



Heated tobacco products - No smoke without fire?

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Back in the 1960s, when smoking was more popular, cigarettes were used as fashion accessories and models, writers and other media personalities would not hesitate to pose either holding or smoking a cigarette. Yet, this was also the period when public concerns about smoking and health began to rise. As a result, in the 1980's tobacco companies developed a brand-new type of cigarettes promoted as "light" and "low-tar". Tobacco advertising created the perception that a healthier cigarette was available on the market¹ and very quickly, many smokers identified the so-called 'light' cigarette as a safe alternative to smoking¹. Studies have since shown that the risk of serious health effects was not actually lower for smokers of "light" and "low-tar" cigarettes and indeed sometimes increased^{2 3}. More recently, the continuing global decline in tobacco consumption has led the tobacco industry to introduce and massively advertise new "heated tobacco products" that they claim to be significantly less harmful than traditional cigarettes. Given the history of tobacco companies using reduced exposure to mislead smokers who want to quit, it is important to evaluate, in the light of the existing scientific evidence, what really are heated tobacco products and their impact on consumers' health.

What are heated tobacco products?

Heated tobacco is a new nicotine delivery system, commonly referred to as "Heat-not-Burn" by the tobacco industry. Heated tobacco products consist of a small tobacco stick that is heated electronically, rather than burned. The tobacco industry is actively pursuing the market with sales on the rise of products such as 'iQOS' and 'glo'.

Tobacco industry research claims a 90-95% reduction in harm

According to a tobacco industry press release, the main ingredient in heated tobacco products is water, whereas the main ingredient in conventional cigarettes is tar. The tobacco industry claims that there is a 90-95% reduction in harmful and potentially harmful substances and toxicity⁴.

Not the full picture: digging deeper into tobacco industry research

Tobacco companies have not informed the public that their studies on emissions from heated tobacco found high concentrations of e.g. particulate matter, tar, acetaldehyde (a carcinogen), acrylamide (a potential carcinogen), an acrolein metabolite (toxic and irritant)⁵⁻⁹ and formaldehyde (a potential carcinogen)^{10 11}. Independent researchers have investigated tobacco industry data and point out that heated tobacco products emit significantly higher levels of several substances that are not recognised as harmful or potentially harmful by the US Food and Drug Administration (FDA) compared with combustible cigarette smoke. Levels of twenty two harmful or potentially harmful substances were more than 200% higher and seven were more than 1000% higher than in reference cigarette smoke¹². Further, human studies show that there is no statistically detectable difference between users of heated tobacco and conventional cigarette for 23 of the 24 biomarkers of potential harm¹³. Both animal and human studies performed by the tobacco industry also show there is no evidence of improvement in pulmonary function or inflammation in smokers who switched to heated tobacco¹⁴ and there is possible hepatotoxicity of heated tobacco¹⁵.

Independent research: a substantially higher risk than claimed by the tobacco industry

Historically, doubt has been cast on the independence of studies carried out by the tobacco industry or researchers funded by

them¹⁶⁻²⁰. Former employees and contractors have detailed irregularities in the clinical experiments on heated tobacco products performed by the industry²¹.

Independent research shows that heated tobacco products emit substantial levels of carcinogenic tobacco specific nitrosamines^{22 23} as well as toxic and irritant substances and potential carcinogens²⁴. Nicotine and tar levels have been found to be almost identical to a conventional cigarette²⁵, the potentially carcinogenic substance acenaphthene is found to be almost 3 times higher than in conventional cigarettes²⁴, and release of formaldehyde cyanohydrin takes place, which is of great concern as it is highly toxic at very low concentrations²⁶. In-vitro studies found that emissions for heated tobacco cause damage to human bronchial epithelial cells²⁷, have the potential to increase oxidative stress and inflammation, infections and airway remodeling and initiate epithelial mesenchymal transition-related changes in the airways²⁸. Experimental animal studies found that exposure to heated tobacco led to decreased blood vessel function comparable to that induced by cigarette smoke²⁹ and impaired arterial flow-mediated dilation, a measure of vascular endothelial function in a manner very similar to tobacco smoke³⁰. In addition, a study found that users of heated tobacco may be forced to smoke more quickly which could lead to an increase in intake of carbonyls (potentially carcinogenic) and nicotine, inducing a high level of nicotine dependence²⁶.

What does ERS recommend?

Even though heated tobacco products may perhaps be less harmful for smokers they nevertheless remain both harmful and highly addictive, and there may be a risk that smokers will switch to heated tobacco products instead of stopping smoking. ERS cannot recommend any product which damages the lungs and human health.

Why does ERS make this recommendation?

It is tempting to recommend to smokers to switch to heated tobacco products without considering all of the consequences. Experiences with filter cigarettes and light cigarettes have shown that 'safer products' undermine smokers' wish to stop smoking, while not improving smokers' health³. Quoting the tobacco industry on 'safer products': "*Quitters may be discouraged from quitting, or at least kept in the market longer ...*". We must remember that two to three out of four smokers want to quit³¹ and almost all smokers regret starting to smoke^{32 33}. Also, many smokers want to quit because they want to regain control of their life^{34 35}, and get cured of their nicotine dependency – this will not happen if they switch to heated tobacco products. A majority of smokers want to quit, and there is not a 'hardening' of smokers³⁶ – on contrary there are fewer hard core smokers³⁷ and they report being less dependent³⁸. We have no evidence that heated tobacco products are efficient as smoking cessation aid. Dual use is very frequent for other harm reduction products as e-cigarettes (approx. 70-80%)^{39 40} and snuff/snus (>40%)⁴¹, and dual use of heated tobacco cigarettes combined with conventional cigarettes cannot be ruled out. Finally, ex-smokers and never-smokers might be tempted to start using this 'harmless' product and a re-normalisation of smoking in public might occur⁴². Four studies show that heated tobacco is used by non-smokers in up to 45% of cases⁴³.

The European Commission underlines that "with regard to the sale, presentation and manufacturing of these products within the European Union, the relevant provisions of the Tobacco Products Directive apply and should be enforced. This includes a ban on misleading elements foreseen by Article 13 and notably any suggestions that a particular tobacco product is less harmful than another⁴⁴.

EU Member states are currently assessing the toxicity of these products. For example, there is concern in the UK” over the potential for non-smokers including children and young people, who would not otherwise start to smoke cigarettes, to start using these products, as they are not without risk. There has also been concern over whether use of these products would lead people to take up smoking cigarettes”⁴⁵.

These concerns are also being aired outside Europe. An expert scientific panel has advised the US FDA to vote against the tobacco industry’s claim that heated tobacco products cut the risk of tobacco-related diseases and that a heated tobacco product is less risky than continuing to smoke cigarettes⁴⁶.

At the last opening of the Conference of Parties (COP) to the WHO Framework Convention on Tobacco Control, Dr Vera da Luiza Costa, head of the WHO FCTC secretariat, raised her concerns regarding new emerging products and recommended parties to the Convention to “expedite implementation of article 5.3 Guidelines and ensure that its applicable to all commercial and vested interests of the tobacco industry, including addressing unproven claims of harm reduction”⁴⁷.

Conclusion

Based on current science-based evidence, we can conclude that heated tobacco products are not harmless, as claimed by the tobacco industry. Even if they turn out to be less harmful than conventional cigarettes, they might have a negative impact on public health. These products were introduced for the same reasons as “low tar” and “light” cigarettes: to prevent smokers from quitting and attract non-smokers. Just like regular tobacco smoking and smokeless tobacco, they remain addictive and carcinogenic to humans^{48 49}. We should not allow debate around these new tobacco products to distract us from the main job at hand – promoting regulatory measures that we know are effective at reducing smoking,

continue to support those who wish to stop smoking and tell smokers that the safest tobacco product on the market is the one they will never smoke.

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