

## We need to talk about vaping

A pilot study of the gingival response when smokers switch from smoking to vaping  
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The effects of vaping have been prominent in health news headlines over the past few years but relatively little is actually known about its effects. By now we've all heard of 'popcorn lung' (*bronchiolitis obliterans*), which causes scarring of the lungs and loss of function, and has been linked to diacetyl, a chemical found in some e-cigarettes. However, some studies



have suggested that vaping does help with smoking cessation and is ultimately much less unhealthy than smoking tobacco.

In this pilot longitudinal study, Wadia *et al.* examine the effects of vaping on the gingiva and inflammatory biomarkers. The study recorded the gingival health of smokers before and after switching to vaping. They expected to see no change in gingival health because of previous studies suggesting that reduction in bleeding was due to the induction of gingival vasoconstriction by the nicotine component of cigarette smoking.

There were 18 participants in the study, but unfortunately four people failed to achieve complete smoking cessation. However, these four did manage to reduce their cigarette intake to only five or less during the two week period. The authors expected a high drop-out rate but didn't observe this which does support the Royal College of Physicians' claim that e-cigarettes could be an effective tool for smokers attempting to quit the habit.

There was a clear increase in bleeding on probing after the study, contradicting the claim from previous studies that gingival vasoconstriction by the nicotine component is the cause of reduced bleeding and suggesting that instead it is caused by other features of smoking. The bleeding was accompanied by an increase in gingival crevicular fluid levels.

The authors note that the study's findings demonstrate vaping has a similar effect on gingival health as smoking cessation, but they suggest that further investigation is needed to determine the difference ➔

### Expert view

Philip Ower  
Specialist in Periodontics  
President, British Society of Periodontology



Tobacco smoking is considered one of the major risk factors for periodontitis<sup>1</sup> and affects the vasculature, humoral and cellular immune responses, cell-signalling and tissue homeostasis<sup>2</sup> of the gingival tissues, although which of these mechanisms of tissue disruption are the most important is not clear.

This small scale study could not be more timely; while the prevalence of cigarette smoking in the general population has drastically decreased, due largely to better public awareness of the harmful effects of tobacco and the ban on smoking in public and work places that came into effect in the UK in 2007, the popularity of e-cigarettes (vaping) has taken off over this period and is currently growing at the rate of about 22% per year<sup>3</sup> with 2.6 million users in the UK alone.

The results of this pilot study showed that the observable effects on the gingival tissues of replacing tobacco with nicotine vapour were

similar to the effects seen in smoking cessation, that is increased gingival bleeding and GCF production, presumably due to recovery of the peripheral circulation. There was no significant change in cytokine levels so no conclusions could be drawn in this respect. However, as there was no control group of smokers who quit for the two weeks and didn't use e-cigarettes the effects observed could have been due to smoking cessation rather than vaping.

The authors correctly point out that this was only a pilot study on a limited number of subjects (18) for a limited time period (two weeks). It is not possible to reach any conclusions that are of practical use in terms of how we may advise our patients – specifically is vaping better than, worse than or similar to tobacco smoking in its effects on the periodontal tissues? However it does point the way for further studies in this important area; what is needed are larger, longer studies with appropriate control groups so that we can start to answer those questions that we get all the time from patients about the effects of vaping on their gums. This study does not provide any clear answers. ■

1. Papananou P N, Lindhe J. Epidemiology of periodontal disease. In Lang N P, Lindhe J (ed) *Clinical periodontology and implant dentistry*. 6th ed. pp 144–150. Wiley Blackwell, 2015
2. Palmer R M, Wilson R F, Hasan A S *et al.* Mechanisms of action of environmental factors – tobacco smoking. *J Clin Periodontol* 2005; **32** (Suppl 6): 180–195.
3. Global e-cigarette and vaporiser, device and aftermarket, analysis and forecast, 2016-2025. September 2016. Available online at [www.researchandmarkets.com/reports/3845485](http://www.researchandmarkets.com/reports/3845485) (accessed November 2016).

◀ between smoking cessation and replacing smoking with vaping. They also suggest collecting plaque samples, as well as studying changes in the oral microbiota.

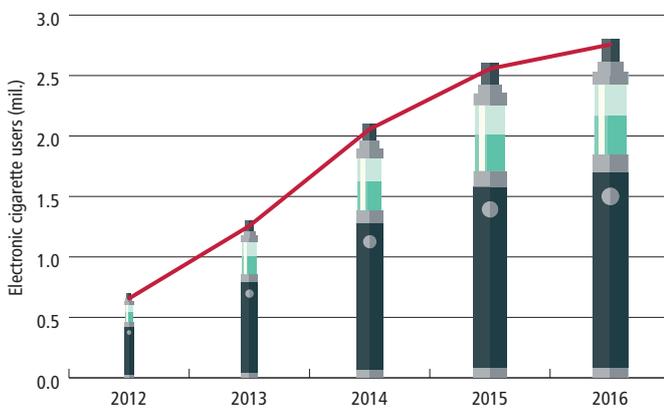
Because vaping may help with smoking cessation, it is likely that more and more smokers will move to e-cigarettes in the future. Therefore, it is important that further research like this is undertaken to gather more evidence so that we can advise patients appropriately and ensure that the public can be made aware of its effects.

By Jonathan Coe



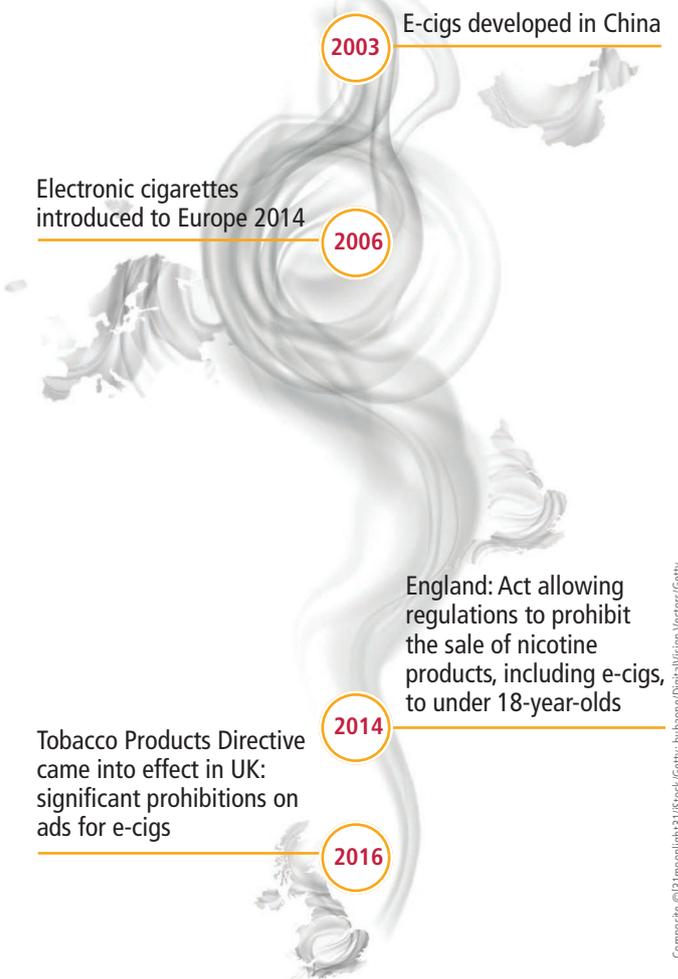
Listen to Stephen Hancocks' summary of this research via the BDJ Youtube Channel  
<http://go.nature.com/bdjyoutube>

## Number of electronic cigarette users (vapers) in Great Britain\*



\*Data from ASH Fact Sheet on the use of electronic cigarettes among adults in Great Britain (May 2016)

## Electronic cigarette timeline



## Author Q&A

with Reena Wadia  
 King's College London Dental Institute



### What was your impetus to research this topic?

Although the prevalence of tobacco smoking has declined in recent years, the use of electronic-cigarettes/vaping has become increasingly popular. The effects of vaping on the gingiva were unknown and we felt an evidence-base needed to be established before providing dental advice to our patients about the use of these products. Therefore, we decided to undertake a pilot study as a necessary first step to explore the effects of e-cigarettes on the gingival condition, prior to undertaking larger scale studies.

### Did you face any challenges in doing this research?

We didn't face any major challenges while undertaking this pilot study. Initially, I felt recruitment would be problematic especially because,

at the time of the study, there were no published benefits on the use of e-cigarettes, specifically as a smoking cessation tool. However, we found that there was genuine interest amongst smokers about the use of e-cigarettes and the majority of individuals who were asked were happy to attempt to switch their regular smoking habits to vaping for two weeks.

### If you were Minister for Health, what policy would you have towards e-cigarettes?

I would develop policies to minimise any risks and investigate any potential benefits of e-cigarettes, not only to smokers but also the wider population.

Recently, e-cigarettes have been shown to be more successful in aiding smoking cessation than traditional nicotine replacement therapies as they replicate many of the delivery, sensory and behavioural characteristics of cigarettes. Once this is confirmed, I would ensure the prescription of e-cigarettes on the NHS would be available as one of the nicotine replacement therapies.

As the number of brands and 'flavours' of e-cigarettes continues to grow, there is a clear need to develop policies to regulate the content, dose, availability and advertisement of these products. ■