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**Global Forum  
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## POSTERS ABSTRACTS

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## **Emerging Needs for Regulation of E-liquid Home Industry To Ensure Safety Among E-cigarette Users in Indonesia**

**Authors:** Amaliya, Amaliya (1); Syawqie, Achmad (2)

Poster presentation

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**Keywords:** Key words : regulation, safety, home-industry, e-liquid

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Awareness and current use of e-cigarettes is increasing in Indonesia, despite the controversy about the possible individual and public health impact of e-cigarettes. There are several conditions relating to the needs of regulation and monitor such as increased home-made e-liquid manufacturing in several home industries.

**Methods :**

Content analysis of e-cigarettes web forum Indovapor was conducted to identify the needs of regulation and safety of e-liquid use.

**Results :**

This forum is the Indonesia first personal vaporizer forum followed by 121,171 members, with 29.330 topics and 226.135 posts from 2012 to February 2017.

The vast majority of discussions in forum was about the safety of e-cigarettes, how to use e-cigarettes for 'newbie' and where to find the devices and the liquid, as well as how to fix broken devices or to modify accessories. Among topics discussed, the questions about safety of home-made e-liquids sold by home-industries in Indonesia and do-it-yourself (DIY) e-liquids were frequently posted by members (48.355 posts). Complains about the use of home-made e-liquids available in Indonesia and DIY e-liquids were dry throat, difficulty in breathing, chest pain and headaches. Affordable price was the reason to purchase them, despite the lack of content labellings.

Taking into account the enormous increase of home industries in e-liquid manufacturing in Indonesia and several adverse effects of home-made and DIY e-liquids reported by users, Indonesia is in need of regulation and monitor to ensure the safety of e-cigarettes using, particularly to control the content of e-liquid and to reduce harmful effects of e-cigarettes.

## **Clove Cigarette Smoking Habits and Periodontal Bone Loss In A Rural Population in Indonesia**

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Poster presentation

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**Keywords:** clove cigarette, periodontal bone loss, harm reduction.

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One of the most important lifestyle factors related to the development and severity of periodontal disease is smoking. The effect of smoking in the progression of periodontitis is well documented and there is strong evidence demonstrating that tobacco smoking habit is a very important risk factor contributing to a higher prevalence and severity of periodontitis in adults. Progressive periodontitis may eventually lead to tooth loss, which often reduces the quality of life, chewing problems and decreased masticatory function, especially if many teeth are involved.

The aim of this study was to assess in a population deprived from regular dental care the relationship between alveolar bone loss (ABL) and smoking. The study population consisted of subjects from the Purbasari tea estate on West Java, Indonesia. A full set of dental radiographs was obtained of each subject and amount of ABL was assessed. In addition, the following parameters were evaluated : smoking and anthropometrics (Body Mass Index).

The results showed in this population, 45.9 % were active clove cigarettes smokers. Post hoc analysis regarding the relationship between Body Mass Index (BMI) and ABL showed that BMI was inversely correlated with smoking status and lower decile of this population had significantly more ABL than the remaining part of the population.

Smoking cessation or harm reduction must be provided and encouraged by the government or the authorities in Indonesia as an alternative for conventional cigarettes, in term of reducing harm caused by tobacco products.

## **Intention to Use the Tobacco Heating System, Associated with Variants of a Potential Product Brochure**

**Authors:** Beacher, Felix (1); Colman, Sam (2); Magnani, Pierpaolo (1); Kallischnigg, Gerd (3); Ramazzotti, Antonio (1)

Poster presentation

**Organisations:** 1: Philip Morris International Management S.A., Market Research and Innovation, Lausanne, Switzerland; 2: Covance Market Access Services, Inc. San Diego, California, USA; 3: ARGUS – Statistics and Information Systems in Environment and Public Health, Berlin, Germany

**Keywords:** Marketing, Public Health

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The Tobacco Heating System (THS) is a candidate Modified Risk Tobacco Product (MRTP). A premarket assessment of an MRTP must consider projected patterns of use, associated with marketing material.

We present data on Intention to Use THS from three comparable US studies assessing different potential versions of a THS Brochure, containing either a health warning developed by PMI or the US Surgeon General's warnings. Intention to Use was assessed by asking "...how likely or unlikely are you to use IQOS regularly?" "Positive Intention to Use THS" was operationalized as the sum of %Very Likely and %Definitely responses.

Each study assessed 1. Smokers with no Intention to Quit CC (S-NITQ), 2. Smokers with the Intention to Quit CC (S-ITQ), 3. Former Smokers (FS), 4. Never Smokers (NS) and 5. Never Smokers from the legal smoking age to 25 years (LA-25 NS).

The Study 1 Brochure (n=943) had a claim on reduced risks of tobacco-related diseases from switching from cigarettes to THS. The Study 2 Brochure (n=933) had a claim on "less risk of harm" from switching from cigarettes to THS. The Study 3 Brochure (n=958) had a claim on reduced exposure to harmful and potentially harmful chemicals from switching from cigarettes to THS.

Across the studies, Intention to Use THS was substantial within S-NITQ, S-ITQ and low or very low within FS, NS and LA-25 NS. The potential THS Brochures were associated with satisfactory profiles in terms of Intention to Use, consistent with a positive impact on public health.

## **Perceived Health Risk of the Tobacco Heating System and Comparators,**

**Authors:** Beacher, Felix (1); Colman, Sam (2); Magnani, Pierpaolo (1); Kallischnigg, Gerd (3); Ramazzotti, Antonio (1)

Poster presentation

**Organisations:** 1: Philip Morris International Management S.A., Market Research and Innovation, Lausanne, Switzerland; 2: Covance Market Access Services, Inc. San Diego, California, USA; 3: ARGUS – Statistics and Information Systems in Environment and Public Health, Berlin, Germany

### **Keywords:**

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The Tobacco Heating System (THS) is a candidate Modified Risk Tobacco Product (MRTP). A premarket assessment of an MRTP must consider risk perceptions associated with marketing material, because risk perceptions could affect uptake.

We present data on Perceived Health Risk from three US studies assessing different potential versions of a THS Brochure, including either a health warning developed by PMI or the US Surgeon General's warnings.

Perceived Health Risk was assessed for THS and comparators (conventional cigarettes (CC), nicotine replacement therapy products (NRTs), E-cigarettes and Cessation) within:

1. Smokers with no Intention to Quit CC
2. Smokers with the Intention to Quit CC
3. Former Smokers
4. Never Smokers
5. Never Smokers from the legal smoking age to 25 years

The Study 1 Brochure (n=944) had a claim on reduced risks of tobacco-related diseases from switching from cigarettes to THS. The Study 2 Brochure (n=934) had a claim on "less risk of harm" from switching from cigarettes to THS. The Study 3 Brochure (n=961) had a claim on reduced exposure to harmful and potentially harmful chemicals from switching from cigarettes to THS.

Across the studies, Perceived Health Risk for THS tended to be lower than for CC and higher than for the lowest comparator (either smoking Cessation or NRTs), within the different smoking groups.

The potential versions of the THS Brochure were associated with a consistent overall pattern of Perceived Health Risk, i.e. whether the claims were on reduced disease risk/ harm or on reduced exposure to HPHCs.

## **Nicotine concentrations in the mainstream and sidestream smoke of different tobacco products, in accordance to the real smoking topography**

**Authors:** Bebenek, Patryk

Poster presentation

**Organisations:** Medical University of Silesia, Poland

### **Keywords:**

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**Significance:** Despite a significant decrease in the prevalence of cigarette smoking which has been observed in the last years, the annual cigar consumption in the United States had incrementally increased over the past decade. From 2000 to 2011 cigars consumption increased by 221%, parallel to the decrease of cigarettes sales. Currently, cigars are the second most popular type of tobacco products available on the American market. This situation is shaped by a couple of reasons. In 2009 the US Food and Drug Administration (FDA) prohibited cigarettes with flavors like fruit, candy and chocolate, with the exception of menthol. However, these regulations do not occur to cigars. Flavors can mask the natural taste and harshness of tobacco making flavored products easier to use and increasing their appeal, especially among young people. Significant increase in cigars consumption in recent years is also associated with common misconception that cigars are less harmful than cigarettes and with the differences in the taxation of those tobacco products (the taxes imposed on cigarettes are higher than taxes imposed on cigars).

**Aim of study:** The aim of this study was to compare the concentrations of nicotine in the mainstream smoke (MS) and side stream smoke (SS) of different tobacco products, burned according to the real smoking topography.

**Methods:** 15 most popular tobacco brands available on the US market were used for the research. Tobacco smoke was generated according to the real smoking topographies using Palaczbot. Samples from MS were collected on the Cambridge glass filters with a diameter of 44 mm, whereas from SS on the same filters, yet with a diameter of 92 mm. Nicotine concentration was marked using the gas chromatography technique.

**Results:** Regardless of the tobacco smoke, nicotine was found in all tested products. In MS the mean concentration of nicotine for cigarillos was: 5,03 mg  $\pm$  1,24 mg, for little cigars: 1,84 mg  $\pm$  0,6 mg, and for cigarettes: 1,62 mg  $\pm$  0,25 mg. In SS the mean concentration of nicotine for cigarillos was: 2,98 mg  $\pm$  1,51 mg, for little cigars: 1,27 mg  $\pm$  0,27 mg, and for cigarettes: 1,87 mg  $\pm$  0,23 mg. The mean nicotine content in the MS of cigarillos was up to 298% higher than the nicotine content of cigarettes. In the case of the SS the mean nicotine concentration of cigarillos was up to 216% higher than the nicotine content of little cigars, and up to 159% higher in comparison to nicotine concentration in cigarettes.

**Conclusion:** Nicotine concentrations were significantly different between cigarettes and cigarillos, both for the MS and the SS. In MS of cigarettes and small cigars nicotine content was very similar and in most cases no statistically significant differences were found. The highest mean concentration of nicotine was found in MS of cigarillos (5,03 mg  $\pm$  1,24 mg), and the lowest mean concentration of this substance was measured in SS of little cigars (1,27 mg  $\pm$  0,27 mg). The content of nicotine in SS and MS is diversified according to the type of tobacco product used. Exposure to nicotine by passive and active smokers varies considerably, depending on the type of tobacco product.

## **A new way of "tobacco smoking" - the popularity of heat not burn devices in Poland.**

**Authors:** Bebenek, Patryk

Poster presentation

**Organisations:** Medical University of Silesia, Poland

### **Keywords:**

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**Significance:** With the growing popularity of e-cigarettes, new heat not burn products have appeared on the market. That group of devices include herbal vaporizers, which were built to heat tobacco and other herbs with the use of conduction or convection, without burning the material inside them. Vaporizers, especially their medical models can be used for drug delivery and aromatherapy. Some users also benefit from vaporizers to inhalation of marijuana. As e-cigarettes are currently well examine in accordance to toxicity of their vapour, herbal vaporizers are still not researched for their toxicity. Because of different types of this products it is important to find the method to identify the most popular of them to be able to verified and measured their toxicity.

**Aim of study:** The aim of the study was to examine the availability on the Internet of herbal vaporizers with exclusion of e-cigarettes in Poland.

**Methods:** To examine the most popular heat not burn products in Polish market, Google browser and auction website have been used. This research were made twice in 2016. First, from February to April, and second from July to August. Research were done in two stages. In the first one Google browser have been used to identify brands and models of heat not burn products available in Polish market. To achieve this goal the polish word "waporyzer" (Eng. Vaporizer) have been used in Google. Then 60 first records have been used to identified all brands and models available in Poland, without e-cigarettes brands and models. In the next stage all found brands and models were divided into two groups. First – portable vaporizers, and second stationary ones. In the final stage, number of offers in Allegro – the most popular polish auction website and Google browser was used to compare the popularity of each model. That allow us to rank the herbal vaporizers due to their popularity.

**Results:** In the first stage 89 models including 58 portable and 31 stationary have been identified. Due to the low accuracy of the records obtained from Google browser, in this study we used results obtained from Allegro website. Records from Google were used only to identify which models and brands are available in Poland. The most popular portable models were (number of offers in Allegro; number of records in Google): Vaporizer AGO, company: Ago Vapor Co. (656; 44338); Vaporizer Titan HEBE, different companies (274; 34817); Storm Vaporizer Pen, no data about company (66; 10424). In case of stationary devices the most popular were (number of offers in Allegro; number of records in Google): Volcano Plenty, company: Storz & Bikel (31; 10698); Volcano Digit Solid Valve, company: Storz & Bikel (28; 4360); Volcano Digit Easy Valve, company: Storz & Bikel (25; 4287).

**Conclusion:** Portable vaporizers are more popular than stationary ones. The number of records from the Google browser does not reflect the popularity of herbal vaporizers in Poland. This method allow us to choose the most popular devices on the market. These results will enable us to provide the toxicological analysis of this product group.

## Using a population model to assess the impact of “dual use” of e-cigarettes with conventional cigarettes

**Authors:** Camacho, Oscar M (1); Murphy, James (2); Proctor, Christopher (3); Hill, Andrew (4)

Poster presentation

**Organisations:** 1: British American Tobacco, United Kingdom; 2: British American Tobacco, United Kingdom; 3: British American Tobacco, United Kingdom; 4: Ventana Systems UK Ltd, Alexandra House, St John Street, Salisbury, SP1 2SB, UK

### Keywords:

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In 2012 draft guidance about MRTP applications, the US FDA encouraged using mathematical models to assess the impact of introducing novel products on the market. Public health is concerned about potential impact of “dual use” of e-cigarettes alongside conventional cigarettes. We used population modelling to investigate what parameters related to dual use could have the biggest impact in terms of population health.

We developed a predictive model looking at a number of scenarios over a 50-year period. In this model, the baseline scenario does not have e-cigarettes on the market, and an alternative scenario has both cigarettes and e-cigarettes available. The model takes account of how consumers use products and uses the past to predict what could happen in the future. This initial analysis shows that smoking prevalence falls from 12.4% of the overall population to 9.7% (including dual users) when e-cigarettes are available (see doi: 10.1016/j.yrtph.2017.03.012).

In that “reference scenario”, dual users are treated the same as smokers (i.e. no change in relative risk with respect to smoking). To look specifically at the impact of dual use, we modified certain parameters (e.g. proportion of dual users, rates of relapse to solus smoking). This created some alternative scenarios for comparison.

Results from this sensitivity analysis suggest how important each parameters is with respect to dual use, and that any potential benefit of reduced cigarette consumption by dual users may be lost if e-cigarette use is not sustained (i.e. it becomes critically important to prevent relapse to exclusive smoking).

## **Characterising novel tobacco heating products – a 5-step approach to looking at aerosol formation by heating**

**Authors:** Cooney, Sarah Elizabeth; Foster, Mark; Nichol, James; Liu, Chuan; McAdam, Kevin; Murphy, James; Proctor, Christopher

Poster presentation

**Organisations:** British American Tobacco, United Kingdom

### **Keywords:**

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Cigarette smoking causes many diseases including cardiovascular disease, lung disease and cancer. Cigarette smoke contains >6500 chemical components, with some of the most risky toxicants arising from combustion. So the use of novel tobacco and nicotine products with much lower levels of toxicants compared to cigarettes holds great potential for reducing the harms associated with tobacco use.

Tobacco Heating Products (THPs) heat rather than burn tobacco, and operate at significantly lower temperatures, so produce fewer toxicants and could be significantly reduced risk compared to cigarettes.

Although various THPs are commercially available, which differ in heating mechanism and temperature, there isn't a standard way to assess whether it is mainly heating tobacco to form aerosol. We have developed a 5-step approach to comprehensively assess this:

Step 1 – Conduct thermogravimetric analysis (TGA) of the tobacco material in its final “consumable” form, allowing analysis of physical and chemical changes of the tobacco as it is heated; Step 2 – Using a fine thermocouple inserted into the tobacco during THP operation, measure the maximum temperature the tobacco is heated to (and duration); Step 3 – Analyse levels of combustion markers in the aerosol; Step 4 – Quantify emissions of a range of other cigarette smoke toxicants that are linked to known low-temperature decomposition of main tobacco constituents; Step 5 – Examine the physical integrity of the tobacco consumable rod after it has been heated in the device, to assess the extent of any degradation.

We use this 5-step approach with gloTM and show that the inhalable aerosol from this THP is generated through thermal evaporation and distillation.

## **Patterns of e-cigarette use and biochemically-verified smoking status of a random sample of vapesshops customers in Greece**

**Authors:** Diamantopoulou, Eleni (1); Barbouni, Anastasia (1); Farsalinos, Konstantinos (2,3)

Poster presentation

**Organisations:** 1: National School of Public Health, Athens, Greece; 2: Onassis Cardiac Surgery Center, Kallithea, Greece; 3: University of Patras, Rio, Greece

**Keywords:** e-cigarettes, smoking, nicotine, carbon monoxide

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**Purpose.** To understand the public health impact of e-cigarette use it is important to determine the smoking status of vapers and how it changes after initiation of e-cigarette use. The purpose of this study was to evaluate the biochemically-verified smoking status and patterns of e-cigarette use among customers of a random sample of vapesshops in the greatest area of Athens in Greece.

**Design.** From a list of 135 vapesshops in Athens, we randomly selected 14 vapesshops for the study. Shops were visited on random days (from Monday to Friday) and time (morning or afternoon hours). The inclusion criteria for participation was that the customer was buying products for own use and was willing to participate to the study.

**Results.** We report the preliminary results on 290 participants. They were aged 34 (IQR: 27-45) years and 30.0% were females. They were using e-cigarettes for a median of 8 (IQR: 2-18) months. The vast majority (90.7%) reported being daily smokers before e-cigarette use initiation, while 0.7% reported never smoking. Daily use of e-cigarettes was reported by 81.7%. Most prevalent reasons for using e-cigarettes were to quit or reduce smoking (88.3%), because they are cheaper than tobacco cigarettes (66.9%) and to reduce environmental exposure of family members to cigarette smoke (61.4%). Biochemically verified smoking cessation (eCO<sub>2</sub><10ppm) was detected in 81.0% of participants.

**Conclusions.** Almost all e-cigarette users, customers of a random sample of vapesshops in Athens, reported being past daily smokers and the majority were successful in quitting smoking.

## **BIOMARKER OF EXPOSURE REDUCTIONS UPON SWITCHING FROM CIGARETTES TO A CARBON HEATED TOBACCO PRODUCT**

**Authors:** Donelli, Andrea; Tran, Cam Tuan; Haziza, Christelle; Ancerewicz, Jacek; de la Bourdonnaye, Guillaume; Weitkunat, Rolf; Lüdicke, Frank

Poster presentation

**Organisations:** Philip Morris Products SA, Switzerland

**Keywords:** Reduced Risk Product, Modified Risk Tobacco Product, Carbon Heated Tobacco Product, Smoking, Smoking abstinence, Harmful and potentially harmful constituents, Biomarkers of exposure, Randomized Controlled Trial

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Tobacco harm reduction, increasingly embraced by the public health community, becomes feasible as new nicotine containing products are becoming available. The FDA has issued a modified risk tobacco product (MRTTP) guideline for products with the potential to reduce the risk of tobacco-related diseases compared to commercially marketed tobacco products. Heating instead of burning tobacco clearly falls into this category. The Carbon Heated Tobacco Product (CHTP) is based on the principle of heating tobacco and is currently being assessed for its potential to reduce harm compared to smoking cigarettes.

This randomized study over 5 day exposure in confinement aimed at demonstrating reduced exposure by measuring 15 different harmful and potentially harmful constituents (HPHCs) selected among those usually present in cigarette smoke; furthermore the load of mutagens in urine, and CYP1A2 activity were assessed. Ad libitum CHTP use (n=41) was compared to continued cigarette (CC) smoking (n=39).

In subjects who switched to CHTP, biomarkers of exposure levels were reduced by a minimum of 50% (Total 1-OHP) to a maximum of 95% (1-NA) on day 5 compared to baseline. Compared to CC use, day 5 levels were reduced by 55% (Total 1-OHP) to 97% (1-NA) with CHTP. CHTP Ames reversion rates and CYP1A2 activity were reduced by 70% and 22%, respectively, from baseline. CHTP nicotine uptake was close to that from CC.

The results indicate that CHTP broadly reduces exposure to the measured HPHCs.

## **METHODOLOGICAL CONSIDERATIONS FOR IDENTIFYING LIKELY USERS OF E-VAPOR PRODUCTS FOR AMBULATORY CLINICAL STUDIES**

**Authors:** Edmiston, Jeffrey; Liang, Qiwei; Liu, Jianmin; Zhao, Yuxi; Sarkar, Mohamadi

Poster presentation

**Organisations:** Altria Client Services LLC, United States of America

**Keywords:** e-vapor, smokers, product trial, likely to use, biomarkers of exposure

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The purpose of this study was to assess the utility of pre-study product trial and a purchase interest questionnaire in identifying likely users of various e-vapor products [EVP]. . Subjects (adult smokers, > 10 cigarettes per day [CPD]) participated in a 4-day product trial period of 4 EVPs. Subjects (n=226) were randomized into a 5-group study: Control Group (CG, n=25. Continued smoking), Test Groups TG1 (n= 51, P15 ad lib use), TG2 (n=52, instructed to use P15 > 1 e-vapor cartridges per day, eCPD or > 2 if CPD >18), TG3 (n=49, P25 ad lib use) and TG4 (n=49, instructed to use P25 > 1 eCPD). Subjects in the TGs were allowed to smoke cigarettes ad libitum. Biomarkers of exposure (BOEs: blood COHb, urine NNAL) were collected at baseline and end of study (21 days). On average, by the end of the study, subjects used 0.8 [TG1], 1.3 [TG2], 0.7 [TG3] and 1.1 [TG4] eCPD and their CPD change from baseline [TG1: -36.1%, TG2: -35.8%, TG3: -28.9%, TG4: -32.2%] was significantly different compared to the CG [+0.8%]. Changes in BOEs were not statistically significant between TGs and CG. Overall, providing instructions to use a minimum number of cartridges appears to have only a modest impact on number of eCPD (ad libitum vs. instructed to use eCPD: 0.8 vs 1.3 for P15 and 0.7 vs. 1.1 for P25). Our results suggest that it might be difficult to identify likely users of a test EVP based on limited product use.

## **'E-cigarette friendly' stop smoking services: The opportunities and barriers to incorporating e-cigarettes into health-care systems**

**Authors:** Farrimond, Hannah Rachel (1); Abraham, Charles (2)

Poster presentation

**Organisations:** 1: EGENIS (Exeter Centre for the Study of the Life Sciences), University of Exeter, United Kingdom; 2: University of Exeter Medical School

**Keywords:** e-cigarettes, stop smoking services, qualitative, policy, training

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UK public health leadership has taken a distinctive international stance by identifying the potential public health benefit of e-cigarettes for smoking cessation. This includes the development of a ground-breaking set of guidelines for developing 'e-cigarette friendly' stop smoking services (McEwan & McRobbie, 2016). This exploratory study, 'Reframing stop smoking services in response to e-cigarette use' is funded by Cancer Research UK to examine the implications for service users and providers. A series of qualitative case studies are currently being conducted in the South-West of England, interviewing stop service managers, advisors, commissioners and clients, as well as ethnographic research in vaping shops. Preliminary findings are reported here. Although some stop smoking services in this area are keen to label themselves 'e-cigarette friendly', there is no consensus over what this means. For some services, this means active engagement; reaching out to local vaping shops, utilising support from 'expert' vapers to assist others, or offering e-cigarettes through a voucher scheme to disadvantaged groups. For others, an 'e-cigarette friendly' service is primarily about positive attitudes and information, but not necessarily engaging beyond that. Concerns about the ongoing scientific controversy, particularly media claims, undermine staff confidence in supporting e-cigarette use. Although the context of UK stop smoking services is one of austerity and cuts to services, there are opportunities for active engagement with e-cigarettes to achieve overall cessation goals. For this to occur, training and policy consistency is needed.

## **Assessment of exposure to smoke toxicants in users of the gloTM tobacco heating product**

**Authors:** Fearon, Ian Michael

Poster presentation

**Organisations:** British American Tobacco, United Kingdom

**Keywords:**

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Cigarette smoking is a cause of many human diseases. The use of novel tobacco and nicotine products with reduced yields of toxicants compared to cigarettes, such as tobacco heating products, and e-cigarettes, holds great potential for reducing the harms associated with smoking. In the UK, several public health agencies have advocated a potential role for novel nicotine products in tobacco harm reduction, as they deliver nicotine in a cleaner form than cigarette smoke. Public Health England stated that “The current best estimate is that e-cigarettes are around 95% less harmful than smoking”. In support of this, the Royal College of Physicians has urged public health to “Promote e-cigarettes widely as a substitute for smoking”.

The gloTM tobacco heating product (THP) is a novel device which heats tobacco to a temperature of around 240°C. Compared to those in cigarette smoke, machine yields of a number of cigarette smoke toxicants are reduced in the emissions from gloTM when used on a machine. To determine whether these reduced emissions lead to reduced exposure in users of gloTM, we conducted a study in Japan in which we examined urinary biomarkers of exposure to cigarette smoke toxicants in volunteers who switched to using the gloTM THP for 5 days. This study was run according to ICH-GCP, and was registered on clinical study registries (UMIN000024988 and ISRCTN14301360). We will present preliminary data from this study on biomarkers of exposure as well as on nicotine pharmacokinetics, in users of gloTM compared to smokers of a combustible cigarette.

## **Health Risks Associated with the Use of Smokeless Tobacco Products:**

**Authors:** Fisher, Michael; Tan-Torres, Susan; Sarkar, Mohamadi

Poster presentation

**Organisations:** Altria Client Services LLC, United States of America

**Keywords:** smokeless tobacco, mortality hazard ratios, compared to smokers

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Available literature suggests US smokeless tobacco products (SLT) are less hazardous than cigarettes. We compare the health risks of SLT to cigarettes using mortality data linked to respondents from two U.S. national public health surveys. We derived Cox proportional hazard ratios (HR) for mortality outcomes among SLT users and cigarette smokers based on data from the National Death Index (NDI) records of survey respondents to the National Health Interview Survey (NHIS) and the Tobacco Use Supplement to the Current Population Survey. These data sets each include over 3,000 current SLT users and over 150,000 total respondents with mortality follow-up through 2011. We did not detect excess HR among current SLT users compared to never SLT users in either data set for all causes, all cancers, lung cancer, digestive organ cancer (including colorectal, pancreatic and liver cancer), genitourinary system cancers, diseases of the circulatory system (including ischemic heart disease and cerebrovascular disease), or diseases of the respiratory system (including chronic lower respiratory diseases and influenza/pneumonia). We also include analyses of dual users and former cigarette smokers who currently use SLT and find no statistically significant differences in HR compared to exclusive cigarette smokers and former cigarette smokers who were completely abstinent, respectively. These data support that SLT use is associated with far lower mortality hazards than cigarette smoking. This study is one of the most comprehensive assessments of mortality hazards associated with SLT use. Overall, this analysis supports current literature indicating SLT use is less hazardous compared to cigarette smoking.

# "Are electronic cigarettes an effective aid to smoking cessation or reduction among vulnerable groups? A systematic review and narrative synthesis of quantitative and qualitative evidence"

**Authors:** Gentry, Sarah

Poster presentation

**Organisations:** NIHR Academic Clinical Fellow in Public Health Medicine University of East Anglia and Suffolk County Council

## **Keywords:**

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**Background:** Smoking prevalence remains high in some vulnerable groups, including those who misuse substances, have a mental illness, are homeless or are involved with the criminal justice system. E-cigarettes use is growing and may support smoking cessation/reduction.

**Aim:** To systematically review evidence for the effectiveness of e-cigarettes for smoking cessation/reduction among vulnerable groups.

**Methods:** Systematic review of quantitative and qualitative data and narrative synthesis. Databases searched were MEDLINE, EMBASE, PsychINFO, CINAHL, ASSIA, ProQuest Dissertations and Theses and Open Grey.

**Results:** 2628 records and 46 full texts were screened; 9 studies have been identified for inclusion, with double screening ongoing. Due to low quality of evidence, it is uncertain whether e-cigarettes are effective. A moderate quality study suggested e-cigarettes were as effective as nicotine replacement therapy for cessation. Four studies suggested significant smoking reduction, however three were uncontrolled and all underpowered. A prospective cohort study found no differences between e-cigarette users and non-users. No significant adverse events and minimal side effects were identified. Qualitative thematic synthesis revealed emergent barriers and facilitators associated with each component of the COM-B (capability, opportunity, motivation, behaviour) behaviour change model, including practical barriers; perceptions of effectiveness for cessation/reduction; design features contributing to automatic and reflective motivation; smoking bans facilitating practical opportunity; and social connectedness increasing social opportunity.

**Conclusion:** Further research is needed to identify the most appropriate type of device for practicality and safety, the level of support required in e-cigarette interventions, and to compare e-cigarettes with current best practice smoking cessation support among vulnerable groups.

## **CORESTA E-Vapour Sub-Group Collaborative Study Results**

**Authors:** Gillman, Gene (1); Tayyarah, Rana (2); Morton, Michael (3)

Poster presentation

**Organisations:** 1: Enthalpy Analytical, USA; 2: ITG Brands, USA; 3: Altria Client Services

### **Keywords:**

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In 2015, the CORESTA E-Vapour Sub-Group (EVAP) conducted a collaborative study on the aerosol from electronic, prefilled “cigalike” e-cigarettes. The goal of this study was to determine the repeatability (r) and reproducibility (R) of proposed CORESTA Recommended Methods (CRMs) for the determination of nicotine, propylene glycol, glycerin, and water in aerosol. Aerosol was generated applying the standardized puffing regime given in CORESTA Recommended Method No. 81.

Eighteen laboratories participated in this international study. Each laboratory tested the same set of four e-cigarette products and one liquid control sample. The aerosol yield was highly variable with r values of 29 to 35% and R values of 33% to 57%. However, when the results were normalized for yield, the r and R values were 8% and 10 to 22 % for nicotine, propylene glycol, and glycerin, respectively. Even after normalizing for aerosol yield, however, water gave r and R values of 22 to 29% and 62 to 81%. A control sample was used to test the method independent of the e-cigarette products. The r values for this sample were approximately 5% for nicotine, propylene glycol, and glycerin, and the r value for water was 14%. The R values for the control sample were 15%, 11%, 21%, and 30% for nicotine, propylene glycol, glycerin, and water, respectively. Based on these results, the draft CORESTA Recommended Methods used in this study have been shown to be fit for the intended purpose for the determination of these constituents in aerosol generated from e-cigarettes.

## **How and why do UK parents tolerate their adolescent children's vaping behaviours? A preliminary qualitative exploration**

**Authors:** Greenhill, Richard (1); Dawkins, Dr Lynne (2); Notley, Dr Caitlin (3); Finn, Dr Mark D. (1); Turner, Dr John J. D. (1)

Poster presentation

**Organisations:** 1: University of East London, United Kingdom; 2: London South Bank University, United Kingdom; 3: University of East Anglia, United Kingdom

**Keywords:** Vaping, e-cigarettes, adolescents, parents, qualitative

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Global e-cigarette use continues to become more popular among the adult population, with increased ubiquity of specialist shops on high streets and vapers using their devices in public. Although less is known about adolescent rates of e-cigarette use, a growing body of research suggests that similar trends may be observed, albeit at lower rates. Given the existence of vaping among the adolescent population, very little is known about how vaping behaviours may play out between different family members. Our poster presents preliminary qualitative data about adolescent vaping behaviours in the household that, as far as we are aware, is the first of its kind. Specifically, we present seven accounts from parents that detail the contexts in which they tolerate their adolescent children's vaping behaviours. Far from a homogenous set of reasons, there is considerable variation between accounts. Our data highlights parents' toleration of vaping as: (1) a pre-emptive prevention of smoking; (2) a direct smoking cessation method; (3) a mimicked behaviour from friends/family; and (4) a coping mechanism for self-harm. This preliminary qualitative data indicates that adolescent vaping in the household is a complex social process that involves context-dependent negotiations between parents and their children.

## **"Well, it's certainly nothing that's evidence-based anyway": A qualitative exploration of UK vapers' views towards the TPD.**

**Authors:** Greenhill, Richard; Dawkins, Dr Lynne; Notley, Dr Caitlin; Finn, Dr Mark D.; Turner, Dr John J. D.

Poster presentation

**Organisations:** University of East London, United Kingdom

**Keywords:** TPD, vaping, e-cigarettes, policy, qualitative

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The Tobacco Products Directive (TPD) came into effect in the EU in May 2016. Article 20 of the TPD introduces regulation of e-cigarettes, including restrictions on tank size, nicotine strength and liquid container design. In the UK, retailers and manufacturers have been given one year to 'catch up' with the new regulations. The current paper presents UK vapers' views towards Article 20, based on 10 semi-structured interviews carried out over the time period of implementation of the TPD (i.e. between May 2016 and December 2016). Using a thematic analysis, we identify three themes across the data that summarise vapers' views towards Article 20 as: (1) inhibiting smoking cessation; (2) helping big business; and (3) being unscientific. These themes suggest that this sample of UK vapers have an overwhelmingly negative perception of Article 20, which in turn highlights implicit and explicit mistrust in public health institutions. This has poor implications for how vapers may engage with future research recruitment, public health policy and tobacco/pharmaceutical industry smokeless products. As such, rebuilding trust among the vaping community may be a priority for researchers, policymakers and industry. As a means of addressing this mistrust, we propose participatory approaches that consult vapers on policy campaigns, as well as broader governmental support of vaping small businesses.

## **CORESTA - A global scientific approach**

**Authors:** Guitton, Pierre-Marie

Poster presentation

**Organisations:** CORESTA, France

### **Keywords:**

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CORESTA, the Cooperation Centre for Scientific Research Relative to Tobacco, is a non-profit global association dedicated to scientific tobacco research created in 1956 as a documentation service and gene bank of tobacco cultivars. In the early '70s, CORESTA developed methods related to the analysis of crop protection agent residues in tobacco leaf. It then expanded its activities to analytical methods for tobacco components, consumer products and smoke.

In 2012, considering the emergence of e-cigarettes and the limited knowledge on these products, CORESTA decided to launch a specific working group, with scientists dedicated to applying to e-vapour products the association's expertise in developing robust analytical methods. Participants in this EVAP group are manufacturers and suppliers of this industry, as well as company-owned, independent and government laboratories, from 15 countries worldwide.

Similarly to the development of standards for conventional tobacco products within ISO – which has integrated 37 CORESTA methods and is integrating five more – EVAP experts work together to define and standardize the most reliable way of measuring liquid and aerosol composition. Standardized methods are needed to provide reliable analytical data and ensure product regulations are based on robust science and can be met by all stakeholders.

CORESTA Recommended Method No. 81 (CRM81), published June 2015, is currently being developed by ISO to become the first international vaping machine standard (ISO 20768). Other methods are currently under development. CRM81, as well as five Technical Reports and a Guide are available to the public on the CORESTA website.

## **Health Criteria Values and the Toxicological Implications of eLiquid Ingredients**

**Authors:** Halliday, Jaydene; Denneval, Charline; Chappell, Colin

Poster presentation

**Organisations:** EL-Science, United Kingdom

**Keywords:** HCV, health, toxicology, eLiquid, risk

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The detrimental health effects of the diketones diacetyl and acetyl propionyl are understood within the vaping community, however, the ingredient concentrations of a significant number of other flavour chemicals should be taken into consideration during eLiquid flavour development in order to ensure a product that is as safe as possible for the end consumer. Over 500 common flavour ingredients were toxicologically risk assessed, and health criteria values (HCVs) were established to determine risk to human health, as well as threshold limits below which there is no anticipated concern for human health. Of particular note are hexanedione, another diketone, guaiacol, and phenol, which have low health criteria values/tolerances. Also of importance are chemicals such as citral and raspberry ketone which have significantly lower toxicity and higher tolerances, but are generally found in eLiquids at concentrations that far surpass the acceptable levels. Over 400 eLiquid products from a wide range of manufacturers based in the UK, USA, Europe, Russia, and China were compositionally analysed via GC-MS and HPLC, and the measured concentrations of flavour ingredients of toxicological concern were compared to their established health criteria values. 24% of the tested eLiquids contained ingredients that were at levels above the recommended thresholds. We report here a selection of the findings, with detail on the toxicological implications of recipe inclusion of these ingredients of concern.

## **A protocol to a 6 month-assessment of a new double-tank smart electronic cigarette in 100 smokers**

**Authors:** Harang-Eltz, Marie; Scheck, Alexandre; Abulféda, Julien

Poster presentation

**Organisations:** Enovap, France

**Keywords:** connected, nicotine intake, smoking-cessation

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Background:

The parameters of use of e-cigarettes in real-life situations remain largely unknown. In this study, those patterns will be analysed with a smart connected device that allows to dose and monitor the nicotine intake of users.

This connected e-cigarette device, Enovap®, integrates original functionalities designed to help smokers quit tobacco.

- The “Hit Control”:

This patented technology allows users to adapt the nicotine concentration in the aerosol generated by the device at the touch of a button according to their needs throughout the day.

- The automatic reduction:

An artificial intelligence that learns and anticipates the users’ nicotine needs allows a slow and personalised decrease of the nicotine intake over time. It aims to reinforce smoking cessation by gently weaning users off nicotine.

The connected platform:

A connected app allows access to a community gathering other users and tobacco-cessation specialists for additional behavioural support.

Expected findings:

100 smokers will use the Enovap® device for a period of 6 months. The data collected will allow to better understand:

- The relationship between cigarettes use and nicotine intake with the electronic cigarettes.
- The pattern of nicotine use throughout the day
- Establish the link, if any, between the nicotine vaping pattern of a user and his profile as a smoker
- Establish the impact of the specific functionalities of the Enovap® on smoking cessation

These findings may help to better characterise the use of e-cigarettes in real-world and to inform on the relevance of the Enovap® system for tobacco-cessation purposes.

## **Effect of nicotine on human gingival and periodontal fibroblasts and epithelial cells. A systematic review of the literature.**

**Authors:** Holliday, Richard (1); Campbell, James (2)

Poster presentation

**Organisations:** 1: Newcastle University, United Kingdom; 2: Newcastle Dental Hospital, United Kingdom

**Keywords:** Nicotine, e-cigarettes, periodontal, fibroblasts, cytotoxicity

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**BACKGROUND:** Tobacco smoking is a major risk factor for periodontitis but the specific role of nicotine is not as clear.

**AIM:** To evaluate the in vitro effects of nicotine on human cells of periodontal relevance, specifically: cell viability, cell attachment, cell proliferation and cytokine production.

**METHODS:** MEDLINE, EMBASE and Web of Science were searched (?30/11/2016). Inclusion criteria: primary studies on human gingival or periodontal ligament fibroblasts (GF, PDL) or gingival/oral epithelial cells (GEC/OEC); nicotine exposure was a variable; there was a suitable control; published in English language. Animal studies were excluded. Search was conducted by two independent reviewers. Study details and principal results were tabulated and analysed narratively.

**RESULTS:** Of 293 potentially eligible studies, 39 were included. The mean quality assessment score was 8.2/15. There was high heterogeneity between the studies; however, 17 studies investigated the effect of a 24-hour exposure on fibroblasts (GF/PDL, cells from smokers excluded). A substantial effect on cell viability was noted at nicotine concentrations above 5mM. Investigations on cell attachment, cell proliferation and cytokine production suggested that effects can be seen at lower nicotine concentrations but studies had high heterogeneity and often contradictory results. Review limitations: excluding cotinine and limiting analysis to four domains.

**CONCLUSIONS:** Nicotine, at the levels found in tobacco smokers, NRT users (including e-cigarettes), seems unlikely to be cytotoxic to periodontal cells in vitro. Evidence of effects on cell attachment, cell proliferation and cytokine production was limited and often contradictory. Further high quality, appropriately interpreted, research is required.

## **Case studies highlighting the importance of e-liquid flavour stewardship and risk assessment**

**Authors:** Holton, Samuel; Costigan, Sandra

Poster presentation

**Organisations:** BAT, United Kingdom

### **Keywords:**

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Many in the public health community believe e-cigarettes offer great potential for reducing the public health impact of smoking. Public Health England, an executive body of the UK Department of Health, recently published a report saying that the current expert estimate is that using e-cigarettes is around 95% safer than smoking cigarettes. The Royal College of Physicians have said that the public can be reassured that e-cigarettes are much safer than smoking and should be widely promoted as an alternative to cigarettes.

Although the relative safety of e-cigarettes compared to smoking is increasingly well-recognised, there is still a need for product standards and rigorous screening and risk assessment of the e-liquid ingredients. Furthermore, since vaping entails inhaling an aerosolised e-liquid, there is an equally-important need to risk assess e-cigarette emissions. Both these assessments are required to ensure e-liquid safety and minimise potential for toxicological effects.

We suggest an approach to toxicological risk assessment of flavours that takes into account flavour ingredients and constituents, and the identification, measurement and risk assessment of any potential thermal breakdown/reaction products. In order to highlight the importance of such robust stewardship, we will use three case studies in which specific ingredients were identified as having potential toxicological concerns and excluded from e-liquids. These are the thermal breakdown of citric acid during heating to produce respiratory-sensitising acid anhydrides; cocoa extract, which could act as a respiratory allergen; and acetoin which is a precursor to diacetyl which has the potential to have adverse respiratory effects.

## **Cigalikes versus Tank Systems: Effects on Smoking Reduction, Self-Reported Satisfaction, Craving and Withdrawal Relief at the Early Stage of a Quit Attempt**

**Authors:** Kimber, Catherine Franciane (1); Soar, Kirstie (2); Corcoran, Olivia (3); Dawkins, Lynne E (4)

Poster presentation

**Organisations:** 1: University of East London School of Psychology, United Kingdom; 2: University of East London School of Psychology, United Kingdom; 3: Medicines Research Group, School of Health, Sport and Bioscience, University of East London; 4: Division of Psychology, School of Applied Sciences, London South Bank University, London, UK

### **Keywords:**

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E-cigarettes are highly heterogeneous. Although experienced vapers tend to use 'tank' models, 'cigalikes' have not lost their appeal and many smokers rate their cigarette-like appearance as very important. Nonetheless, cigalikes have been associated with poorer nicotine delivery and reduced satisfaction, and tanks may be more effective for smoking cessation.

Given that nicotine is the primary reinforcer of smoking behaviour, models with poor nicotine delivery will likely decrease product acceptability and preclude smoking cessation. To date, no published studies have directly compared cigalikes and tanks with various nicotine concentrations. This study aimed to compare a cigalike and a tank model on a) user satisfaction, craving and withdrawal symptoms relief and, b) cigarette consumption over one month.

Seventy (62.9% female) e-cigarette-naïve smokers provided a carbon monoxide (CO) sample at baseline and after 1 and 2 weeks. Saliva (for cotinine) was collected at baseline and upon successful quit attempts. Following random allocation to one of the following groups: i) cigalike-high (18mg/mL nicotine), ii) tank-high (18mg/mL) and iii) tank-low (6mg/mL), participants provided information on smoking history and completed the Fagerström Test of Nicotine Dependence (FTND), the Mood and Physical Symptoms Scale (MPSS) and a subjective effects questionnaires. Participants were then given the e-cigarette and liquid, and reported daily e-cigarette use (numbers of puffs/day), cigarettes consumption and subjective symptoms over 4 weeks. Changes in cigarettes consumption, CO levels, craving, withdrawal, satisfaction, hit, positive and adverse effects across the three groups will be presented.

## Exposure to heavy metals in cigarette smokers who switched to electronic cigarettes

**Authors:** Kosmider, Leon

Poster presentation

**Organisations:** Medical University of Silesia, Poland

### Keywords:

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**Significance:** Among heavy metals, which are present in tobacco smoke, lead and cadmium are of particular importance. Both metals affect smokers health. Cadmium is included into I group according to IARC classification based on sufficient evidence of the carcinogenicity in humans, while exposure to lead is linked to elevated blood pressure and increase risk of hypertension.

**Aim of study:** The aim of the study was the assessment of blood level of lead and cadmium in individuals declaring to be nonsmokers, cigarette smokers, dual smokers and e-cigarette users.

**Methods:** The study involved 163 volunteers (F/M, 77/86) non occupationally exposed to lead and cadmium, who were divided into four groups: never smoking (n=51; 37.1±5.3y), smoking for at least 2 years (n=35; 31.3±5.7y), dual smokers smoking conventional cigarettes for at least two years and using e-cigarettes for at least 6 months (n=29; 26.8±5.8y), e-cigarette users for at least 6 month previously smoking conventional cigarettes for at least two years (n=48; 30.1±5.8y). Lead and cadmium in blood were determined by atomic absorption spectrometry.

**Results:** The mean blood concentration of lead and cadmium (micrograms/L (95% CI)) adjusted to age, sex and BMI were 12.6 (10.9-14.3); 15.3 (13.6-17.0); 14.9 (12.8-17.1); 18.4 (15.3-21.5) for blood lead and 0.371 (0.101-0.641); 0.495 (0.225-0.766); 1.796 (1.447-2.143); 1.817 (1.325-2.308) for blood cadmium in the nonsmokers, e-cigarette users, dual smokers and smokers group, respectively. Highly significant difference ( $p < 0.0001$ ) was found between blood level of cadmium in nonsmokers or users of e-cigarette and smokers or dual smokers.

**Conclusion:** The study suggests that smokers who completely switch to e-cigarettes and stop smoking conventional cigarettes may significantly reduce their exposure to cancer-causing cadmium. Whereas only slightly decreasing of blood concentration of lead in e-cigarette users and dual smokers in relation to blood concentration of lead in smokers may be a result of slow releasing of lead to the circulation from bone, where lead was accumulated during period of smoking the conventional cigarettes.

## **Correlation between vapers' behavior and production of degradation products (carbonyls, VOCs)**

**Authors:** Lalo, Helene; Soulet, Sebastien; Casile, Carine; Pairaud, Charly

Poster presentation

**Organisations:** LFEL, France

**Keywords:** electronic cigarettes, behavior, vaping profil, aldehydes production

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Smoking is a major cause of premature death. Electronic cigarettes (commonly call EC) are a promising tool for a safer consumption of nicotine. However, the scientific community is still divided about the health benefit of the EC. Indeed, although ECs seem much safer than tobacco cigarettes (there isn't combustion in EC), some publications show more important production of formaldehyde in EC than in classic cigarette. The main issue of these publications is the lack of information about the device and the condition of use. We propose here a study on the degradation products found in vapor according to several profile of EC's users. After have conducted a societal survey from novice to experiment EC user, we draw up realistic weak and intense profile of vaper in order to study the impact of behavior on the production of degradation products.

With a model e-liquid, based on most used PG/VG ratio, nicotine rate and most popular aromatic molecules, we have generated controlled emissions thank to our vaping machine U-SAV (Universal system for analysis of vaping). Flow rate, inspiration time, value of power and resistance: each physical parameter has been configured to correspond to our chosen profile (weak or intense). Then the vapor has been studied in order to measure multiple degradation products (carbonyls, VOCs).

We highlight in this research the importance of a well controlled condition of use for the study of vapor's toxicity. Indeed, even with an intense profile, the degradation products are way less significant than in tobacco cigarette.

## **Cigarette Smoking Behavior Among Ever Triers of E-Cigarettes**

**Authors:** Largo, Ed; Gogova, Maria; Apkarian, Linda; Valente, John

Poster presentation

**Organisations:** Altria Client Services LLC, United States of America

**Keywords:** e-cigarettes, smokers, transition away from smoking

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E-cigarettes can provide cigarette consumers with a means to transition away from smoking. We examined cigarette smoking behavior among individuals who have ever tried e-cigarettes. We conducted an online cross-sectional survey (Fall 2014) in respondents recruited from online panels and central location testing facilities. The final online panel sample (N=3,472) consisted of adults segmented into three Test Groups: T-E: Use e-cigarettes “every day” and during the past 30 days (n=530); T-S: Use e-cigarettes “some days” or “rarely” and during the past 30 days (n=986); T-N: Ever tried e-cigarettes but now report “not at all” or not during the past 30 days (n=976); and one Reference Group (RefGrp) : Current, past 30-day tobacco product users who are e-cigarette nevertriers (n=980). The proportion of respondents who reported ever smoking a cigarette was high across study groups (> 96%). A smaller proportion of T-E respondents (46%) reported current cigarette smoking compared to T-S (71%) and a greater proportion had switched from cigarette smoking to e-cigarette use (24% vs. 3%). The proportion of T-E respondents who had switched from cigarette smoking was greater than the proportion of respondents in T-N and reported quitting cigarette smoking after first trying an e-cigarette (8%). The proportion of cigarette smokers planning to quit smoking in the next 30 days was highest among T-N (42%) compared to the other groups, including only 19% of RefGrp smokers. These results have implications for tobacco harm reduction, suggesting that regular use of e-cigarettes can facilitate transitioning away from cigarette smoking.

## **The influence of media on the perception of e-cigarettes industry in 2016 in Poland.**

**Authors:** Lipowicz, Justyna

Poster presentation

**Organisations:** LIPRO e-Liquid Production sp. z o.o. sp.k., Poland

**Keywords:** raport, media, e-cigarettes, e-liquid

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The poster shows that press releases which appeared in 2016 created a negative image of the majority of e-cigarettes. Meanwhile the media usually serves as the first source of information for the consumer when it comes to the product, so the media image of the industry is crucial and requires further analysis of this unfavorable situation.

The poster is an extension of the presentation: "Image is everything. The influence of media on the perception of e-cigarettes industry in 2016 in Poland."

The analysis of the e-cigarettes image was based on the exclusive results of research on the media presence of the e-cigarettes industry in 2016 in Poland. The analysis covered material obtained by monitoring more than 1100 newspapers, 5 million online sources and 100 radio and television stations. The collected material was analyzed using the techniques aimed at studying the effectiveness of Public Relations activities. For this purpose, the following indicators were used: the scope, the reach, the image impact index, a SWOT analysis and the advertising equivalent.

According to this research, the publications discussing e-cigarettes were mostly negative- as much as 58% of the materials presented information in a negative light. Information of a positive nature constituted as little as 10% of the entire media coverage. 32% of the publications were neutral.

As far as the present situation of the media image of e-cigarettes is concerned, it requires the creation of a positive discourse centered around e-cigarettes in order to improve the way they are received by the industry.

## **Optimal conditions for using e-liquid, a milestone to improve product safety.**

**Authors:** Lipowicz, Sebastian; Duda, Robert; Wolski, Tadeusz

Poster presentation

**Organisations:** LIPRO e-Liquid Production Sp. z o.o. sp.k., Poland

**Keywords:** e-cigarettes, e-liquids, traditional cigarettes, conditions

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Recently, the electronic cigarette industry has been in active development. The biggest changes have occurred in electronic nicotine inhalers used to evaporate e-liquid, commonly called e-cigarettes. At first, the devices were very simple, but this has changed with the development of the above industry. Currently there is a wide selection of electronic cigarettes that allow the adjustment of voltage and intensity. Some of them can be modernized which means that the user is able to use a device that meets his requirements.

In 2016, universities and research units published numerous articles saying that using e-cigarettes is no less harmful than smoking cigarettes. Many types of e-cigarettes were used in these publications to obtain vapour for analytical purposes. Their technical specifications is not the same as the scientific poster suggests. The most popular publications were selected to create the poster, which compares the harmfulness of e-cigarettes and traditional cigarettes.

The poster states that e-liquids are less harmful than traditional cigarettes if used under reasonable conditions. However, they can give the opposite effect to that expected, especially when the e-cigarette evaporates liquid under conditions which can lead to overheating. When the e-liquid overheats, the vapour inhaled by the vaper causes an unpleasant taste. This forces the user to change how they vape, so as to inhale fewer undesirable substances.

The poster shows that an insightful analysis of scientific publications allows us to draw interesting conclusions. The secondary objective was to give the public a more balanced view of the industry.

## **Multi-disciplinary studies into the toxicological and neurobehavioral effects of e-cigarette use**

**Authors:** Marczylo, Tim (1); Zhuikova, Elizabeth (1); Durrant, Philippa (2); Kovatsi, Leda (3); Liu, Lichan (4); Ioannides, Andreas (5); Ioannides, Costas (5); Goldsmith, Nathan (1); Bailey, Alexis (2)

Poster presentation

**Organisations:** 1: Toxicology Department, Public Health England, Chilton, UK;; 2: Institute of Medical and Biomedical Education, St George's University of London;; 3: Aristotle University of Thessaloniki, Medical School, Greece;; 4: AAI Scientific Cultural Services, Cyprus; 5: School of Biosciences & Medicine, University of Surrey.

### **Keywords:**

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E-cigarettes are popular as a quitting aid or to reduce cigarette consumption. The safety and health impacts of e-cigarettes have not been evaluated. E-cigarettes are considered to be safer alternatives to tobacco cigarettes but still contain nicotine which is both highly addictive and is a precursor for carcinogenic tobacco-specific nitrosamines (TSNA). We wish to understand both the neurobehavioral and toxicological effects of the transition from tobacco to e-cigarette use.

Our multidisciplinary studies (SmokeFreeBrain) cover in vitro (modulation of CYP enzymes involved in the bioactivation of procarcinogens in human blood-brain barrier, lung and liver cells), in vivo (CYPs modulation, histological effects, changes to brain transporter and receptor levels and biomonitoring of TSNA and TSNA-derived DNA adduct formation) and human volunteer studies. The latter will monitor smokers transitioning to e-cigarettes for a: nicotine, cotinine and TSNA in urine and saliva, b; salivary cortisol, c; TSNA-derived DNA adducts in saliva and urine and d: exhaled carbon monoxide and blood COHb. Craving, mood, anxiety, social anxiety, sleep quality, blood pressure and heart rate are used to assess psychological and cardiovascular effects during transition and resting state brain electrical activity will be measured by EEG.

Preliminary EEG data have identified significant changes in regional activations throughout the brain while behavioural data show modest changes in nicotine craving, nicotine withdrawal symptoms, social anxiety and sleep quality following transition to e-cigarettes. This study will provide information on the safety and effectiveness of e-cigarettes for smoking cessation which we anticipate will drive relevant policy decisions.

## **Impact of Puffing Parameters on E-cigarette Aerosol Chemistry**

**Authors:** Miller, John; Wilkinson, Walt; Wilkinson, Celeste; Sink, Kathlen; Skapars, Jim; Anderson, Adam; Gardner, William; Karles, George

Poster presentation

**Organisations:** Altria Client Services LLC, United States of America

**Keywords:** e-cigarettes, formaldehyde, puffing parameters

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E-cigarettes have gained in popularity in the past few years, and understanding the potential exposure to the end user has become increasingly important. In May 2016, FDA proposed full chemical characterization of e-cigarette aerosol for Premarket Tobacco Applications. E-cigarette devices heat aerosol carriers such as propylene glycol and glycerin, and ingredients such as nicotine and flavors. Some of the energy delivered to the device during vaping can potentially lead to the thermal degradation of e-liquid components. It has been previously reported that aerosols from e-cigarettes may contain thermal degradation products (e.g. carbonyls such as formaldehyde, acetaldehyde, acrolein, and crotonaldehyde). These thermal degradation products are produced by various e-cigarette use conditions, such as elevated temperatures of the heating coils or poor wicking of the e-liquid. Our work examines the impact of different puffing parameters on the formation of formaldehyde, acetaldehyde, and acrolein.

## **Comparing the composition of aerosol from an e-cigarette with cigarette smoke: toxicant levels are on average 95% lower in Vype ePen emissions compared to smoke**

**Authors:** Murphy, Marina

Poster presentation

**Organisations:** British American Tobacco, United Kingdom

### **Keywords:**

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Despite growing use of e-cigarettes, there are few studies that comprehensively examine composition of their aerosols. We describe the most complete chemical comparison to date of an e-cigarette aerosol compared to cigarette smoke. This includes FDA HPHC compounds, as well as chemicals previously found specifically in e-cigarettes.

The products were Vype ePen (Blended Tobacco flavour) and the Kentucky Reference Cigarette 3R4F. Vype ePen was puffed in two separate 100-puff blocks using a 55/3/30 puffing regime (volume(cm<sup>3</sup>)/duration(s)/ interval(s)). In a separate room 3R4F smoke was collected using the Health Canada 55/2/30 regime (ventilation blocked). Air/method blank analysis was also carried out at the same time, location and method as the e-cigarette measurements. Independent contract labs used ISO17025 accredited methods to quantify the following emissions: carbon/nitrogen oxides, carbonyls/dicarbonyls, alcohols/di-alcohols, phenols, o-heterocycles, chlorinated dioxins/furans; volatile, substituted and, polynuclear aromatic hydrocarbons; amides, azines, aromatic and aliphatic amines, nicotine and related compounds, nitrosamines, metals and radionuclides.

Of the 142 compounds tested, 105 compounds were undetectable in Vype ePen emissions. 23 compounds were detected or quantified at comparable levels in Vype ePen emissions and air/method blank; therefore it was concluded that ePen did not generate any measurable levels of these compounds. 15 compounds were quantified at higher levels in Vype ePen emissions than the blank, but at substantially lower per-puff levels than 3R4F. Similar per-puff emissions of four compounds (propylene glycol, glycerol, menthol, chromium) were found with Vype ePen and 3R4F.

This study shows substantial chemical differences between emissions from e-cigarettes and tobacco cigarettes. Most cigarette toxicants examined could not be detected in the e-cigarette aerosol. Measuring air/method blanks is an essential step for identifying experimental artefacts amongst trace-level e-cigarette aerosol constituents.

## **Post-market assessment of the Tobacco Heating System 2.2 (THS) use in Japan**

**Authors:** Prieto, Luis; van der Plas, Angela Maria; Skiada, Dimitra; Benzimra, Muriel; Dobrynina, Mariia; Tudor, David; Weitkunat, Rolf; Luedicke, Frank

Poster presentation

**Organisations:** Philip Morris International, Switzerland

**Keywords:** IQOS, tobacco, cross-sectional, prevalence, heat-not-burn

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**Background:** THS is a heat-not-burn tobacco product that generates an aerosol with significantly reduced levels of chemicals compared with cigarette smoke. The assessment program designed for THS includes pre- and post-market studies.

**Objective:** To provide an overview of the ongoing THS use post-market assessment in Japan.

**Methodology:** Three annual cross-sectional surveys are being conducted covering population representative and THS -user samples. Recruitment into these is done in four waves per year (n=1200 and n=500 per wave), respectively. Additionally, a cohort study is being conducted following 2,000 THS users and 2,000 cigarette smokers, recruited over a period of 4 years (500 participants per group and year), for up to 5 years.

**Results:** The first survey and cohort study waves have been completed in March 2017. The population-based survey included 631 (51.7%) women and 589 men, with a mean age of 54 years. The estimated population prevalence of smoking was 17% (95% CI: 15-19%; 27.6% in men and 7.3% in women). The mean number of cigarettes smoked per day was 15.9 in men and 13.6 in women. Most participants in the THS user survey (n=487, 97.4%) had previously initiated tobacco product use with cigarettes. Currently, more than half used THS exclusively (n=281, 56.2%), while 27.6% (n=138) used THS and cigarettes, and 11% (n=55) used more than two products. The mean number of HeatSticks used per day was 15.9 in men and 15.2 in women.

**Conclusions:** The THS use post-market assessment in Japan is ongoing. The studies provide prevalence and product use information.

## **A framework for assessing the reduced risk potential of e-cigarettes at individual and population levels**

**Authors:** Proctor, Christopher

Poster presentation

**Organisations:** British American Tobacco, United Kingdom

### **Keywords:**

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Cigarette smoking is a cause of many human diseases. The use of novel tobacco and nicotine products with reduced yields of toxicants compared to cigarettes, such as tobacco heating products, and e-cigarettes, holds great potential for reducing the harms associated with tobacco use. In the UK, several public health agencies have advocated a potential role for novel nicotine products in tobacco harm reduction, as they deliver nicotine in a cleaner form than cigarette smoke. Public Health England stated that “The current best estimate is that e-cigarettes are around 95% less harmful than smoking”. In support of this, the Royal College of Physicians has urged public health to “Promote e-cigarettes widely as a substitute for smoking”.

Health related claims such as ‘reduced exposure’ and/or ‘reduced risk’ should be fully substantiated using a weight of evidence approach based on a comprehensive scientific assessment. The US Food and Drug Administration is currently the only national regulator to have provided a guidance outlining a framework to assess novel tobacco and nicotine products as Modified Risk Tobacco Products (MRTPs). Based on that draft guidance, we designed a framework comprising pre-clinical, clinical, and population studies to assess the risk reduction potential of novel tobacco and nicotine products at the individual and population levels. We will detail the necessary scientific studies within the assessment framework and illustrate them through a case study with a commercially available, closed modular e-cigarette (Vype ePen) compared to a scientific reference tobacco product (3R4F).

## **Conceivable saving of lives in the EU if there had not been a ban on snus**

**Authors:** Ramstrom, Lars

Poster presentation

**Organisations:** Institute for Tobacco Studies, Sweden

**Keywords:** EU ban on snus, Tobacco-related mortality, Saving of lives, Swedish tobacco use patterns

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The EU Commission has stated that almost 700.000 premature deaths in the EU every year are attributable to tobacco use. This represents an overall tobacco-related death rate more than double as high as in Sweden. Specific analyses have shown that this difference is largely due to the dominating use of snus (banned in the EU except Sweden) instead of cigarettes among Swedish men. This raises the question how actual numbers of tobacco-related deaths compare to numbers that could have been conceivable if citizens in EU countries had been able to adopt the Swedish tobacco use patterns. Based on the WHO Global Report Mortality Attributable to Tobacco (Geneva 2012) this study has estimated, for each EU Member State and for the EU as whole, the number of deaths attributable to tobacco in two scenarios – one based on the actual country- age- and disease-specific death rates presented in the WHO report, another one based on the corresponding Swedish death rates. Estimates are presented for 'All malignant neoplasms'; 'Trachea, bronchus, lung cancer'; 'All cardiovascular diseases'; 'All causes of death'. For the total of men in the EU the inter-scenario difference regarding 'All causes of death' is around 350.000. This could be seen as an estimate of the optimum conceivable number of tobacco-related deaths that might have been saved if there had not been a ban on snus and if effective information had encouraged the adoption of Swedish tobacco use patterns. Altogether, availability of snus could make it possible to save many lives.

## **ACTUAL USE STUDY OF THE CANDIDATE MODIFIED RISK TOBACCO PRODUCT (MRTP); TOBACCO HEATING SYSTEM (THS).**

**Authors:** Roulet, Steve (1); Magnani, Pierpaolo (1); Kallischnigg, Gerd (2); Dugan, Ariella (3); Gage, Chris (3); Kanitscheider, Claudia (4); Apecechea, Mercedes (4); Ramazzotti, Antonio (1)

Poster presentation

**Organisations:** 1: Philip Morris International Management S.A., Lausanne, Switzerland; 2: Argus, Berlin - Germany; 3: Kantar Health LLC, New York, United States of America; 4: Kantar Health GmbH, Munich, Germany

**Keywords:** Population studies, Trajectories.

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This study was a single group, prospective observational study, implying an assessment of subject-reported stick-by-stick consumption of HeatSticks and of conventional cigarettes (CC). Participants received HeatSticks free of charge and were able to consume HeatSticks, CC and other nicotine containing products ad libitum. The study consisted of a 1-week baseline period, a subsequent 6-week observational period, and a 1-week close-out period.

The results indicate that:

1. 33.8% of the participants “started using” HeatSticks (i.e.  $\geq$  100 HeatSticks used) during the observational period, meaning that they were using the product on a continuous basis.
2. 32.7% of them “switched” (i.e.  $\geq$  70% of tobacco products (HeatSticks and CC) used were HeatSticks) from CC to HeatSticks showing that a sizeable proportion of participants adopted a usage behavior involving either exclusive or predominant use of HeatSticks.
3. 34.6% of the participants who “started using” HeatSticks had a “combined use” of CC and HeatSticks (i.e.  $>$ 30% and  $<$ 70% of products used were HeatSticks). While the proportion of “combined use” decreased over time, the proportion of “CC use” (32.7%) (i.e.  $\geq$ 30% of products used were HeatSticks) increased, indicating that a substantial proportion of participants with “combined use” returned to CC.
4. 15.5% of the participants, who “started using HeatSticks and switched” to HeatSticks, “switched back” to CC.
5. There was no increase in the use of tobacco products between the baseline and the observational period.
6. The levels of misuse of THS were overall low suggesting that participants used the product as intended or designed.

## **Plasma Nicotine Pharmacokinetic Profiles for Various E-Vapor Products Used by Adult Smokers Under Ad-Libitum vs. Controlled Use Conditions**

**Authors:** Sarkar, Mohamadi; Liu, Jianmin; Liang, Qiwei; Gogova, Maria; Zhao, Yuxi

Poster presentation

**Organisations:** Altria Client Services LLC, United States of America

**Keywords:** nicotine, pharmacokinetics, e-cigarettes, cartridge, tank, Cmax

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Plasma nicotine pharmacokinetic (PK) profiles are often used to characterize nicotine exposure from e-vapor products (EVP). The purpose of this analysis was to determine PK profiles when adult smokers (AS) use EVPs under ad libitum or controlled use conditions. We conducted a 6-way randomized crossover study in twenty-four AS smoking >10 cigarettes/day and had not used EVPs in the past month. AS used six different types of EVPs (tank- or cartridge-based) with different flavors and levels of nicotine under two use conditions (10 hours apart) – controlled use of 10 inhalations of 4-second duration with 60-second intervals (over ~10 minutes) and ad libitum use for 10 minutes. Nicotine plasma levels were measured periodically for 120 minutes. The maximum concentration (C<sub>max</sub>0-2hrs) and area under the curve (AUC<sub>0-2hrs</sub>) were higher under ad libitum vs. controlled use. On average, AS took ~twice as many puffs under ad libitum compared to controlled use and average puff duration ranged from 3.0 to 3.6 s for the six EVPs. The interindividual variability (CV%) for C<sub>max</sub>0-2hrs was larger under ad libitum (53%) than under controlled use (28%). The identical use conditions under controlled use may provide a better method to compare nicotine PK from different types of EVPs. The high inter-individual variability under ad libitum use conditions may reflect several factors including preference and satisfaction. The pros and cons of each test condition for assessing nicotine PK will be discussed. These variability estimates may be used to design future studies with EVPs.

## **Characterization and influence of electronic cigarette's configuration, e-liquid's properties and users' behaviour on the quantity of vaporized e-liquid : an experimental predictive model for nicotine delivery**

**Authors:** Soulet, Sébastien; Pairaud, Charly; Casile, Carine; Lalo, Hélène

Poster presentation

**Organisations:** LFEL, France

**Keywords:** Electronic cigarette, E-liquid consumption, Nicotine delivery

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Current electronic cigarette (EC) researches focus on the analysis on the e-liquids or vapour emitted from them. Most of studies concern the degradation's products found in vapor. Molecules researched are generally from the family of aldehydes such as formaldehyde, acetaldehyde and acroleine. Results of these publications show a huge influence of e-cigarette devices and e-liquids on degradation's products. There is a lack of knowledge on the influence of fundamental EC's parameters like: user inhalation behaviour, e-liquid proprieties or even resistance's design. The proposal research is focus on the influence of more fundamental parameters on e-liquid consumption. The aim of the work is to map the e-liquid's consumption according to fundamental EC's parameters: human and device.

The manipulations are based on the AFNOR standard XP-D90-300 part 3 protocol for the generation of emissions. Although we keep the base of the protocol (5x20 puffs), we vary the key parameters one by one (i.e. vaporization time, flow rate, PG/VG ratio, ethanol and water percent, power supplied, resistance proprieties) to highlight their influences on e-liquid's consumption. The vaping machine used, U-SAV, controls and real-time reads physical parameters such as: energy supplied, resistance value, flow, allowing a good stability in time and repeatability on different manipulations.

The influence of those parameters on the e-liquid consumption allows writing physical (and empirical) models. Those models express how consumptions of e-liquids can be influence by different vaping behaviours. Except the flow rate that is function of air flow regime, the parameters seem to have a linear influence.

## **Risk Assessment of Electronic Cigarette Ingredients and Their Reactions to Heating**

**Authors:** Syawqie, Achmad (1,2); Winny, Yohana (2); Inne, Sasmita (1,2); Hening, Pramesti (2); Kosterman, Usri (2); Amaliya, Amaliya (1,2)

Poster presentation

**Organisations:** 1: Indonesia's Public Health Observer Organization, Indonesia; 2: Padjajaran University Bandung

**Keywords:** E-cigarette, e-liquid, ingredient risk assessment, reaction product risk assessment, thermal breakdown product.

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Electric cigarette (e-cigarette) is a global new phenomenon that is considered as alternative to tobacco cigarette addiction; however, its safety has been widely criticized. The precise risk profile of e-cigarettes compared to cigarettes is not clear, in part because of the lack of product-specific analyses of e-cigarettes. Additionally, the emergence of heated tobacco products is also interesting to assess.

We conduct analysis on nine samples of e-liquid and e-cigarettes distributed in Bandung, West Java, Indonesia and one heated tobacco product that is available in Japan to analyze the ingredients and chromatogram profile of e-liquid and heated tobacco product post heating process. The two products were analyzed by generating the aerosol with an e-cigarette device and THS heater according to the manufacturer's instructions. Results showed that almost all producers of e-liquid use food grade ingredients as the components (i.e. USP Propylene Glycol, USP Glycerin Natural/Vegetable, Artificial/Natural Flavoring/Sweeteners, Distilled Water.). There were also increases in the concentration of other constituent substances. While for the heated tobacco product, the result showed the decrease in chemical compound concentration after the heating process, and it did not degraded into new substance.

Moving forward YPKP will conduct a clinical assessment on volunteers who are also active e-cigarettes users, this will be conducted towards the end of year 2017; the research will be focused on the assessment of their oral cavity's health.

The aim of the research is to inform the Government of Indonesia a scientific-based findings regarding e-cigarette's potential to curb smoking addiction

## Evaluation of Nicotine Pharmacokinetics and Subjective Effects following Use of a Novel Nicotine Aerosol System

**Authors:** Teichert, Axel (1); Brossard, Patrick (1); Felber Medlin, Loyse (1); Sandalic, Larissa (1); Ancerewicz, Jacek (1); Franzon, Michael (1); Wynne, Chris (2); Laugesen, Murray (3)

Poster presentation

**Organisations:** 1: Philip Morris Products S.A., Research & Development, Neuchâtel, Switzerland (part of Philip Morris International group of companies); 2: Christchurch Clinical Studies Trust Ltd, Christchurch, New Zealand; 3: Health New Zealand Ltd, Christchurch, New Zealand

**Keywords:** E-cigarette, Technology

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Novel nicotine aerosol systems represent an evolving part of the tobacco harm reduction strategy. We present the first in human data from the clinical assessment of a novel nicotine aerosol system based on the in situ formation of an aerosol of submicron airborne particles consisting of a nicotine salt delivered to the lungs through inhalation.

This open-label, ascending nicotine levels study, conducted in 16 healthy smokers, investigated the plasma nicotine pharmacokinetic profile, subjective effects, and the safety and tolerability of the nicotine delivery system in relation to the Nicorette® inhalator. The study was conducted in New Zealand and registered at [www.clinicaltrials.gov](http://www.clinicaltrials.gov) (NCT02532374).

Three different nicotine delivery levels (50, 80 and 150 µg/puff) were evaluated in ascending order on different days, following initial use of the Nicorette® inhalator.

Inhalation of the aerosol delivered by the novel nicotine aerosol system, resulted in a rapid rise in nicotine plasma concentrations, suggesting a pulmonary absorption route. Craving reduction, as assessed by the Visual Analog Scale craving score, was faster than for the Nicorette® inhalator. The mean QSU-brief total scores were similar for both products. Product satisfaction scored higher than the Nicorette® inhalator and the aerosol delivered by the novel nicotine aerosol system was well tolerated as indicated by the adverse events collection, safety measurements and cough assessment.

This novel nicotine aerosol system shows potential over existing nicotine delivery systems by delivering nicotine with kinetics close to cigarettes without exogenous carrier substances as used in current electronic cigarettes.

## **Ecomonitoring the electronic nicotine delivery systems for the strategy of nicotine replacement therapy for smoking COPD patients**

**Authors:** Trofimov, Aleksei V. (2); Berdnikova, Nadezhda G. (1); Menshov, Valerii A. (2); Novikov, Kirill N. (3); Yablonskaya, Olga I. (2)

Poster presentation

**Organisations:** 1: Emanuel Institute of Biochemical Physics, Russian Academy of Sciences, Russian Federation; 2: I.M. Sechenov First Moscow State Medical University; 3: Emanuel Institute of Biochemical Physics, Russian Academy of Sciences,

### **Keywords:**

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Among the numerous issues referred to regulation of the electronic nicotine delivery systems (ENDS), there is a view that it should maximize the public health opportunities of their use [1]. In this context, we currently explore the utility of ENDS as nicotine replacement therapy tools for smoking patients suffered from the chronic obstructive pulmonary disease (COPD). The incentive for such a work resides in the fact that smoking COPD patients are hardly able to quit smoking and require the appropriate nicotine replacement therapy. ENDS may open a new efficient opportunity for such a therapy, however, clearly not all of them suite this purpose and their quality needs to be examined prior to use in such a medical context. With this in mind, we currently perform monitoring of the ENDS available on the local market of the Russian Federation to choose the brands which exhibit the acceptable aerosol emission properties in terms of their reduced potential to cause oxidative-stress developments in a human organism. We have shown that the formation undesirable oxidation products (e.g., carbonyl compounds) in the ENDS aerosol proceeds most likely through the free-radical chain mechanism and intervention of hydroperoxides and depends decisively on the temperature and the mode of the evaporation of nicotine-contained liquids, aeration of an atomizer, material of the evaporator, content of the liquid in the ENDS cartridge, etc. Lowering the prooxidant potential of the emission derived from ENDS enable their use in nicotine replacement therapy for smoking COPD patients and to enhance their quality of life upon quitting smoking the tobacco cigarettes and switching to the pertinent ENDS. We also note the importance of subjective factors affecting the use of ENDS and technical problems of their operation.

[1] A. McNeill, L.S. Brose, R. Calder, S.C. Hitchman, P. Hajek, H. McRobbie, E-cigarettes: an evidence update. A report commissioned by Public Health England, Public Health England, London, 2015.

# Comparison of Methods for Carbonyls Quantitation in Electronic Cigarette Aerosol

**Authors:** Wadkin, Rhys

Poster presentation

**Organisations:** Nerudia, United Kingdom

**Keywords:**

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Introduction:

Propylene glycol (PG) and glycerol are usually the main ingredients in e-liquids. PG and glycerol degrade to form carbonyls upon heating. Carbonyls are harmful and some are considered carcinogenic or potentially carcinogenic by IARC.

The quantitation of carbonyls from electronic nicotine delivery systems (ENDS) aerosol is important in the current regulatory climate. The MHRA in the UK has stated that formaldehyde, acetaldehyde, and acrolein are included as key emissions. The FDA add crotonaldehyde to these on their list of Harmful and Potentially Harmful Compounds (HPHC) list for ENDS.

Many methods exist to quantify carbonyls in aerosol, presented here are the advantages and disadvantages of each in terms of accuracy, sample size, and specificity. Aerosol capture methods may also differ within each method type.

Method of Comparison:

A comparison of the following analytical methods was made:

- LC-UV
- LC-MS
- GC-MS
- NMR spectroscopy

Consideration was made where sample capture techniques varied within a method type:

- DNPH tube (LC)
- DNPH Impinger (LC)
- TD tube (GC)
- Cryogenic condensation of aerosol (GC)

Discussion

Issues and benefits of each method / capture technique were discussed including LOD's, LOQ's, specificity issues, safety, and sample size (number of puffs required). These were all found to vary across analytical methods, and capture techniques were considered to have different effects on the actual puffing profile applied to the e-cigarette during sampling.

## **An ethnographic observational study of smoking cessation advice given in vape shops**

**Authors:** Ward, Emma Louise (1); Notley, Caitlin (1); Dawkins, Lynne (2); Holland, Richard (3)

Poster presentation

**Organisations:** 1: University of East Anglia, United Kingdom; 2: London South Bank University, United Kingdom; 3: University of Leicester, United Kingdom

**Keywords:** Electronic Cigarettes. Smoking Relapse Prevention. Qualitative research

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**Aims:** Current UK Stop Smoking Service guidelines (McEwan and McRobbie, 2016) encourage supporting the use of e-cigarettes, but the extent health professionals can offer specific and personalised advice is limited, as the evidence base is still emerging. Vape shops are the ‘front line’ of smoking cessation advice for consumers who choose not to access formal medical advice. This observational study focuses specifically on the advice given by UK vape shops about using e-cigarettes to quit smoking.

**Methods:** Ethnographic observations of a total sample of 12 urban e-cigarette shops of typical advice given by shop assistants to quitters. Detailed field notes were maintained commenting on setting, culture, and informal observations of advice giving episodes. Additional in depth non-participant observations of three selected shops were undertaken with a researcher in situ, observing further interactions between the shop assistants and customers.

**Results:** Vape shops differentiated the advice they gave to customers using e-cigarettes to quit smoking and customers who were vaping hobbyists. Smoking cessation advice given related to devices, liquid flavours, nicotine strengths, and quitting strategies. Attempts were made to assess and understand patterns of smoking and nicotine dependence, in order that advice could be tailored about the most appropriate product and strength of e-liquid that the customer might try.

**Conclusions:** Our study found that vape shops offer well intentioned advice from an ‘informed expert-by-experience’ perspective. The advice was variable as it was not evidence based. However, advice was broadly helpful, well received and encouraged ongoing interaction between vape shop staff and customers.

## **Effects of nicotine and E-C cigarette fluids on cytochromes P450 in hCMEC/D3 blood-brain barrier**

**Authors:** Zhuikova, Elizabeth (1); Bailey, Alexis (2); Ioannides, Costas (3); Marczylo, Tim (1)

Poster presentation

**Organisations:** 1: Toxicology Department, Public Health England, Chilton, UK; 2: Institute of Medical and Biomedical Education, St George's University of London,; 3: School of Biosciences & Medicine, University of Surrey.

### **Keywords:**

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Despite continuous efforts to discourage people from smoking, chronic tobacco use still remains a major public health concern worldwide. E-cigs are a safer alternative to tobacco smoking, however, the possibility of detrimental health consequences after long term use remains a significant knowledge gap.

Nicotine is highly addictive and nicotine metabolites (nitrosamines) are known carcinogens and can form DNA adducts. This raises concerns in regard to potential susceptibility to neurotoxicity, histopathology and cancer. Multiple studies highlight the ability of nicotine to compromise blood brain barrier (BBB) integrity, leading to detrimental alterations in transport and receptor systems. How much BBB contributes to the metabolism of nicotine and the bioactivation of procarcinogens remains unknown.

We have investigated nicotine-mediated changes to expression levels of a panel of cytochrome P450 enzymes (CYPs), associated with the bioactivation of procarcinogens and nicotine metabolism, using a hCMEC/D3 BBB cell model. Initial results indicate a significant increase in CYP2A6 expression levels after 24-hour exposure to 1 µg/ml of nicotine, suggesting the BBB as a potential site for nicotine metabolism. There was no induction of either CYP1A1, CYP3A4, CYP1A2 or CYP2A13. Expression of each CYP was however markedly lower in hCMEC/D3 than in hepatic cell line, HepaRG. We have compared effects of exposures to nicotine, e-liquid and e-liquid aerosol condensate and have examined their effects upon two recently described extrahepatic CYP isoforms, CYP2U1 and CYP2S1, whose expression is highly enriched at the BBB. Study will contribute to the current understanding of the safety of E-cig use.