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# First evidence of long-term health damage from ecigs: Smoking E-Cigarettes Daily Doubles Risk of Heart Attacks

February 24, 2018

[Stanton A. Glantz, PhD](#)

Here is the UCSF press release on a new study I am presenting at the Society for Research on Nicotine and Tobacco today (24 Feb 2018):

## **Smoking E-Cigarettes Daily Doubles Risk of Heart Attacks**

When Combined with Daily Cigarette Use, Heart Attack Risk Rises Five-Fold, Study Finds

Daily use of electronic cigarettes is associated with nearly a doubling of the odds of a heart attack, according to a new study led by UC San Francisco. This is the first evidence of a substantial, human health impact of the popular devices that were first introduced about a decade ago, indicating that e-cigarettes may be more dangerous than previously thought.

The new study of nearly 70,000 people found that heightened heart attack risk for e-cigarettes is on top of the effects of conventional cigarettes, which by themselves nearly triple the odds of heart attack risk when smoked daily. Together they lead to five times the non-smoking heart attack risk in those who use both conventional cigarettes and e-cigarettes every day.

The [research](#) will be presented February 24 in Baltimore at the 2018 annual meeting of the Society for Research on Nicotine and Tobacco.

“The finding of increased heart attack risk for e-cigarette use, in addition to the risks of any smoking, is particularly troubling, because most people who use e-cigarettes continue to smoke cigarettes,” said senior author [Stanton Glantz, PhD](#), who presented the work. Glantz is a UCSF professor of medicine and director of the [UCSF Center for Tobacco Control Research and Education](#).

The health effects of e-cigarettes have been a contentious topic in the scientific community in recent years, but evidence is mounting that links them to direct health harms.

Last month, a report from the National Academies of Sciences, Engineering, and Medicine cited a range of health impacts of e-cigarette use, ranging from exposure to nicotine and other toxic substances to “substantial” evidence that e-cigarette use results in symptoms of dependence. The report observed that there wasn’t yet evidence of the risks of heart, cancer or respiratory disease in people who used e-cigarettes, but found some support from animal studies that long-term use could increase those risks.

While noting that it could take decades for some health effects to appear, the National Academies [report](#) also showed a clear impact of e-cigarettes on young smokers: “Among youth – who use e-cigarettes at higher rates than adults do – there is substantial evidence that e-cigarettes use increases the risk of transitioning to smoking conventional cigarettes.”

While e-cigarettes deliver lower levels of carcinogens than conventional cigarettes, they also expose users to high levels of ultrafine particles and other toxins that have been linked to increased cardiovascular and non-cancer lung disease risks -- which account for more than half of all smoking-caused deaths.

Moreover, studies are increasingly documenting that instead of prompting smokers to switch from conventional cigarettes to e-cigarettes or quitting altogether as some scientists and policymakers had hoped, e-cigarettes are reducing the likelihood that people will quit smoking, while also expanding the nicotine market by attracting more youth to start.

The new study from UCSF and George Washington University drew upon National Health Interview Surveys of 2014 and 2016 involving 69,725 people, and controlled for conventional cigarette use, demographic characteristics such as age, gender and body mass index, and health characteristics such as hypertension, diabetes, and high cholesterol.

When adjusted for other risk factors, daily e-cigarette use was associated with significantly increased odds (Odds Ratio: 1.79) of having had a heart attack (myocardial infarction), as was daily conventional cigarette smoking (OR: 2.72). Former and occasional e-cigarette use were not associated with significant changes in the odds of having had a heart attack, while the same categories of cigarette smoking were associated with smaller increases in risk than for current smokers.

“E-cigarettes are widely promoted as a smoking cessation aid, but for most people, they actually make it harder to quit smoking, so most people end up as so-called ‘dual users’ who keep smoking while using e-cigarettes,” said Glantz. “The new study shows that the risks compound. Someone who continues to smoke daily while using e-cigarettes daily has an increased risk of a heart attack by a factor of five.

“The good news is that the risk of heart attack starts to drop immediately after you stop smoking,” he added. “Our study also shows little risk associated with being a former e-cigarette user.”

Co-authors are Alzahtani Talal, MD, Ivan Pena, MD, and Nardos Temesgen, MD, all of George Washington University.

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## Comments

### Where is the study? I can't

[Permalink](#) Submitted by Jim McDonald on Feb 24, 2018

**Comment:**

Where is the study? I can't wait to read it.

While we wait, can you explain how you controlled for conventional cigarette smoking? Are you saying you eliminated e-cig users who also had a history of smoking? Did you also eliminate people with a history of heart disease before trying e-cigarettes?

[reply](#)

## There is a link to the

[Permalink](#) Submitted by Stanton Glantz on Feb 24, 2018

**Comment:**

There is a link to the abstract that was presented in the press release above.

We control for current and past cigarette smoking by including smoking status (never, former, some days, or daily) in the same logistic regression model as we include e-cigarette use (quantified the same way). The effects of smoking and e-cigarette use are independent of each other and assessed at the same time.

Thus, the effects of e-cig use that we estimate are *on top of* any effects of smoking, whether people are current or former smokers.

[reply](#)

## Thanks. I've seen the

[Permalink](#) Submitted by Jim McDonald on Feb 24, 2018

**Comment:**

Thanks. I've seen the abstract. I'm wondering when the full study will be published.

[reply](#)

## I don't know when the paper

[Permalink](#) Submitted by Stanton Glantz on Feb 25, 2018

**Comment:**

I don't know when the paper will be published. It takes a long time from initial submission to publication and no author has control over that process. That is why journals have exceptions to their embargo policies that allow abstracts to be submitted to meetings.

[reply](#)

## On the data you looked at is

[Permalink](#) Submitted by Andrew Day on Feb 24, 2018

**Comment:**

In the data you looked at is it possible to tell if e-cigarette use was initiated before the myocardial infarction? From the abstract it doesn't seem to be able to tell when e-cigarette use was initiated or when the MI happened.

reply

## Unfortunately, no. That is

[Permalink](#) Submitted by Stanton Glantz on Feb 25, 2018

**Comment:**

Unfortunately, no. That is one of the limitations of all cross-sectional studies, which are a snapshot in time. That is why we are careful to say there is an "association."

The fact that some of the MI's occurred before e-cigarettes were available, called exposure misclassification, biases the results toward the null, which means that we are almost certainly *underestimating* the association between e-cig use and having had an MI. You can see this issue discussed, including citations to a statistical methods paper that explains why this is the case, in our paper showing that e-cigarette use is associated with less smoking cessation in the EU, which is available [here](#).

Getting information on timing requires longitudinal studies in which people are followed forward in time, often for many years. These studies take a long time to do (because you have to wait for time to pass) and are much more expensive to do than cross-sectional studies. That is why the cross-sectional studies are always done first. Finding associations as we did between daily e-cig use and MI demonstrates the need for longitudinal studies.

While longitudinal studies are better, the fact is that well-done cross sectional studies generally come up with similar risk estimates as longitudinal studies. This is illustrated by the studies on gateway effects for e-cigs causing kids to take up cigarettes. The original cross-sectional studies pointed the way for subsequent longitudinal studies, which nailed down the link.

reply

## Have similar cross-sectional

[Permalink](#) Submitted by Cowan MacClaine on Feb 25, 2018

**Comment:**

Have similar cross-sectional studies been done with nicotine replacement products?

reply

## There are many papers on NRT

[Permalink](#) Submitted by Stanton Glantz on Feb 27, 2018

**Comment:**

There are many papers on NRT and heart disease. It is important to keep in mind that NRT (other than the inhaler) does not deliver ultrafine particles and is much cleaner than e-cigarettes. While nicotine does have cardiovascular effects, the other components are likely more important drivers of the effects of e-cigarettes and cigarettes on heart disease.

reply

## I wasn't referring to MIs

[Permalink](#) Submitted by Andrew Day on Feb 27, 2018

**Comment:**

I wasn't referring to MIs that happened before the advent of e-cigarettes (which I agree have little effect on the results), but more the smokers who had an MI (or other cardiac event) and then switched to e-cigarettes. Since we know there are a large number of smokers who are still unable to quit smoking after such events it is not only plausible, but probable that they would try e-cigarettes after having an MI. I fear that we won't be able to say definitively if e-cigarettes increase risk of heart disease until there are some long term longitudinal studies.

[reply](#)

## This is not a problem with

[Permalink](#) Submitted by Stanton Glantz on Feb 27, 2018

**Comment:**

This is not a problem with our analysis because we include *former smoking* as well as e-cig use in our logistic regression model. So the effects of any former smoking is captured directly rather than as an artifact in any of the e-cig variables.

In addition, for that to be inducing an artifact in our results smokers who had MIs would have had to try quitting with e-cigarettes at a much higher rate than smokers who did not have MIs trying to quit. There is no reason to expect that to be the case.

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Math question \*

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Preview



**Stanton A. Glantz, PhD**

Director, Center for Tobacco Research Control & Education

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