

Characterization of vaping liquids used in vaping devices across four countries: Results from an analysis of selected vaping liquids reported by users in the 2016 ITC Four Country Smoking and Vaping Survey

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Abstract

Objectives This study presents an analysis of vaping products (VPs) purchased in the USA, Canada, England and Australia and assesses whether differences in regulations were associated with differences in the chemical composition of the VPs.

Methods April–September 2017, a total of 234 VP refill liquids and prefilled cartridges were purchased in convenience samples of retail locations in each country. Products were chosen from brands and styles most commonly reported by current VP users in the 2016 ITC Four Country Smoking and Vaping Survey. All products were tested for nicotine, tobacco-specific nitrosamines (TSNAs), minor tobacco alkaloids, organic acids and flavouring chemicals.

Results Consistent with the laws in Canada and Australia at the time of product purchase, nicotine was not detected in any of the VPs (n=10 in Canada; n=15 in Australia). US liquids (n=54) had a mean nicotine concentration of 16.2 mg/mL, (range=0.0–58.6) and English liquids (n=166) had a mean concentration of 11.9 mg/mL ((range=0.0–31.2) $F(3244)=12.32$, $p<0.001$). About 5% of English samples exceeded the UK's 20 mg/mL nicotine limit. Substantial country differences were observed in levels of TSNAs, with the USA being higher than elsewhere. Of all products tested, 18.8% contained at least one organic acid. Liquids purchased in England contained far more identifiable flavouring chemicals than those in the other countries.

Conclusions VP composition, particularly with respect to nicotine and flavouring, varies by country, likely reflecting both marketplace preferences and country-specific regulations. There are differences between nicotine levels claimed on the package and actual levels, particularly in England.

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