

## The electronic cigarettes debate

Electronic cigarettes (e-cigarettes) are relatively new in South Africa and their popularity is increasing. Their appearance coincides with intensifying attempts by government and society to reduce tobacco smoking through stricter limitation on its sale, advertising and use. Debate has been triggered on their use regarding the potential risks of increasing nicotine addiction and encouraging people to start smoking, or whether e-cigarettes might serve rather as an efficient means of treating addiction, thus assisting smokers to quit.

Opinions among doctors regarding e-cigarettes vary, some seeing potential for good, others condemning them outright. Several professional medical societies have taken the stand that, whatever their potential as a smoking-cessation method, they cannot be encouraged since they are produced and promoted by the tobacco industry. Also, that research supported by the manufacturers of e-cigarettes may not be presented at their meetings or in their medical journals.

We present the following arguments for the potential benefit and harms of e-cigarettes, based on the currently available evidence.

### Electronic cigarettes: The potential benefits outweigh the risks



Cigarettes kill over 6 million people each year – almost twice that from HIV and tuberculosis combined.<sup>[1]</sup> Smoking is strongly associated with the five leading causes of global mortality, namely ischaemic heart disease, stroke, chronic obstructive pulmonary disease, lower respiratory tract infection and lung cancer.<sup>[2]</sup> It is estimated that without tobacco, one-third of all cancer deaths would be avoided.<sup>[3]</sup> Yet, despite this overwhelming evidence of harm – not to mention financial burden – the majority of smokers are unable to quit. The cigarette's combination of chemical and psychological addiction overwhelms common sense; in smoking-cessation trials, where only highly motivated patients are enrolled, sustained quit rates rarely exceed 25%.<sup>[4]</sup> We need more strings to our bow, if we hope to win this battle. Could e-cigarettes play a role in smoking cessation? The argument in favour of physicians supporting the use and sale of e-cigarettes is simple: they are safer than cigarettes, they are effective in reducing tobacco risk and, potentially, they are the best method of assisting smokers to quit.

Although many South African doctors are not familiar with e-cigarettes, they already boast 2.5 million users in the US alone and have been on the market for almost 10 years. E-cigarettes are battery-powered devices, similar in appearance to conventional cigarettes that vaporise nicotine for inhalation. There is great public interest in this product. Google search volumes for 'e-cigarettes' have exceeded those for both nicotine replacement therapy (NRT) (e.g. gum) and varenicline for the last 2 years.<sup>[5]</sup>

Many smokers have embraced e-cigarettes as an acceptable alternative. Users feel that they are a healthier, cheaper substitute for tobacco and purchase them primarily to help quit smoking or avoid relapse (77% of 3 587 internet responders).<sup>[6]</sup> The emerging data on efficacy are encouraging; e-cigarettes may reduce health risks of smokers. One key randomised clinical trial, performed in smokers who were not motivated to quit, showed sustained quit rates similar to those in motivated populations using trial interventions (e.g. varenicline). Without any form of counselling or incentive, quit rates at 1-year were 8.7%, with a further 10.3% having >50% reduction in smoking. Moreover, 73% of those who gave up smoking at 1 year had quit the use of e-cigarettes as well.<sup>[7]</sup> Perhaps even more impressive is a second smaller study using e-cigarettes in schizophrenic patients who had no intention of quitting. In this highly addicted group, 64% of study participants achieved either abstinence (14% of subjects) or a sustained 50% reduction in cigarette smoking (in 50% of subjects), at 1 year.<sup>[8]</sup>

Naturally, the question of safety arises. The main components of the refill fluid are nicotine, the vaporising propellant (propylene glycol or vegetable glycerin) and chemicals used as flavourants. They

do not produce smoke, but a vapour that is inhaled, and the common adverse effects of e-cigarettes (cough, mouth irritation and headache) are mild and appear to decrease over time.<sup>[7]</sup> The nicotine component of e-cigarettes is thought to be safe as it has not been shown to cause cancer, cardiovascular disease or lung damage<sup>[9]</sup> – neither has it been shown to be cytotoxic to stem cells.<sup>[10]</sup> An additional advantage is that e-cigarettes are not associated with side-stream smoking – they have not been shown to affect bystanders, which could potentially reduce the 600 000 annual deaths associated with passive smoking.<sup>[11,11]</sup> A further advantage of their use is that switching is not associated with the weight gain seen in smokers who quit. But the real benefit for those who convert is the sparing of exposure to the over 8 000 chemicals (including carcinogens) found in cigarette smoke. It is highly unlikely that e-cigarettes are as toxic to human tissues as conventional cigarettes. In support of this, e-cigarettes do not result in the acute rise in white blood cells or carbon monoxide levels seen with conventional cigarettes.<sup>[7,11]</sup> The reduction in exposure to innumerable carcinogens, with the long-term reduction in risk of numerous cancers, is likely to prove the e-cigarette's greatest benefit.

E-cigarettes are used as NRT to overcome the unpleasant cravings of nicotine withdrawal. Although not as effective as cigarettes, they are more efficient than other forms of NRT in their ability to deliver nicotine.<sup>[12]</sup> Thus they alleviate the desire to smoke, and most users surveyed report being able to cut back successfully on tobacco and believe that e-cigarettes helped them to achieve smoking cessation.<sup>[12,13]</sup> Uniquely, e-cigarettes address the psychological and social aspects of smoking that bind many people to the habit by allowing potential quitters to participate in the 'ritual' of smoking.<sup>[7]</sup> The flavouring of e-cigarettes (including tobacco, blackberry, vanilla and even 'red-bull' flavour) provides an exciting, socially acceptable alternative to cigarettes.

It is estimated that smoking cessation before the age of 45 years adds, on average, 9 years to a person's life.<sup>[14]</sup> In light of this, if e-cigarettes improve quit rates, surely they should be considered, if not embraced. They remain the only currently available therapy that simultaneously addresses both the physical and psychological components of tobacco addiction – assisting smokers to both quit and cut down, with the added benefit of avoiding 'passive smoking' by others.

E-cigarettes are safe and effective and, based on the available evidence, the potential benefits must outweigh their risks, especially when compared with the alternative: smoking.

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