Written evidence submitted by Professor Peter Hajek (ECG0017)

**Background information:** I have been involved in numerous studies of effects of e-cigarettes (EC) and also in systematic reviews and summaries of relevant research findings (list of publications on request). I have no links to any e-cigarette (EC) or tobacco manufacturers.

Vaping is a controversial topic and regulators have to appraise the claims by people who wish for restrictive EC regulations. Such claims include assertions that vaping lures children to smoking, that it poses serious health risks, and that it does not help smokers quit. While evidence on some aspects of EC use remains unclear and on-going monitoring of new research is needed, the anti-vaping claims usually rely on a few types of studies that include some obvious as well as some more subtle biases.

My experience in this field has led me to become aware of the typical ways in which anti-vaping activists misinterpret research data. In this submission I want to alert the Committee members to the most common issues and to show how such claims are contradicted by existing evidence.

The sources of misreporting and the relevant evidence summarised below are not referenced as this would involve dozens of studies and the narrative concerns issues of logic and interpretation rather than concrete data-sets. However, I would be happy to provide detailed references for any of the statements below if needed.

**Appraising anti-vaping claims:**

**Vaping lures children to smoking:** Such claims are based on two biases. Firstly, most US and international surveys of vaping in young people label ‘ever trying an e-cigarette’ as ‘use’, and ‘trying an EC it in the past month’ as ‘current use’. For most readers who understand the term ‘current smoker’ as denoting someone who smokes daily, ‘current vaping’ implies regular and probably addictive use. In reality, most of these adolescents only tried vaping once or twice. Authors of these studies feel justified in using this ‘trick’ because preceding studies used such labels too and this was not challenged.

The second commonly used stratagem is to interpret the fact that the same young people who try one product also try the other as showing that vaping leads to smoking. Such reports ignore the obvious common liability explanation for the phenomenon. People who try white wine are more likely to also try red wine than teetotallers.

In this context, it may be useful to mention another common error. Anti-vaping activists typically present nicotine as a highly addictive substance with an implication that if a teenager tries it, in whatever form, they will become hooked. While cigarettes are highly addictive, nicotine is not. Separated from other tobacco constituents, it has very low addictive potential, if any. It is difficult to get laboratory animals to self-administer it, and as with e-cigarettes, it is extremely rare for nicotine replacement treatment products to appeal to non-smokers. Unlike cigarettes, which lead over 60% of people who try them for the first time to become daily smokers for at least a period of time, nicotine on its own only appeals to smokers. For non-smokers, nicotine on its own is either neutral or aversive.

Regarding the actual evidence on these issues, all surveys that enquired about weekly and daily vaping found this restricted almost exclusively to smokers, with negligible or no such use reported
in non-smokers; and countries that allow vaping, such as the UK, noted no increase in smoking among teenagers but rather an accelerated decline in smoking among them.

**Vaping may be as dangerous as smoking:** This claim is typically based on four different tactics.
1. Unrealistic exposure levels in in-vitro and animal studies (cells bathed in e-liquid, laboratory animals poisoned with huge nicotine doses, e-liquid fried at high temperatures so that it releases toxins the way burned toasts do).
2. Interpreting any presence of potential toxins, such as diacetyl, however low and harmless, as a sign of danger.
3. Avoidance of comparisons with cigarette smoke.
4. Interpreting acute effects of nicotine as a sign of risk when the effects have no prognostic value.

Critical readers need to ask: Did the exposure reflect vapers’ exposure; Are the levels of chemicals above safety norms; and How do the effects compare with effects of cigarette smoke?

Regarding the actual evidence on this issue, the existing data from humans did not identify any substantial risk so far. There is also simple logic: E-cigarette vapour does not contain the majority of toxins that cause smoking related disease and those that are present are there at only a small fraction of levels present in tobacco smoke. Ingredients specific to EC may present some risks, but these are low compared to risks of smoking, and are most likely modifiable by product adjustments.

There is an easy diagnostic for spotting biased papers. They typically start with a claim that e-cigarettes are promoted as safe. I never saw any such promotion and doubt that it exists, but the claim provides an opportunity for the authors to present the presence of some chemical or other as a significant finding, even if the levels of the chemical are much lower than from smoking and have no health implications.

**Vaping undermines quitting smoking:** This claim is based on one type of often repeated finding:
Among people who tried to stop smoking with the help of e-cigarettes, the subgroup that failed to stop smoking has a reduced chance of quitting over the next period of time. Such data provide no assessment of EC efficacy in smoking cessation. The EC failure group has excluded people who successfully switched to vaping and it also typically comprises of more dependent smokers.

Regarding the actual evidence on this issue, efficacy of EC in helping smokers quit can be assessed via randomised trials and also via population effects. There are only two randomised trials of EC with long term outcome and one with a short term results, but they show efficacy. More importantly, EC are helping smokers quit outside clinical settings, on the population scale. According to Eurobarometer, 7% of ex-smokers in Europe quit smoking with the help of all the existing licensed stop smoking medication together (seven different nicotine replacement treatments, varenicline and bupropion) while 6% quit using EC. To put these striking figures into perspective, some of the medicinal products have been available for over 30 years, widely recommended by physicians and easily available. EC have been around for only a few years and their use has been generally discouraged in most EU countries. In the UK alone, there are some 1.5 million people who successfully stopped smoking with the help of vaping.

**In summary,** current evidence shows that EC are a gateway away from smoking rather than into it and that vaping is much less risky than smoking. More information is needed on several issues, but there is sufficient evidence available to make it clear that product regulation, including marketing, product labelling, use in public places, taxation etc. should be geared to encouraging smokers to switch to vaping.
Here is an additional remark on the EU Tobacco Product Directive. The Directive regulates EC much more strictly than conventional cigarettes, which protects cigarettes from their much less risky competitor and is thus damaging to public health. Parts of the vaping industry are now lobbying for a strict enforcement of this counterproductive regulation for commercial reasons, while arguing that the irrational over-regulation is needed to protect the public. We already have consumer protection regulation that fits that purpose. Public health would benefit if the EC section of the TPD is scrapped as soon as possible and if, in the meantime, it is ignored as much as is legally possible.

21 November 2017