




Enter keywords...

Search

 (<https://plus.google.com/103561559026876981170/posts>)  (<https://www.facebook.com/cancerresearchuk>)  (https://twitter.com/CR_UK)



CANCER RESEARCH UK

(<http://www.cancerresearchuk.org>)

Let's beat cancer sooner

Donate (<http://www.cancerresearchuk.org/support-us/donate/>)

HOME ([//WWW.CANCERRESEARCHUK.ORG/HOME/](http://WWW.CANCERRESEARCHUK.ORG/HOME/))

ABOUT CANCER ([HTTP://WWW.CANCERRESEARCHUK.ORG/ABOUT-CANCER/](http://WWW.CANCERRESEARCHUK.ORG/ABOUT-CANCER/))

SUPPORT US ([HTTP://WWW.CANCERRESEARCHUK.ORG/SUPPORT-US/](http://WWW.CANCERRESEARCHUK.ORG/SUPPORT-US/))

OUR RESEARCH ([HTTP://WWW.CANCERRESEARCHUK.ORG/OUR-RESEARCH/](http://WWW.CANCERRESEARCHUK.ORG/OUR-RESEARCH/))

FUNDING FOR RESEARCHERS ([HTTP://WWW.CANCERRESEARCHUK.ORG/FUNDING-FOR-RESEARCHERS/](http://WWW.CANCERRESEARCHUK.ORG/FUNDING-FOR-RESEARCHERS/))

ABOUT US ([HTTP://WWW.CANCERRESEARCHUK.ORG/ABOUT-US/](http://WWW.CANCERRESEARCHUK.ORG/ABOUT-US/))

Home (<http://www.cancerresearchuk.org>) > About us (<http://www.cancerresearchuk.org/about-us>)

> Cancer news (<http://www.cancerresearchuk.org/about-us/cancer-news>) > Science blog (<http://scienceblog.cancerresearchuk.org>)

> A marathon not swings and roundabouts: the evidence on e-cigarettes

A marathon not swings and roundabouts: the evidence on e-cigarettes

Category: Science blog (/)

February 12, 2015

Nikki Smith (<http://scienceblog.cancerresearchuk.org/author/nikki-smith/>)



Although they were almost unheard of a few years ago, there are now an estimated 2.1 million e-cigarette users (http://www.ash.org.uk/files/documents/ASH_891.pdf) – or vapers – in the UK.

But despite their widespread use, these devices have arrived so quickly that the evidence on how safe they are, and how effective they are at helping people quit smoking, is still in its relative infancy.

And from a glance at the news, it would be easy to believe that this evidence is swinging from one side to the other every few weeks.

From our perspective, however, the reality is far more stable. And we think it's important to demystify the situation, because of the potential for harm, confusion and lost opportunity.

We've [blogged before](http://scienceblog.cancerresearchuk.org/2014/08/29/the-promise-and-challenges-of-e-cigarettes-the-story-continues-to-unfold/) (<http://scienceblog.cancerresearchuk.org/2014/08/29/the-promise-and-challenges-of-e-cigarettes-the-story-continues-to-unfold/>) about the promises and challenges for these products.

But we thought we'd take a look at some of the rather controversial e-cigarette headlines that have appeared this year.

Quick recap

There are a variety of devices on the market collectively called 'e-cigarettes'.

And although they differ in shape, size and mechanism – from first generation 'cig-a-likes' to later generation 'tank-style' devices – they all work in a similar way: they use an electric current to heat and vaporise a liquid form of nicotine to produce a vapour that's inhaled to give a hit of nicotine.

This is very different to traditional tobacco cigarettes, which burn tobacco leaves producing a dangerous cocktail of carcinogens in addition to nicotine.

So, e-cigarettes should, in theory, be far safer than tobacco products – and they almost certainly are.

But you wouldn't necessarily think so from recent media reports.

New Year, new rumours

Portland State Formaldehyde Study

In January, the Daily Mail ran the misleading headline that "Some e-cigarettes may release more cancer-causing chemicals than regular tobacco". After we spotted it, it was updated (<http://www.dailymail.co.uk/health/article-2921321/Some-e-cigarettes-release-cancer-causing-chemicals-regular-tobacco-study-suggests.html>) to "Some e-cigarettes may release more **of a** cancer-causing chemical than regular tobacco, **study suggests**" [emphasis ours].

But this still over-exaggerates the news in our opinion.

The study (<http://www.nejm.org/doi/full/10.1056/NEJMc1413069>) behind the headlines looked at levels of chemicals that release formaldehyde – a known carcinogen – in vapour from a 'tank-style' e-cigarette when run at different voltages.

It found that, at a high voltage, daily use of the e-cigarette *could* release more formaldehyde than smoking 20 cigarettes.

But if we look a bit more closely at the research, there are several reasons why we don't think this warranted the headlines it got.

Firstly rather than measuring the chemicals that users are actually exposed to, the study used a machine to generate and measure the e-cigarette vapour.

This is particularly important in this case, because at the lower voltage tested, no formaldehyde was found. So the results entirely depend on how these products are used.

It's also important to note that this was only looking at one type of e-cigarette, and this can't necessarily be generalised to the extensive range of products out there. This is one of the key limitations with the evidence around e-cigarettes, and why we need to take a balanced view of all the information we have – rather than relying on one study.

Furthermore, the study in question only looked at one chemical so it can't be used to compare the overall level of risk.

So what do other studies say? According to a [review of evidence](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/311887/E-cigarettes_report.pdf) (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/311887/E-cigarettes_report.pdf) commissioned by Public Health England last year, when looking at the vapour from e-cigarettes as a whole, there seems to be far fewer chemicals present than in tobacco smoke, and mostly at much lower levels.

Are you a man or a mouse?

Last week e-cigarette research hit the headlines again (<http://www.itv.com/news/2015-02-05/e-cigarettes-are-not-a-safe-alternative/>) with “E-cigarettes are ‘not a safe alternative’” and (<http://www.independent.co.uk/life-style/health-and-families/health-news/ecigarettes-increase-the-risk-of-flu-and-pneumonia-10024243.html>) “E-cigarettes ‘increase the risk of flu and pneumonia’”. And the most misleading, and in this case inaccurate, of all – as the image on the right from the Metro shows – “Cancer threat’ in e-cigarette vapour”. (The use of speech marks in these headlines – or ‘scare quotes’ as they’re often referred to in journalism circles – is the first indication that all may not be as it seems.)



Misleading headlines

Taking a closer look at why some of these headlines are misleading, the study (<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0116861>) explored the impact of e-cigarette vapour on a small number of mice, and found they were more susceptible to infections.

The comparison made here was only against mice who breathed air – so it’s impossible to draw conclusions about how this stacks up against exposure to cigarette smoke.

On top of this, there are a number of other limitations to this study, the first of which is that it’s always questionable how far results of studies in mice can be applied to humans. The mice were exposed to a dose of e-cigarette vapour to match the levels of use by humans, rather than being scaled down.

And again, this study used a machine-generated dose of vapour from an e-cigarette. And there was certainly no attempt to look at cancer risk as part of this study.

So – taking these caveats into account – this study is definitely helpful in terms of opening up another avenue for exploring the potential health impact of e-cigarettes. And it underlines the need for long-term follow-up of users.

But to draw actual conclusions about how ‘safe’ e-cigarettes are, you need studies looking at the impact of e-cigarettes on human users.

Are there any such studies? There hasn’t been time yet to see any long-term health impact e-cigarettes, but in the short-term, a 2014 meta-analysis (<http://pubhealth.oxfordjournals.org/content/early/2014/08/09/pubmed.fdu055.short>) found that the most common health complaints seem to be irritation, nausea, headache and dry cough. And overall these negative effects seem to be less compared to smoking cigarettes.

The results of the small (<http://www.ncbi.nlm.nih.gov/pubmed/23363041>) studies (<http://www.ncbi.nlm.nih.gov/pubmed/24373737>) looking into the immediate impact of e-cigarette use have been inconsistent, so at this stage we don’t know if there will be a significant positive or negative impact on lung function compared to cigarettes. We know cigarettes hugely increase (<http://www.surgeongeneral.gov/library/reports/50-years-of-progress/50-years-of-progress-by-section.html>) the risk of pneumonia and other respiratory problems.

We are keen to understand the impact of e-cigarettes, and this is why we are investing into e-cigarette research to understand better the risks of using e-cigarettes and what impact they have on smoking rates.

What we know for now

Overall, the evidence so far (including the studies discussed here) suggests that e-cigarettes are almost certainly far safer than smoking tobacco. But note the use of the word “safer” rather than “safe” – they are not entirely risk-free products and shouldn’t be used by non-smokers or people under 18.

But here’s what we do know: it’s hard to overstate the impact of smoking on your body – quitting is the most important thing you can do for your health. While the evidence for e-cigarettes builds, there are more established, proven quitting methods (<http://www.nhs.uk/smokefree>) that boost your chances more than e-cigarettes seem to. But we do recognise their potential (<http://onlinelibrary.wiley.com/doi/10.1111/add.12623/abstract>) to help some people stop smoking.

Commenting on the evidence as it stands, Professor Linda Bauld, a Cancer Research UK expert on cancer prevention, said: “As smoking remains the biggest preventable cause of cancer we need to do all we can to continue to reduce smoking rates. Confusion over e-cigarettes, often driven by misleading headlines, may be hindering rather than helping more people move away from tobacco.

“These products have real potential but we need to conduct and correctly interpret new research to keep giving people accurate information about the choices available to them.”

So we imagine e-cigarettes will continue to live up to their polarising reputation for some time yet.

But when it comes to robust scientific evidence, it will take time – and slow and steady wins the race.

Nikki Smith is a senior health information officer at Cancer Research UK