

# How to measure nicotine delivery from e-cigarettes

To be effective in helping smokers get off cigarettes, e-cigarettes need to deliver enough nicotine to replace what smokers were getting from tobacco, but also need to deliver it consistently at different use sessions. From later this year e-cigarettes sold in Europe will have to be tested to ensure that they deliver nicotine consistently, but no specific protocol has been proposed yet.

A new study published today in the scientific journal *Addiction* evaluated a new method for measuring nicotine delivery from e-cigarettes. Researchers found that 'first-generation' e-cigarettes, which use 'cartomizers', delivered nicotine less consistently than later-generation e-cigarettes, which use 'atomizers' that vaporize e-liquid contained in a refillable tank. The consistency of nicotine delivery from the atomizers was similar to pharmaceutical nicotine inhalers and tobacco cigarettes and within the acceptable limits for medicinal nebulizers.

Three cartomizer and four tank-type atomizer products were tested, as well as three cartridges from a nicotine inhaler and three tobacco cigarettes.

The method requires the collection of three aerosol samples from 20-puff sessions (with a five-minute period between sessions) using the same cartomizer and the same wick-coil replacement head. The comparison between those puff sessions determines the intra-sample consistency. The same procedure is repeated twice, with the batteries fully charged, using two more cartomizers and wick-coil replacement heads. The comparison between the three cartomizers and between the three wick-coil replacement heads determines the inter-sample consistency.

The authors propose that this protocol could be adopted by the EU regulators as a method for testing consistency in nicotine delivery from e-cigarettes.

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For editors:

Farsalinos KE, Yannovits N, Sarri T, Voudris V, and Poulas K. (2016) Protocol proposal for, and evaluation of, consistency in nicotine delivery from the liquid to the aerosol of electronic cigarettes atomizers: Regulatory implications. *Addiction* 111: [doi: 10.1111/add.13299](https://doi.org/10.1111/add.13299)

**Interviews with lead author Dr Konstantinos Farsalinos:** contact him at the Onassis Cardiac Surgery Center, Greece by email ([kfarsalinos@gmail.com](mailto:kfarsalinos@gmail.com)) or telephone (+30 6977454837).

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