A discussion on the debate surrounding e-cigarettes and the risks and benefits posed to public health – opinion piece

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As a society we often take a ‘once bitten twice shy’ approach when faced with unfamiliar challenges, whether this be in relation to children’s safe guarding or fitness to practice. Consequently e-cigarettes being introduced recently as a safe alternative to smoking tobacco has raised more than a few eyebrows in the medical world, careful to avoid failures of the past.

It was just 60 years ago that cigarette companies used doctors to promote their brands, with slogans like, ‘More Doctors smoke Camels than any other cigarette’ leading many to falsely believe smoking was therapeutic. Alongside this was the belief among professionals that smoking was OK, with the New England Journal of Medicine and the Journal of the American Medical association publishing cigarette ads on their covers in the 1930s and 40s.¹ This approval by doctors not only caused countless people to develop addiction and suffer the consequences but lead to a loss of trust in the medical profession that has never fully been regained.

Therefore, as e-cigarettes are now being endorsed worldwide with almost no regulation, many medical practitioners are questioning their overall benefits and perhaps more importantly, risks. However, many believe being overly cautious could result in rejection of an opportunity to potentially save lives.

What are electronic cigarettes?

To understand the core principles of the debate we must first understand the nature of the e-cigarette. E-cigarettes, vaporisers or electronic nicotine delivery systems are devices used, to deliver nicotine to the user without the involvement of tobacco.

Many brands exist on the high street, with some mimicking the usual cigarette design and others with a more modern twist. Currently the cigarette type device resembles a cigarette, with a light at the end that glows bright when in use, allowing the smoker a more realistic experience. The liquid used in the devices is a combination of nicotine in propylene glycol and glycerine. When the heating element heats the liquid, a vapour is produced containing nicotine. As the smoker exhales, some of this vapour may be realised into the surrounding environment.

E-cigarettes have been advertised as a safe alternative to smoking and many people are using them freely in public places where smoking is banned. This has presented many problems as although they do not produce tobacco smoke, to the wider non smoking public, the potential for harm has lead to controversy over public health.
Are electronic cigarettes better to use than normal cigarettes?

In comparison with smoking normal cigarettes e-cigarettes are a much safer alternative. We know already that the significant harm from normal cigarettes is contained in the tobacco component rather than the nicotine, so the potential harm is notably reduced smoking e-cigs. However, in the absence of robust scientific research we cannot conclude that harm is negligible for non smokers; therefore, in terms of safety for the general public it would be inconclusive to suggest that e-cigarettes are completely safe. The main argument for harm associated with e-cigarettes use in public places comes from the effects of nicotine itself, as it stimulates the nervous system and can affect health by increasing the heart rate and blood pressure.  

However, under proper regulation, increasing the amount of current smokers to swap to e-cigs would have a noticeable positive effect on public health. Professor Michael Russell summed the issues up well when he wrote in 1976, “People smoke for nicotine but die from the tar”. This highlights the main crux of the debate, that deaths from smoking are associated with the tobacco; therefore eliminating this factor can only produce more desirable health effects.

What does the law say in the UK?

Smoking is the largest preventable cause of premature death in the United Kingdom. Therefore, it has been a target of various legislation to curb this health burden. However, despite this, e-cigarettes have entered the market as a consumer product rather than a nicotine replacement therapy and subsequently have bypassed laws used to protect users.

Many groups have raised concerns due to the increase in supply and demand of e-cigarettes and the involvement of tobacco companies in advertisement and sales. In particular the World health organisation has become concerned due to their pre existing ‘Treaty on tobacco’, aimed at protecting health policy through tobacco control from the ‘commercial and vested interests ’ of the tobacco industry.

Regulation therefore, must play a large part in directing and curbing the aims of the market towards public health agenda. To tackle this, action was taken in February 2014 with the EU Tobacco Products Directive (TPD) being passed by the European parliament and became law in April 2014. Those in the EU member states must incorporate this new legislation into law by May 2016. This legislation means that e-cigarettes containing up to 20mg/ml nicotine strength come under the TPD. Over this amount they will be required to undergo approval as medicines in order to remain available to the public.

The question remaining is, will this be enough?

At this point in time it is a huge step towards regulating e-cigarette distribution, the focus is user centered and aims to make the use of e-cigarettes as safe as possible whilst protecting users from the harm of those with monetary incentives for example, tobacco companies. This
is a powerful example of the effectiveness of the EU, where legislation can be delivered across the board to protect the wider public and is a far cry from the more gradual action taken throughout Europe to curb smoking in public places.

**Are electronic cigarettes effective in helping smokers quit?**

Effectiveness is a difficult outcome to measure as it has many facets. Due to the variability in e-cigarette design and user experience, effectiveness can be difficult to gauge. One study has shown that of those who reported using e-cigs or having tried them was to ‘help me stop smoking tobacco entirely’\(^\text{7}\) Another study has found that the devices are being used to ‘help reduce the amount of smoking, but not stop completely’\(^\text{8}\)

Recent published population level data shows that e-cigarettes are now more popular for those trying to quit smoking and are 60% more effective in helping smokers quit than nicotine replacement therapy bought over the counter \(^\text{9,10}\)\(^\text{11}\) It is important to note also that many of the surveys that are available currently have been conducted by companies selling the product so may be subject to bias.

Despite the intention to use e-cigarettes to cut down or stop smoking, there is little evidence to suggest that this is working. Therefore, it is arguable that although an innovative way to aid smokers quit, e-cigarettes are just another sticking plaster to a much greater social issue. Smokers need the self-motivation and determination to quit, this is a behavioural and social problem linked inextricably to the environment and social situations smokers face on a daily basis. Should we be targeting the root of the problem first?

This is again a fair argument however, if e-cigarettes reduce smoking even by a small percentage they could be said to be more effective than nothing at all. The research supports this, Action on Smoking and Health (ASH) have seen a growth from 700,000 users to 2.1 million in the last two years, and some evidence suggest that they can be effective in helping some smokers quit\(^\text{12}\)

**What are the main risks to non-users?**

The risk to non-users has been one of the main driving forces of controversy over e-cigarettes recently. A small amount of research has been carried out and the lack of regulation has left a void that has began to fill with myth and confusion.

The level of nicotine present in e-cigarettes is around one tenth of that generated by a normal cigarette\(^\text{13}\) and a recent study supported this adding that passive exposure to the aerosol can expose non-users to nicotine but at levels that are unlikely to have a pharmacological significance\(^\text{14}\)
Toxins have been found in a number of studies of electronic cigarettes\textsuperscript{15,16,17,18} However, these are at very low levels not expected to cause harm and much less than normal cigarettes.\textsuperscript{19,20}

Evidence has also shown little harmful effects in the short term from exposure to propylene glycol, the liquid in which the nicotine is suspended.\textsuperscript{21} Despite this research further trials must be conducted to know for sure the long term impact exposure may have to the smoker and non-smokers lungs. Until this happens, as the market expands and more and more companies invest in e-cigarettes sales, tensions will begin to rise with harsher regulations in terms of marketing and use.

On the other hand, one paper states an ‘often unconsidered advantage” to e-cigarettes is the lessened risk for secondhand smoke in situations such as in cares or in the home, a common occurrence that can often be overlooked.\textsuperscript{22}

**What is the situation on the ground, who uses them?**

Significant controversy has surrounded the role of the media targeting young people and non-smokers in e-cigarette advertisements. Between 2009-2011 searches on Google using ‘electronic cigarette’ increased fifty fold\textsuperscript{23} which reflects not only the growing popularity of the product but the effect advertising is having on the general public.

According to surveys by ASH, there has been an increase in users from 3% in 2010 to 18% in 2014. Likewise there has been an upward trend in those who have tried e-cigarettes, from 9% in 2010 to 52% in 2014. This upward slope is likely to see greater rise in the coming year as health promotion campaigns continue to warn of the dangers of smoking, and many people may begin looking for ways of stopping.\textsuperscript{5}

However, in spite of health professionals concern over the glamorisation and normalising of smoking encouraging young children to start, this has not been the case on the ground. From the current evidence collected, e-cigarette use is limited to those who have already smoked previously\textsuperscript{24,25}

ASH has estimated that of the around 2.1 million e-cigarette users in the UK,\textsuperscript{13} this is made up of almost entirely current or ex-smokers. There is very little to suggest that those who never smoked are beginning to use e-cigs\textsuperscript{26}

**What is the overall risk: benefit argument given current evidence?**

The overall risk is low to non users and smokers alike. From recent studies, toxins have been found to be at such low levels to not cause harm. However, due to the vast array of brands, this cannot be relied upon as consistent evidence. Smoking e-cigarettes has rapidly increased among the population and if regulated correctly could be an efficient and effective way to help smokers quit. The industry has become so popular that many organisations have been
compelled to take notice and appropriate action and this will see a greater drive in regulation of sales but also advertisements.

**How are they regulated?**

Currently the Committee of Advertising Practice has published new rules on advertising e-cigarettes to cover the period between now and when the TPD takes effect. These rules are aimed mainly at preventing advertisements to those who are young and non-smokers. In addition the Children and Families Act 2014 prevented the sale of e-cigarettes to under 18’s. These safe guards as well as the Tobacco Products directive all serve to prevent future harmful effects of e-cigarettes.

In terms of where e-cigarettes can be smoked, they are not currently regulated under smoke free laws in the UK; therefore users can use them in almost all public places. The danger being that all the work done to make smoking socially unacceptable behaviour could be damaged by an introduction of a similar device in public places. ASH has worked with the Environmental Health and trading standards to provide businesses with guidance on the issue. However, leaving this decision to the discretion of individuals with no healthcare background could raise some questions.

**What does the WHO and the BMA say?**

The WHO has hailed controversy surrounding its latest commissioned report on e-cigarettes. The WHO called for governments to regulate advertising and marketing of e-cigarettes and for the ban on indoor use, with the overall concern being to prevent young non smokers starting. However, many health practitioners and organisations are split on their opinion. One report in the guardian has the headline, ‘E-cigarettes could save over 50,000 lives in the UK’. Critics believe the report is misleading with Professor of Tobacco Addiction, Anne McNeill from Kings College London saying, ‘the WHO’s approach will make it harder to bring these products to the market than tobacco products, inhibit innovation and put off smokers from using e-cigs, putting us in danger of foregoing the public health benefits these products could have’.

Further to this, Prof Robert West and Dr Jamie Brown from UCL claim this week in the British Journal of General Practice that for every million smokers who switch to e-cigs, over 6000 premature deaths would be prevented every year.’

In response, Prof John Ashton, president of the Faculty of Public health welcomed the report and said, ‘we want to be sure that any benefits they may have don’t undo all the hard work that has been done over the decades to save lives by reducing smoking’.

The BMA agreed with WHO that e-cigarettes are a concern and that stronger regulation is required to prevent the normalisation of smoking again and that they don’t undermine current
tobacco control measures. Dr Moorthy, deputy chair of BMA board of science also communicated the desire for greater regulation and ‘robust independent scientific evidence, to ensure the public are fully informed of the benefits and risks’

**What would you do? The dangers of saying ‘go ahead’**

As medical students and doctors, it is important to reflect on the doctor’s position of trust and the duty to promote health and well being amongst patients. It is clear that there is still much controversy surrounding e-cigarettes in the UK and this combined with little research means that decisions and opinions are often being made on an individual basis. Currently the message from the WHO and BMA are to err on the side of caution, not forgetting e-cigarettes have not been approved as a medical NRT. Many patients will be turning up to their GP and will be reporting the use of e-cigarettes often with positive stories of their aid in quitting. It is important to remember that there is no robust and long-term evidence available in order to base our advice to patients, so advice must be based on the individual patient and aim to reduce the harmful effects of tobacco.

**Short summary**

It is clear that much more research will need to be conducted to know for sure the effectiveness and impact e-cigarettes have had on the population. However, with thousands every year dying prematurely from smoking, any glimmer of hope for reducing this figure is worth the time to investigate. In this interim period, organisations must focus on their previous message of smoking cessation and regulation of the tobacco industry to prevent regression to past norms.
References

1) HemOnc today. Cigarettes were once ‘physician’ tested, approved. [Link](http://www.healio.com/hematology-oncology/news/print/hemonc-today/%7B241d62a7-fe6e-4c5b-9fed-a33cc6e4bd7c%7D/cigarettes-were-once-physician-tested-approved). Accessed 18/01/15


8) YouGov survey. Total sample size 12,269. Fieldwork undertaken between 5th and 14th March 2014. All surveys were carried out online. The figures have been weighted and are representative of all GB adults (aged 18+)


11) Brown J, Beard E, Kotz D, Michie S & West R. Real-world effectiveness of e-cigarettes when used to aid smoking cessation: a cross-sectional population study. Published online 20 May 2014


16) Williams M, Villarreal A, Bozhilov K, Lin S, Talbt P. Metal and silicate particles including nano particles are present in ECcartomiser fluid and aerosol. PloS one 2013;8 (3):e57987


26) YouGov survey. Fieldwork dates and sample size:
Adults: Children:
March 2010: 2,297 adult smokers March 2013: 2,178 children aged 11-18
March 2012: 12,436 adults March 2014: 2,068 children aged 11-18
February 2013: 12,171 adults
March 2014: 12,269 adults
Surveys were conducted online and results weighted to reflect the British population, as appropriate
