'Heat not burn' smokeless tobacco product may not be as harm free as claimed

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iQOS, one of the first 'heat not burn' smokeless tobacco products marketed as a safer alternative to conventional cigarettes, may not be as harm free as its manufacturer claims, suggests research published online in the journal *Tobacco Control*.

iQOS is a battery-operated electronic device, which mimics the looks, taste, and sensory experience of a cigarette. It contains a specially designed heat stick, which uses a tobacco plug to deliver nicotine. This is heated to temperatures well below those at which conventional cigarettes burn, producing a tobacco-infused vapour for inhalation rather than smoke.

Tobacco smoke is what contains the cocktail of chemicals that is so harmful to health.

The manufacturer, Philip Morris International, has evaluated IQOS in several published studies, but there has been little independent research.

To try and plug this gap, the US researchers set out to assess the performance of iQOS under five different puff conditions, and the impact of two cleaning protocols: a thorough clean after use of each heat stick to remove fluid and debris from the heater; and the manufacturer's recommendations to clean the device after every 20 heat sticks before using the brush cleaners supplied with the product.

The researchers also wanted to gauge if the plastic polymer film filter,

which aims to cool the vapour, might pose a risk to health.

Each iQOS heat stick only lasts for 6 minutes after which it automatically shuts off and requires recharging before use. So to get the most out of each heat stick, real life users would have to shorten the interval between puffs, speeding up their puff rate, and potentially breathing in larger amounts of vapour, say the researchers.

The tobacco plug charred as a result of pyrolysis—thermal decomposition in the absence of oxygen. Charring was more extensive when thorough cleaning was not carried out after use of each heat stick, suggesting that build-up of debris and fluid increases pyrolytic temperatures, say the researchers.

Analysis of the polymer film showed that irrespective of whether cleaning was done or not, the intensity of the heat was sufficient to melt the film even though it was not in direct contact with the heating element.

Following the manufacturer's recommended cleaning instructions increased both the extent of charring and polymer film melt.

Of further concern was the release of fomaldehyde cyanohydrin by the melting filter at temperatures that all users will easily exceed, say the researchers. This chemical is highly toxic even at very low levels.

"iQOS is not strictly a 'heat not burn' tobacco product," write the researchers, who go on to say: "This study has shown that the iQOS system may not be as harm free as claimed, and also emphasises the urgent need for further safety testing as the popularity and user base of this product is growing rapidly."

More information: iQOS: evidence of pyrolysis and release of a

toxicant from plastic, *Tobacco Control* (2018). DOI: 10.1136/tobaccocontrol-2017-054104