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## Electronic cigarettes are unsafe and pose health risks, UC Riverside study finds

### Safety evaluation of e-cigarettes is urgently needed, researchers say

RIVERSIDE, Calif. – Electronic cigarettes (or e-cigarettes), also called "electronic nicotine delivery systems," are increasingly used worldwide even though only sparse information is available on their health effects. In the United States, e-cigarettes are readily available in shopping malls in most states and on the Internet. But how safe are e-cigarettes?

To address this question, researchers at the University of California, Riverside evaluated five e-cigarette brands and found design flaws, lack of adequate labeling, and several concerns about quality control and health issues. They conclude that e-cigarettes are potentially harmful and urge regulators to consider removing e-cigarettes from the market until their safety is adequately evaluated.

Unlike conventional cigarettes, which burn tobacco, e-cigarettes vaporize nicotine, along with other compounds present in the cartridge, in the form of aerosol created by heating, but do not produce the



**IMAGE:** The image shows e-cigarette fluid leaking out of a cartridge, making it difficult to handle without touching the nicotine solution.

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thousands of chemicals and toxicants created by tobacco combustion. Nothing is known, however, about the chemicals present in the aerosolized vapors emanating from e-cigarettes.

"As a result, some people believe that e-cigarettes are a safe substitute for conventional cigarettes," said [Prue Talbot](#), the director of UC Riverside's [Stem Cell Center](#), whose lab led the research. "However, there are virtually no scientific studies on e-cigarettes and their safety. Our study – one of the first studies to evaluate e-cigarettes – shows that this product has many flaws, which could cause serious public health problems in the future if the flaws go uncorrected."

Study results appear in this month's issue of *Tobacco Control*.

Talbot, a professor of [cell biology and neuroscience](#), was joined in the study by Anna Trtchounian, the first author of the research paper. Together, they examined the design, accuracy and clarity of labeling, nicotine content, leakiness, defective parts, disposal, errors in filling orders, instruction manual quality and advertizing for the following brands of e-cigarettes: NJOY, Liberty Stix, Crown Seven (Hydro), Smoking Everywhere (Gold and Platinum) and VapCigs.

Their main observations are that:

- Batteries, atomizers, cartridges, cartridge wrappers, packs and instruction manuals lack important information regarding e-cigarette content, use and essential warnings;
- E-cigarette cartridges leak, which could expose nicotine, an addictive and dangerous chemical, to children, adults, pets and the environment;
- Currently, there are no methods for proper disposal of e-cigarettes products and accessories, including cartridges, which could result in nicotine contamination from discarded cartridges entering water sources and soil, and adversely impacting the environment; and
- The manufacture, quality control, sales, and advertisement of e-cigarettes are unregulated.

The study was funded by a grant to Talbot from the University of California Tobacco-Related Disease Research Program ([TRDRP](#)).

"More research on e-cigarettes is crucially needed to protect the health of e-cigarette users and even those who do not use e-cigarettes," said Kamlesh Asotra, a research administrator at UC TRDRP. "Contrary to the claims of the manufacturers and marketers of e-cigarettes being 'safe,' in fact, virtually nothing is known about the toxicity of the vapors generated by these e-cigarettes. Until we know any thing about the potential health risks of the toxins generated upon heating the nicotine-containing content of the e-cigarette cartridges, the 'safety' claims of the manufactureres are dubious at best.

"Justifiably, more information about the potential toxic and health effects of e-cigarette vapors is necessary before the public can have a definitive answer about the touted safety of e-cigarettes. Hopefully,

in the near future, scientists can provide firm evidence for or against the claimed 'safety' of e-cigarettes as a nicotine-delivery tool."

UC TRDRP supports research that focuses on the prevention, causes, and treatment of tobacco-related disease and the reduction of the human and economic costs of tobacco use in California.

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**About electronic cigarettes:**

E-cigarettes consist of a battery, a charger, a power cord, an atomizer, and a cartridge containing nicotine and propylene glycol. When a smoker draws air through an e-cigarette, an airflow sensor activates the battery that turns the tip of the cigarette red to simulate smoking and heats the atomizer to vaporize the propylene glycol and nicotine. Upon inhalation, the aerosol vapor delivers a dose of nicotine into the lungs of the smoker, after which, residual aerosol is exhaled into the environment.

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