

Switching from conventional to electronic cigarettes reduced toxicant exposure, even for dual users

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Among adults who wanted to stop smoking conventional cigarettes, both those who switched to using only electronic cigarettes (e-cigarettes) and those who switched to dual use of e-cigarettes and conventional cigarettes had significant reductions in exposure to carbon monoxide and the toxicant acrolein, according to a study published in *Cancer Prevention Research*, a journal of the American Association for Cancer Research.

"Acrolein is a toxicant found in both <u>tobacco smoke</u> and e-cigarette vapor," said Hayden McRobbie, MB, PhD, professor of <u>public health</u> <u>interventions</u> in the Tobacco Dependence Research Unit of the Wolfson Institute of Preventive Medicine at Queen Mary University of London, United Kingdom. "There have been concerns about the potential for increased exposure to toxicants like acrolein that are found in both tobacco smoke and e-cigarette vapor among individuals who are both vaping and smoking, so-called 'dual users.'

"We found that e-cigarette use significantly reduced exposure to carbon monoxide and acrolein over a four-week period," added McRobbie. "The reduction was greatest in those who switched to <u>e-cigarettes</u> completely, but even those who were dual users at four weeks had reduced exposure to carbon monoxide and acrolein. These results suggest that e-cigarettes may reduce harm compared with conventional cigarettes, even in dual users, but longer-term studies are needed to



confirm this."

McRobbie and colleagues enrolled in the study 40 adults who wanted to stop smoking conventional cigarettes. All participants were provided with a brand of e-cigarettes called Green Smoke. The researchers measured carbon monoxide in participants' breath one week before switching to the e-cigarettes, the day of switching, and once a week for the next four weeks. They also analyzed urine samples provided by participants the day of switching and four weeks after switching, looking for a biomarker of exposure to acrolein.

Four weeks after switching, 33 participants were still using e-cigarettes. Of these individuals, 16 were using only e-cigarettes and 17 were dual users.

The researchers found that from one week before switching to four weeks after switching, levels of carbon monoxide in the breath of those who were using only e-cigarettes decreased by 80 percent (from 15 parts per million [ppm] to 3 ppm). For those who were dual users, the carbon monoxide levels reduced by 52 percent (from 23 ppm to 11 ppm).

Urine levels of the biomarker of exposure to acrolein, S-(3-hydroxypropyl)mercapturic acid (3-HPMA), decreased by 79 percent (from 1,623 nanograms per milligram of creatinine [ng/mg creatinine] to 343 ng/mg creatinine) for those who were using only ecigarettes and by 60 percent (from 2,443 ng/mg creatinine to 969 ng/mg creatinine) for dual users.

"The results are very reassuring," said senior author Peter Hajek, PhD, professor of clinical psychology and director of the Tobacco Dependence Research Unit. "Dual users did not increase their acrolein intake; on the contrary, they reduced it substantially. The reason for this is that smokers who receive nicotine from e-cigarettes have a reduced



need to smoke and so smoked less."

According to McRobbie, limitations of the study include the fact that the researchers measured levels of only two toxicants, <u>carbon monoxide</u> and acrolein, that the study included only people who wanted to <u>stop</u> <u>smoking</u>, and that the study was run over only four weeks.

More information: "Effects of Switching to Electronic Cigarettes with and without Concurrent Smoking on Exposure to Nicotine, Carbon Monoxide, and Acrolein." *Cancer Prev Res* September 2015 8:873-878; DOI: 10.1158/1940-6207.CAPR-15-0058

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