

Safety dominates the debate on electronic cigarettes

One of the most hotly debated topics over the past year has been the use of electronic cigarettes (e-cigarettes), driven by their growing popularity. It seems obvious that use of a device that helps smokers to quit conventional tobacco use should be encouraged, and therefore intuitive that regulation should be minimised. However, like all good debates, there are many grey areas; long-term safety data are required, and there have been signs in recent weeks that safety should be a primary consideration.

Earlier this month, eight US senators asked the Food and Drug Administration (FDA) to assess the potential cancer risk associated with the high-powered tank systems of e-cigarettes, following media reports of two studies that will be reported in *Nicotine and Tobacco Research* describing the release of formaldehyde (a known carcinogen) in the vapour. Tank systems are larger devices than traditional e-cigarettes that can hold more nicotine and have variable voltages. The devices can be modified by retailers and users. According to a report in *The New York Times*, the studies show that these systems can allow high temperatures to be reached that result in the release of toxins.

Additional safety concerns were raised in April by the US Centres for Disease Control and Prevention, which noted that the number of documented exposures from e-cigarettes reported to US poison centres had increased from one per month in September, 2010, to 215 per month in February, 2014, with 51.1% of those affected aged 0–5 years; by contrast, no increase was seen over the same time period in the number of exposures to conventional tobacco. Exposures differed between the two products, with ingestion exposures being more common for tobacco (97.8% vs 68.9%) whereas inhalation (2.0% vs 16.8%) and eye (0.1% vs 8.5%) and skin exposures (0.1% vs 5.9%)—resulting in vomiting, nausea, and eye irritation—were more common for e-cigarettes than for conventional cigarettes. Worryingly, exposures from e-cigarettes accounted for 41.7% of the combined monthly e-cigarette and cigarette exposure reports to the poison centres in the latest data. *The Guardian* newspaper, using data from the National Poisons Information Service, has also reported a similar increase in the number of poisonings from e-cigarettes in the UK. In view of the results of a recent survey by the UK Action on Smoking and Health group, which showed that e-cigarette use in the UK has tripled

from 700 000 in 2012 to a staggering 2.1 million in 2014, the number of poisonings can be expected to increase. The survey authors also noted that the proportion of smokers and ex-smokers who had ever tried e-cigarettes rose from 8.2% in 2010 to 51.7% in 2014.

Preclinical data reported at the 2014 American Thoracic Society meeting in San Diego (CA, USA, May 16–21; abstract 57341) also suggests e-cigarettes might not be as benign in terms of toxicity as manufacturers suggest. Researchers showed that the virulence of drug-resistant bacteria was increased by vapours from e-cigarettes, possibly through changes in pH, and also that the ability of cells to destroy bacteria was impaired; although in parallel experiments the bacteria were even more virulent in the presence of tobacco smoke. Nevertheless, the growing number of reports emphasising safety concerns with e-cigarettes means that this issue needs careful consideration.

The explosion in the use of e-cigarettes has meant regulatory authorities have struggled to keep pace with technological developments. On Apr 24, 2014, the FDA announced that it will now regulate e-cigarettes and has proposed minimum age requirements for their sale, inclusion of health warning labels, and the reporting of the ingredients of the product. As previously discussed in *The Lancet Respiratory Medicine*, there has been a worrying mirroring of big tobacco tactics in the marketing of e-cigarettes towards young people, so it is reassuring that the FDA is taking some steps to protect this vulnerable group, although there will probably be a delay before these measures are fully implemented. Notably, several US cities have implemented indoor bans this year. These bans should prevent a return to the normalisation of smoking by stopping the use of e-cigarettes in public indoor spaces, as well as ensuring that the precautionary principle is applied until more evidence on second-hand exposure to vapours is available.

Many would agree that, used appropriately, the e-cigarette has a valuable part to play in smoking cessation, but because the long-term safety of e-cigarettes is unclear, and the effects of second-hand exposure to vapours unknown, we need to proceed cautiously, working hand-in-hand with regulators, to ensure that users and the general public are protected from harm. ■ *The Lancet Respiratory Medicine*



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For more on the **debate on e-cigarettes** see [Comment](#) *Lancet Respir Med* 2013; **1**: 429; [Comment](#) *Lancet Respir Med* 2013; **1**: 431; and [Correspondence](#) *Lancet Respir Med* 2013; **1**: e26.

For the **report in The New York Times** see http://www.nytimes.com/2014/05/04/business/some-e-cigarettes-deliver-a-puff-of-carcinogens.html?_r=0

For the **US Centers for Disease Control and Prevention report** see <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6313a4.htm>

For the **report in The Guardian** see <http://www.theguardian.com/society/2014/apr/14/e-cigarette-poisoning-figures-soar-adults-children>

For the **Action on Health and Smoking survey** see http://www.ash.org.uk/files/documents/ASH_891.pdf

For more on the **marketing of e-cigarettes to minors** see [Editorial](#) *Lancet Respir Med* 2014; **2**: 1