



15<sup>th</sup> June 2012

**To whom it may concern:**

Dear Sir/Madam,

I write with reference to recent inaccurate, misleading and dangerous press publications in the Cyprus Mail (amongst others internationally). It is absolutely essential that public health bodies, such as the WHO, FDA, EC and all Health Ministries in every territory understand the science behind electronic cigarettes and ensure that press releases are factually accurate and scientifically correct. It behoves all good journalists to do the same. To this end, we have put together this document, with a view to educating those who seem to be intent on frightening smokers away from switching to a demonstrably safer and healthier alternative to smoking, which serves no purpose other than to ensure that millions of smokers will continue to die.

We have seen a number of 'concerns' raised, and hope to provide scientifically factual responses herein which can lay these to rest once and for all.

**"We don't know what's in the liquid."**

Yes, we do.

ECITA has carried out in excess of 100 tests on e-liquid, using isotope dilution analysis by GC/MS to date, and hundreds of other similar tests have been carried out by those from within the industry, as well as independent government testing. This barrage of tests demonstrates precisely what is in the liquid:

Propylene Glycol (PG) CAS 57-55-6  
Vegetable Glycerine (VG or 'Glycerol') CAS 56-81-5  
Nicotine CAS 54-11-5  
Food-standard flavourings



## **“We don’t know what happens when Propylene Glycol is inhaled.”**

Yes, we do.

PG has been extensively studied for many years, and has been classified as GRAS (Generally Regarded As Safe)<sup>1</sup>. Consider the following findings:

"[the Environment Protection] Agency has concluded that there are no endpoints of concern for oral, dermal, or inhalation exposure to propylene glycol and dipropylene glycol."

"A review of the available data has shown propylene glycol and dipropylene glycol to be negative for carcinogenicity in studies conducted up to the testing limit doses established by the Agency; therefore, no further carcinogenic analysis is required. [...]"

Propylene glycol and dipropylene glycol were tested for mutagenic or genotoxic potential and found to be negative in a battery of studies".<sup>2</sup>

"... Adequate long-term feeding studies are available which indicate that [propylene glycol] does not represent a cancer hazard."<sup>3</sup>

## **“What about vegetable glycerine?”**

VG is also classified as GRAS.<sup>4</sup>

"Glycerol is free from structural alerts, which raise concern for mutagenicity. Glycerol does not induce gene mutations in bacterial strains, chromosomal effects in mammalian cells or primary DNA damage in vitro." ...

"The weight of evidence indicates that glycerol is of low toxicity when ingested, inhaled or in contact with the skin." ...

"No further work is indicated, because of the low hazard potential of this substance."<sup>5</sup>



## **“The liquid contains 18% nicotine.”**

This is, quite simply, a miscalculation.

Cartridges and e-liquid for electronic cigarettes often contain 18mg/ml, but this is **1.8%, not 18%**.

Due to a ‘quirk’ in the *système internationale* (SI) for weights and measures, the measurement of a litre does not ‘fit’ into this system. This means that it is quite common for mistakes to occur, as the size of the units is not the same, despite having the same prefix (milli, or thousandth).

One millilitre is a cubic centimetre (or cm<sup>3</sup>, which equates to one millionth of a cubic meter) with a mass of around 1g (the exact value depends on the liquid in question). This means that a value in mg/ml is roughly equivalent to milligrams per gram, rather than the milligrams per milligram that a quick glance would lead you to assume.

This means that for a solution to contain 18% nicotine, it would have to have **180mg/ml**.

## **“But nicotine is highly toxic.”**

For a child, nicotine is toxic at a level of 10mg in total.<sup>6</sup>

For an adult non-smoker/non-nicotine addict, nicotine is toxic at a level of 30-60mg (0.5-1mg/kg).<sup>7</sup>

This is precisely why ECITA has been working with its members across Europe to ensure that the correct hazard symbols, and risk and safety phrases are printed on the labels, and that electronic cigarette liquid be supplied in child-resistant containers, in accordance with the EU General Product Safety Regulations *et al*.



## “What about passive ‘vaping’?”

There is no risk from inhaling the vapour directly, so there can be no concern about inhaling it as side-stream vapour.

“Permissible Exposure Limit (PEL)

The current OSHA (Occupational Safety and Health Administration, USA) standard for nicotine is 0.5 milligram of nicotine per cubic meter of air ( $\text{mg}/\text{m}^3$ ) averaged over an eight-hour work shift.”<sup>8</sup> The EU PEL is the same.<sup>9</sup>

(These studies are still relevant, despite their dates. Consider the fact that the EU PEL was copyrighted as “IPCES, CEC 2005”. These studies have not been repeated or updated because the chemical profiles of the compounds under consideration have not changed in the intervening years.)

If we assume, for the sake of argument, that none of the nicotine vapourised is absorbed on inhalation, then to fill a  $10\text{m}^3$  room (not a very big room at all!), you would need to vapourise 5mg of nicotine all at once. Any PEL has to be at a level at which there is no observable effect on anyone or anything, otherwise it would not be deemed a ‘permissible exposure limit’.

Nicotine oxidises readily, so to exceed the PEL, you would have to **continuously** vapourise 5mg of nicotine, and maintain that level in order for the PEL to be exceeded. This is simply not possible with existing ecig technology, nor is it desirable, so such technology is unlikely to be forthcoming.

## “What about the risk of overdose?”

Vaping is broadly similar to smoking, and offers the same flexibility as to how much consumers consume.

The habit of vaping directly replaces the habit of smoking, and includes the natural (and often subconscious) self-regulation of nicotine intake: as a smoker reaches the limit of their own individual nicotine tolerance level,



they are naturally induced to slow down or stop for a while before smoking again. Vaping works in precisely the same way.

Let us consider a 'worst case scenario':

The highest level of eliquid used by most vapers is 36mg/ml or 3.6%. (This is in the UK, where the highest level allowed is 7.5% (or 75mg/ml), according to the UK Poisons Act. Other EU countries such as Greece and France have a lower level of 2% (20mg/ml).) A 'heavy user' might consume 3ml over the course of a day. This means that this individual will have consumed a total of 108mg over the course of the day. If we assume a 'day' to mean 18 hours, this would be equal to 6mg per hour, or 6.75mg/hour over a 16 hour day, assuming 8 hours for sleep.)

The indications for the Nicorette Inhaler suggest that the maximum recommended dose of nicotine over a 24 hour period is 160mg:

**"NICORETTE® Inhaler  
Nicotine 10 mg"**

"For best results 6-12 cartridges should be used per day"<sup>10</sup>

with Pfizer suggesting:

"a maximum of 16 cartridges daily"<sup>11</sup>

Nicotine has an elimination 'half life' of 100-150 minutes, according to 6 studies analysed and referenced in 'Pharmacological Reviews'.<sup>12</sup>

This means that nicotine is rapidly eliminated from the body with concentration dropping by half every 2 hours (approximately).



## **“Electronic cigarettes contain cancer causing chemicals.”**

Yes, they do – at comparable levels (i.e. not dangerous levels) to those found in existing NRT products.

The levels of TSNAs (Tobacco-Specific Nitrosamines) detected by the FDA were too low to allow them to be quantified (i.e. they were too low for the actual amount present to be identified), but it was less than 0.0000021%. Indeed, the TSNAs detected by the FDA were **below** the level set for the Nicotrol Inhaler (which is approved for use worldwide). In its press release, the FDA made much of the fact that the Nicotrol Inhaler was used as a control. However, the level of TSNAs in the inhaler was not actually tested, making it of very limited use as a control for this test.<sup>13</sup>

This omission led the manufacturer of the product tested to commission an independent third-party analysis of the FDA’s testing procedure for this so-called ‘scientific research’. This analysis – by a well-established company with accredited expertise – was very critical of both the methods used and the conclusions drawn, particularly with regard to TSNA levels.<sup>14</sup>

Indeed, a number of studies<sup>15</sup> have found that the levels in medicinal NRT products and electronic cigarettes are comparable, yet no one has seen fit to alert the media so that the public can be warned about the ‘dangers’ of using NRT. According to public health physician, and respected international expert, Professor Dr Michael Siegel, MPH, MD:

“Had the FDA acted in an objective manner – it would have had to also urge the public not to use nicotine replacement products, since they have carcinogens in them.”<sup>16</sup>

The comparable levels of TSNAs are not surprising – both NRT and electronic cigarettes use pharmaceutical grade nicotine (being the highest grade available in quantity) sourced from tobacco plants. It is hard to see it as anything other than deliberate misinformation that the FDA chose not to include this vitally important fact in its press release.

In a study carried out in 2010, Professor Dr Siegel from Boston University argued that what we do know of e-cigarettes is already enough to conclude that they are far safer than real cigarettes. He says: “The truth is we know a lot more about what is in electronic cigarettes than in

Electronic  
Cigarette  
Industry  
Trade  
Association



The industry standard of excellence

regular cigarettes. Our review shows that carcinogen levels in electronic cigarettes are up to 1,000 times lower than in tobacco cigarettes."<sup>17</sup>

There has been a history of poorly-researched and highly sensationalist articles published, the majority of which amount to little more than scaremongering. It is well within the ability of the electronic cigarette industry (and indeed the consumers of these products) to locate and understand the pre-existing research.

It does not reflect well on journalists - let alone public health professionals - that they are seemingly unable to perform (even very basic) research before expressing an opinion.

It is my fervent hope that we shall not see any further publications from journalists or public health experts until the full import of the scientific data provided herein has been properly considered and understood.

Yours faithfully,

**Katherine Devlin**

President  
ECITA (EU) Ltd



## References:

<sup>1</sup><http://www.fda.gov/Food/FoodIngredientsPackaging/GenerallyRecognizeDasSafeGRAS/GRASSubstancesSCOGSDatabase/ucm261045.htm>

2

[http://www.epa.gov/oppsrrd1/reregistration/REDs/propylene\\_glycol\\_red.pdf](http://www.epa.gov/oppsrrd1/reregistration/REDs/propylene_glycol_red.pdf)

<sup>3</sup> <http://www.inchem.org/documents/sids/sids/57-55-6.pdf>

Inchem is part of the International Program on Chemical Safety, a co-operative effort between international chemical safety and occupational health bodies.

<sup>4</sup><http://www.fda.gov/Food/FoodIngredientsPackaging/GenerallyRecognizeDasSafeGRAS/GRASSubstancesSCOGSDatabase/ucm260418.htm>

<sup>5</sup> <http://www.inchem.org/documents/sids/sids/56815.pdf>

<sup>6</sup><http://www.inchem.org/documents/pims/chemical/nicotine.htm#DivisionTitle:7.2.1.2%20Children>

<sup>7</sup><http://www.inchem.org/documents/pims/chemical/nicotine.htm#DivisionTitle:7.2.1.1%20Adults>

<sup>8</sup> <http://www.cdc.gov/niosh/docs/81-123/pdfs/0446.pdf>

<sup>9</sup> <http://www.inchem.org/documents/icsc/icsc/eics0519.htm>

<sup>10</sup> <http://www.medsafe.govt.nz/profs/datasheet/n/Nicoretteinh10mg.pdf>

<sup>11</sup> [http://www.pfizer.com/files/products/uspi\\_nicotrol\\_inhaler.pdf](http://www.pfizer.com/files/products/uspi_nicotrol_inhaler.pdf)

<sup>12</sup> <http://pharmrev.aspetjournals.org/content/57/1/79/T2.expansion.html>

13

<http://www.fda.gov/downloads/Drugs/ScienceResearch/UCM173250.pdf>

<sup>14</sup> [http://casaa.org/uploads/Exponent\\_Response-to-the-FDA-Summary.pdf](http://casaa.org/uploads/Exponent_Response-to-the-FDA-Summary.pdf)

<sup>15</sup> <http://tobaccoanalysis.blogspot.co.uk/2009/07/comparison.html>

Electronic  
Cigarette  
Industry  
Trade  
Association



The industry standard of excellence

<sup>16</sup> <http://tobaccoanalysis.blogspot.co.uk/2009/07/disingenuousness-of-fdas-press.html>

<sup>17</sup> <http://sph.bu.edu/insider/Recent-News/evidence-suggests-e-cigs-safer-than-cigarettes-researcher-claims.html>