample ID represents a Matrix Spike. An aliquot of an actual sample is spiked with a known amount of analyte so that a percent recovery value can be determined. The MS analysis indicates what effect the sample matrix may have on the target analyte, i.e. whether or not anything in the sample matrix interferes with the analysis of the analyte(s).
- The addition of *MSD* to the Sample ID represents a Matrix Spike Duplicate. Prepared in the same manner as a MS, the use of duplicate matrix spikes allows further confirmation of laboratory quality by showing the consistency of results gained by performing the same steps multiple times.
- The addition of *LD* to the Sample ID represents a Laboratory Duplicate. The analyst prepares an additional aliquot of sample for testing and the results of the duplicate analysis are compared to the initial result. The result should have a difference value of within 10% of the initial result (if the results of the original analysis are greater than the LOQ).
- The addition of *AD* to the Sample ID represents an Alternate Dilution. The analyst prepares an additional aliquot at a different dilution factor (usually double the initial factor). This analysis helps confirm that no additional compound is present and coeluting or sharing absorbance with the analyte of interest, as they would have a different response/absorbance than the analyte of interest.



## General Reporting Notes

(continued)

- The Sample ID *LCS* represents a Laboratory Control Sample. Clean matrix, similar to the client sample matrix, prepared and analyzed by the laboratory using the same reagents, spiking standards and procedures used for the client samples. The LCS is used to assess the control of the laboratory's analytical system. Whenever spikes are prepared for our client projects, two spikes are retained as LCSs. The LCSs are labeled with the associated project number and kept in-house at the appropriate temperature conditions. When the project samples are received for analysis, the LCSs are analyzed to confirm that the analyte could be recovered from the media, separate from the samples which were used on the project and which may have been affected by source matrix, sample collection and/or sample transport.
- **Significant Figures:** Where the reported value is much greater than unity (1.00) in the units expressed, the number is rounded to a whole number of units, rather than to 3 significant figures. For example, a value of 10,456.45 ug catch is rounded to 10,456 ug. There are five significant digits displayed, but no confidence should be placed on more than two significant digits.
- **Manual Integration:** The data systems used for processing will flag manually integrated peaks with an "M". There are several reasons a peak may be manually integrated. These reasons will be identified by the following two letter designations on sample chromatograms, if provided in the report. The peak was *not integrated* by the software "NI", the peak was *integrated incorrectly* by the software "II" or the *wrong peak* was integrated by the software "WP". These codes will accompany the analyst's manual integration stamp placed next to the compound name on the chromatogram.



**This Is The Last Page  
Of This Report.**



Resources for Community Wellness:  
www.CreatingHealthyCommunities.org  
E-mail: BeActive@City-Buffalo.org  
Phone: 851-4052 \* Fax: 851-4309

# State Health Officer's Report on E-Cigarettes

## *A Community Health Threat*

Ron Chapman, MD, MPH  
CDPH Director and State Health Officer  
California Department of Public Health

January 2015

Edmund G. Brown Jr., Governor  
State of California

Diana S. Dooley, Secretary  
California Health and Human Services Agency







# HEALTH ADVISORY – January 28, 2015

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## Electronic Cigarettes: A Summary of the Public Health Risks and Recommendations for Health Care Professionals

This health advisory seeks to inform health care professionals of the public health risks posed by the marketing, sale and use of electronic cigarettes (e-cigarettes) especially to children and young people. Electronic cigarettes (e-cigarettes) are battery-operated devices, often designed to resemble a cigarette, that deliver and emit a nicotine-containing aerosol. E-cigarettes are considered electronic nicotine delivery devices (ENDS) and have many names. They are frequently referred to as e-cigs, e-hookahs, hookah pens, vapes, vape pens, vape pipes, or mods. There are disposable and rechargeable e-cigarettes as well as refillable “tank systems” that hold a larger volume of the e-cigarette liquid (e-liquid) and that heat the e-liquid to higher temperatures.<sup>1</sup>

### Toxicity of E-cigarettes and Exposure to Emissions

The heated e-liquid forms an aerosol that contains high concentrations of ultrafine particles that are inhaled and become trapped in the lungs.<sup>2</sup> Chemicals in the aerosol are absorbed through the blood stream and delivered directly to the brain and all body organs. Analyses of e-liquids by the Food and Drug Administration (FDA) and other laboratories found variability in the content of e-liquids and inaccurate product labeling related to nicotine content and chemicals.<sup>3</sup>

Typically, e-liquids contain nicotine, flavoring agents, propylene glycol and toxic chemicals known to cause cancer, birth defects and other reproductive harm.<sup>1, 4-7</sup> While several studies found lower levels of carcinogens in the e-cigarette aerosol compared to smoke emitted by traditional cigarettes, both the mainstream and secondhand e-cigarette aerosol have been found to contain at least ten chemicals that are on California’s Proposition 65 list of chemicals known to cause cancer, birth defects or other reproductive harm, including acetaldehyde, benzene, cadmium, formaldehyde, isoprene, lead, nickel, nicotine, n-nitrosornicotine, and toluene.<sup>1, 5-7</sup>

E-cigarette emissions are also a health concern for those exposed to the secondhand aerosol. Although not as dangerous as secondhand smoke from combustible tobacco products, people exposed to e-cigarette aerosol absorb nicotine at levels comparable to people exposed to secondhand smoke.<sup>8</sup> E-cigarette emissions also contain volatile organic compounds (VOCs) and fine/ultrafine particles.<sup>6</sup> These ultrafine particles can travel deep into the lungs where they get trapped and may lead to tissue inflammation.<sup>9</sup>

## Health Effects of Nicotine

Nicotine, the primary psychoactive ingredient in e-liquid, stimulates pleasure/reward pathways in the brain. It is a highly addictive neurotoxin that is as addictive as heroin and cocaine.<sup>10,11</sup> It affects the cardiovascular and central nervous systems, causing blood vessels to constrict, raising the pulse and blood pressure.<sup>12</sup> Nicotine adversely affects maternal and fetal health during pregnancy, contributing to low birth weight, preterm delivery and stillbirth.<sup>13</sup> Nicotine is also known to cross the placenta and is detectable in the breast milk of smoking mothers as well as mothers exposed to secondhand smoke.<sup>14,15</sup> Preliminary studies show that using a nicotine-containing e-cigarette for just five minutes causes similar lung irritation, inflammation and effect on blood vessels as smoking a traditional cigarette, which may increase the risk of a heart attack.<sup>1,9</sup>

Exposure to and use of nicotine products by adolescents is of particular concern because adolescence is a critical period for brain growth and development. As a consequence, adolescents are especially vulnerable to the toxic effects of nicotine. Exposure to nicotine during adolescence may harm brain development and predispose future tobacco use.<sup>13,16,17</sup> Even a brief period of continuous or intermittent nicotine exposure in adolescence elicits lasting neurobehavioral damage.<sup>18</sup>

## Nicotine Poisonings

E-liquids are available in flavors such as bubble gum, cherry and chocolate, which makes them appealing to children and youth. E-cigarette cartridges and e-liquid bottles are not equipped with child resistant caps and often leak, creating a potential source of poisoning through ingestion and skin or eye contact. Even a small amount of e-liquid ingested by a small child can be lethal.<sup>19</sup>

There has been a significant rise in the number of calls to poison control centers for both adults and children who were accidentally exposed to e-liquids.<sup>20</sup> Nationally, the number of calls rose from one per month in September 2010 to 215 per month in February 2014.<sup>21</sup> Figure 1 depicts e-cigarette-related calls to the California Poison Control Center over a five year period. In California, from 2012 to 2014, the number of calls to the poison control center

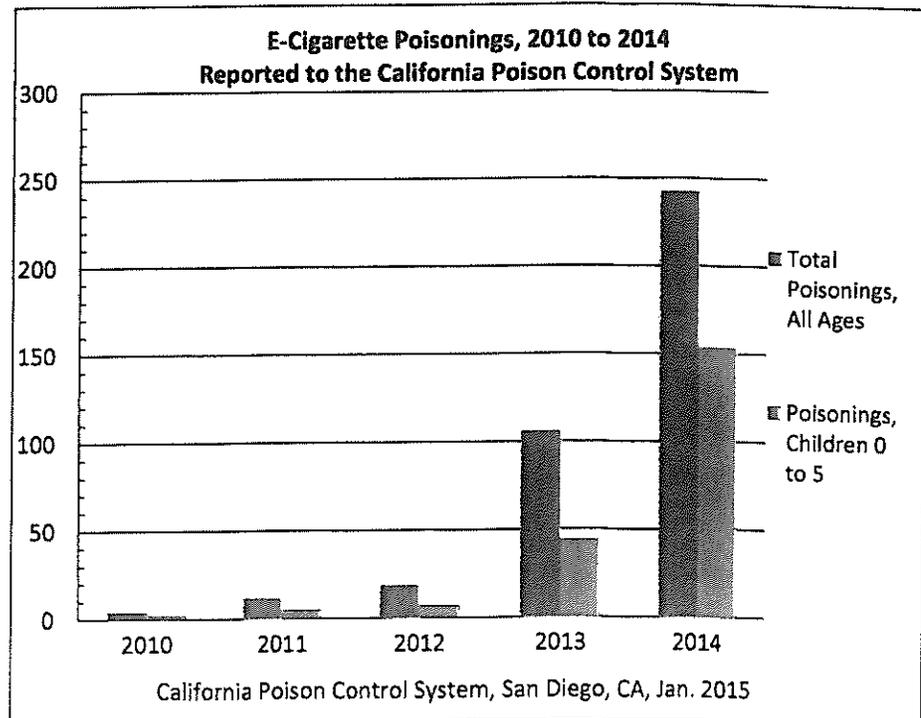


Figure 1: E-cigarette-related calls to the California Poison Control System.

involving e-cigarette exposures in children five and under increased sharply from 7 to 154. By the end of 2014, e-cigarette poisonings to young children tripled in one year, making up more than 60% of all e-cigarette poisoning calls. Adults have also mistakenly used e-liquid in harmful ways, such as eye drops, and have been harmed by exploding cartridges.

### E-cigarette Use and Youth

Recent national and preliminary California data show that youth are experimenting with e-cigarettes at an alarming rate. In 2014, the Monitoring the Future survey, which tracks substance abuse trends among over 40,000 youth nationally, found that the use of e-cigarettes among teens surpassed the use of traditional cigarettes. More than twice as many 8<sup>th</sup> and 10<sup>th</sup> graders reported using e-cigarettes than traditional cigarettes in the survey, and among 12<sup>th</sup> graders, 17 percent reported currently using e-cigarettes vs. 14 percent using traditional cigarettes.<sup>22</sup> Another survey, the National Youth Tobacco Survey, found that in 2013, that e-cigarette use among high school students tripled between 2011 and 2013, increasing from 1.5 percent to 4.5 percent.<sup>23</sup> Over a quarter million students who reported using e-cigarettes had never used traditional cigarettes.<sup>24</sup> Overall, studies suggest that youth who may have otherwise never smoked cigarettes are now getting hooked on nicotine due to e-cigarettes, and that adolescents who use e-cigarettes are more likely to progress from experimenting with cigarettes to becoming established smokers.<sup>25, 26</sup>

E-cigarette devices may also be used to inhale illegal substances, such as marijuana and hash oil.<sup>19</sup> Because many of these devices are similar in appearance to a ball point pen, school and law enforcement personnel are unaware that inappropriate use of nicotine and illegal substances is occurring.

### E-cigarette Use and Adults

Among California adults, use of e-cigarettes in the past 30 days doubled from 1.8 percent in 2012 to 3.5 percent in 2013. For younger adults (18 to 29 year old), e-cigarette use tripled in one year from 2.3 percent to 7.6 percent. Young adults are three times more likely to use e-cigarettes than those 30 and older. Nearly 20 percent of young adult e-cigarettes users have never smoked traditional cigarettes.<sup>27</sup>

### E-cigarette Availability

E-cigarettes are readily accessible throughout California, and the number of stores selling e-cigarettes quadrupled between 2011 and 2013, increasing from 12 percent to 46 percent.<sup>28, 29</sup> Figure 2 depicts the percent of tobacco stores selling e-cigarettes in California counties.

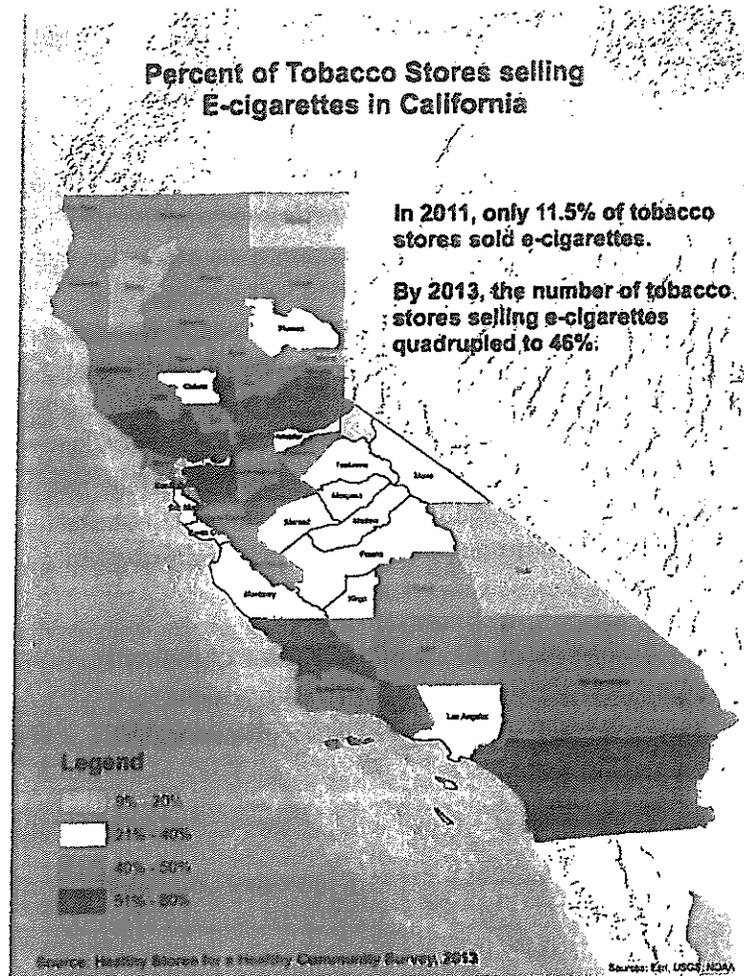
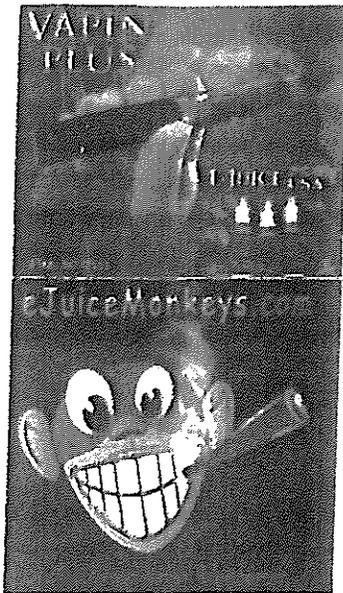


Figure 2: Percent of tobacco stores selling e-cigarettes in CA.

## E-cigarette Marketing

Over the past 40 years, great strides have been made to protect youth from tobacco marketing. Numerous state and federal laws and litigation regulate the sale, marketing and distribution of traditional tobacco products and tobacco-related paraphernalia. These restrictions include: prohibiting tobacco advertising on television, radio and billboards; prohibiting youth-oriented tobacco products marketing, including a ban on the sale of flavored cigarettes and the use of cartoon characters; prohibiting free sampling of cigarettes and restrictions on sampling of other tobacco products; restrictions on brand name sponsorship of sporting, music, and cultural events; restrictions on giving away branded promotional items such as t-shirts.<sup>30</sup> Presently in California, these restrictions are not interpreted to apply to e-cigarettes. As a result, the e-cigarette industry is legally allowed to use marketing strategies and tactics that are no longer permissible for traditional tobacco products.

Many television networks (e.g., ABC Family, USA, Bravo, E!, MTV, VH1 and Comedy Central) with a substantial proportion of youth viewers, are airing e-cigarette advertising. There is also e-cigarette advertising on radio, internet, billboards, in magazine and print publications, and in stores.<sup>31</sup> E-liquid containing nicotine is frequently marketed as “e-juice” and is sold in fruit and candy flavors. Promoting and labeling nicotine containing products as “juice” may mislead consumers to believe that e-liquid is safe to ingest and that e-cigarettes pose no health risk.



The use of cartoon characters in advertising and promoting of e-cigarettes as fashion accessories are other ways these products appeal to youth with the implication that these products are harmless (see Figure 3). E-cigarette manufacturers report sponsoring concerts, sporting events, and parties that include the distribution of free samples; many of these events occurred in California.<sup>32</sup> Another tactic to create a perception that e-cigarettes are family friendly is through the association of these products with family oriented attractions.

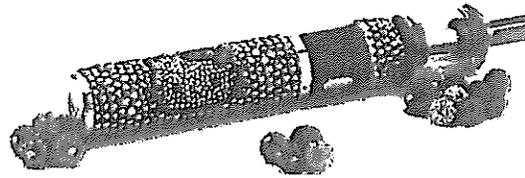


Figure 3: E-cigarette products and accessories.

### Cessation Claims

There is no scientific evidence that e-cigarettes help smokers to successfully quit traditional cigarettes or that they reduce consumption of traditional cigarettes.<sup>25,33</sup> A number of recent studies show that e-cigarette users are no more likely to quit than regular smokers. One study found that 89 percent of e-cigarette users are still using them one year later and another study found that e-cigarette users are a third less likely to quit cigarettes.<sup>34,35</sup> These studies suggest that e-cigarettes are effectively inhibiting people from successfully kicking their nicotine addiction. In addition, dual use of cigarettes and e-cigarettes is continuing to rise, which may diminish any potential benefits of cutting back on traditional cigarettes.<sup>36</sup> Continuing to smoke traditional cigarettes, while also using e-cigarettes, does not reduce the cardiovascular health risks.<sup>1,37,38</sup>

## California health care providers are recommended to:

### ***Educate, Advise and Protect Unborn Children, Young Children and Adolescents.***

- Educate parents, adolescents, and the public, as well as health care personnel, school personnel, child care providers, and community leaders, about these products:
  - Nicotine is contained and is highly addictive and toxic
  - Increases in e-cigarette related poisonings, especially to children.
- Advise that these products are especially harmful to adolescents and pregnant women.
- Advise and warn e-cigarette users about toxicity of these products to themselves and those subjected to secondhand emissions.

### ***Educate About Clean Indoor Air.***

- Educate parents and the public to take steps to protect children and themselves from exposure to e-cigarette emissions.

### ***Encourage Cessation.***

- Current smokers and e-cigarette users should be advised to quit and offered support.
- Refer users to cessation resources offered by their health insurance plan including access to FDA approved cessation medications.
- The California Smokers' Helpline at 1-800-NO BUTTS is another cessation resource.

### ***Protect Children from Nicotine Poisoning.***

- Inform parents and e-cigarette users that e-cigarette cartridges and e-liquid bottles are a potential source of poisoning through ingestion, skin or eye contact. Store these materials out of the reach of children, away from medications, and call the California Poison Control Center at 1-800-222-1221 for expert help in case of accidental exposure.

### ***Promote Health Literacy: Educate about Misleading Marketing.***

- Educate parents and e-cigarette users about misleading advertising and labeling.
- Educate adolescents, parents and others about unknown ingredients and rights as consumers to have ingredient disclosure readily accessible.

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