

Credulous or cynical? Science journalists played yet again by e-cigarette pseudoscience and spin



I've just written to [Sarah Knapton](#), Science Editor at the once-proud Telegraph titles. She has picked up one of the most idiotic American press releases ever written and turned it one of the most idiotic UK news stories ever written*: [E-cigarettes are no safer than smoking tobacco, scientists warn](#) - an outrageous headline buffed up with a subtitle that invokes the spectre of cancer.

Cells exposed to the e-cigarette vapour showed several forms of damage, including DNA strand breaks, which can lead to cancer

Here's the study and press release:

- Study: Yu V, Rahimy M, Korrapati A, et al. Electronic cigarettes induce DNA strand breaks and cell death independently of nicotine in cell lines. *Oral Oncol* 2015;52:58-65. [\[link\]](#)
- Eureka Alert Press release: [Cell harm seen in lab tests of e-cigarettes](#)

See if you can see how the headline can be justified by the study. On second thoughts, don't waste your time: it can't.

The UK's statistics vigilante, *Stats Guy* Adam Jacobs, has already nominated the Telegraph article the "*most dangerous, irresponsible, and ill-informed piece of health journalism of 2015*" - [Dangerous nonsense about vaping](#).

Here's my letter to Sarah Knapton about it.

Dear Sarah

I see you are complaining about being 'trolled' by vapers over reporting of this e-cigarette cell study.

Another day of being trolled by vapers who refuse to accept that e-cigarettes are harmful despite mounting evidence <https://t.co/557Br7fj5A>

— Sarah Knapton (@sarahknapton) [December 30, 2015](#)

With respect, I don't think it is fair to call it trolling if the Telegraph published a headline like that based on an unchallenged opinion from a scientist with an axe to grind. Perhaps vapers are just despairing about uncritical science journalism.

If we are going to be scientific about it, let's just consider the claim made in the press release for this story:

The overarching question is whether the battery-operated products are really any safer than the conventional tobacco cigarettes they are designed to replace.

Wang-Rodriguez doesn't think they are.

"Based on the evidence to date," she says, "I believe they are no better than smoking regular cigarettes."

This is a remarkable claim. It goes beyond the usual 'we just don't know enough' argument and makes an affirmative claim of equivalent risk based on available evidence. To my knowledge, no other experts worth the name believe this or have published anything that supports it, and there is nothing in the evidence base that justifies it. Dr Wang-Rodriguez hasn't done a systematic review of the evidence to date and the reviews that have been done suggest

much lower risk - 1-3 orders of magnitude lower. PHE's experts stand by the claim that the best estimates are at least 95% lower risk than smoking. Didn't that give you a pause to reflect? Did you consider getting a second opinion?

Nevertheless, the Telegraph just took the press release claim at face value and made a headline of it. If a troll is "[a person who makes a deliberately offensive or provocative online posting](#)" perhaps it is the Telegraph that is trolling vapers and the nation, not vapers trolling you?

If we took the more conventional journalistic practice of simply reporting on what the research in question had found, then there would be rather less scope for sensationalism. A cell study does not (and cannot) establish there is a real cancer risk, it cannot establish it is the same magnitude as smoking, cannot address all the other cancer sites associated with smoking, cannot assess risks other than cancer. So whatever the results said, no comparison of the type made in the press release could be drawn from this work and nothing could be said about cancer risk. Again, this is about being critical about what scientific studies can and cannot tell us - and therefore what is hype in a press release.

Did you find time to read the study itself?

They did, in fact, measure cigarette smoke, but the results are buried in obscurity. These cigarette measurements are not mentioned at all in the press release or any of the commentary in the paper itself - why might that be? The giveaway is in the methodology section...

E-cigarette, cigarette, and nicotine treatments

E-cigarette vapor was pulled through media using negative pressure, and the resulting extract was filter-sterilized with a 0.2 µm pore-size filter before treating cell cultures. The cigarette-treated media was made similarly using Marlboro Red filter cigarettes, which were determined by the Federal Trade Commission in a 2000 report to contain 1.2 mg of nicotine per cigarette. [...]

*Treatment media was replaced every three days with 1% e-cigarette extract. **Because of the high toxicity of cigarette smoke extract, cigarette-treated samples of each cell line could only be treated for 24 h.** (emphasis added)*

That should have rung an alarm bell as it is completely inconsistent with Wang-Rodriguez' claim of equivalent risk and the Telegraph's headline. The methodology section is very poorly written, but it appears to imply that they measured e-cigarette vapour over days and weeks, but cigarette extract over just 24 hours. The results use an unusual formulation in which the cigarette measures do not really appear as part of the results, but are just offered "for comparison".

The authors even point out that nicotine can damage cells in cell studies. However, we know there is no evidence that nicotine causes cancer from studies of NRT and snus. That means it is possible to find cell damage in petri-dishes that does not manifest as serious disease in the body. This is a widely known characteristic of cell studies: they must not be over-interpreted. So that should have been another clue not to take this in the way it was spun.

"There have been many studies showing that nicotine can damage cells," says Wang-Rodriguez. "But we found that other variables can do damage as well. It's not that the nicotine is completely innocent in the mix, but it looks like the amount of nicotine that the cells are exposed to by e-cigarettes is not sufficient by itself to cause these changes

From this, the authors go on to speculate about formaldehyde and diacetyl, drawing on yet more junk science from the U.S., which has been extensively debunked.

My point is that this is an area of science that is very heavily loaded with activist bias, and especially in the U.S. where the major funder, the NIH plays an activist role. This is an extreme example, but we are repeatedly seeing UK journalists played by spin from the activist-scientists. I think that's what's winding up vapers, not any kind of inconvenient truth discovered by truth-seeking scientists. The solution to that is not to dismiss critics as trolls, but to have a more critical approach to science.

The best reporting recently on this has come from Rolling Stone, where the journalist took some time to examine claims and counter claims - it's worth a read:

[*E-Cigs' Inconvenient Truth: It's Much Safer to Vape*](#)

Final thought: this study was published 4th November 2015. This press release coincides with the New Year season for quitting smoking. Can you see the cynicism in this, and how harmful it is to make such absurd claims when people may be considering switching to vaping for the New Year?

Relevant links....

1. Study: Yu V, Rahimy M, Korrapati A, et al. Electronic cigarettes induce DNA strand breaks and cell death independently of nicotine in cell lines. Oral Oncol 2015;52:58-65. [[link](#)]

2. Eureka Alert Press release: [Cell harm seen in lab tests of e-cigarettes](#)

PS. No competing interests.

Clive Bates

Why does junk like this get written?

Here's my theory:

- The rise of online... Online articles provide direct real-time countable feedback on journalists' contribution to newspaper exposure and ad revenue, so there is acute competition between colleagues for clicks and user feedback. This does not apply in the printed paper - where individual performance is aggregated with all colleagues into overall circulation figures. This shifts the journalistic incentives from serving regular readers with high-quality journalism to attracting non-regular readers with click bait.
- The disdain for the reader... Science journalists don't really care about truth and complexity or about serving their readers. This is a banal scientific non-story in reality, made into something publishable by extreme hype in the press release. It would be impossible to report the actual useful information from this research because there isn't really any.
- The argument from authority... There is a lazy model of scientific journalism that relies on *authority* - the authority of 'scientists' placed on pedestals as pure truth seekers, and the authority of peer-reviewed

journals - which are supposed to guarantee the integrity of published research. Once you've got all that authority behind the story, there's no argument: you're just humbly reporting science. Utter nonsense to anyone who is *scientific about science*.

- The money shot... Several commentators made opposing points in this article (in fairness, Knapton did add some contrarian views), but the single outlandish and evidence-free quote was the money-shot and that persisted as the headline and nose for the piece, even though basically shot down by everyone else she spoke to. The journalist simply had no incentive to blow up the story by adopting a critical or inquiring perspective: "*American scientist says weird and irresponsible stuff based on nothing*" is hardly news.
- The pack mentality... What if others had run it and the Telegraph didn't? Once again, the click-bait phenomenon and competition between journalists at work.

*I've concentrated on the Telegraph, but others were hard at it too: [Mirror](#), [Guardian](#), [Independent](#) and the [Mail](#) all disgraced themselves with their credulous or cynical reporting of this story, using variations on the same theme.

The [Daily Caller](#) put the record straight and a vaper, Paul Barnes, did the best job of showing journalists how to be journalists: [Facts do matter blog: degreasing engines and killing cells](#). Another vaper, Fergus Mason, followed up with a blog explaining it all for the giants of UK popular science writing: [New study shows e-cigarettes are safer than tobacco smoke](#).

Other articles that examine this story more critically:

- Linda Bauld in *The Guardian*: [No, there's still no evidence e-cigarettes are as harmful as smoking](#)
- Mike Siegel, Rest of the Story: [New Year Begins With Anti-Vaping Researcher Telling Public that Smoking is No More Hazardous than Vaping](#)
- Carl V. Phillips, Anti-THR lies: [The key fact about ecig junk science: "public health" is a dishonest discipline](#)
- Bradley J. Fikes, San Diego Union-Tribune: [E-cig reporting: What went wrong? Flawed, slipshod journalism misrepresented study](#)
- Andy Coghlan, New Scientist: [Vaping really isn't as harmful for your cells](#)

[as smoking](#)

Update: After the Clarification/Correction...

- Bradley J. Fikes strikes against The Telegraph:, San Diego Union-Tribune (15 January): [E-cig clarification needs clarification](#)
- Mike Siegel, Rest of the Story (14 January): [In Press Release "Correction," VA Researcher Reiterates that Smoking May Be No More Hazardous than Vaping](#)

The primary fault lies with the authors. My own main concern is not primarily with journalists, though they should be much much better than this. My main concern is with public health academics and academia: there is basically no challenge or push back and no accountability for the consequences of this sort of casual mendacity - yet we should recall that a few more cancers and deaths are likely to be the result. Where is the professional outrage in the public health community? Where is the hard challenge back to Dr. Wang-Rodriguez from those who know, or should know, better?

Science update: a note from Dr. Konstantinos Farsalinos on what the researchers did wrong in the experiment itself (not merely the ludicrous claims about relative risk and cancer). Bear in mind the researchers had to stop the tests using cigarette smoke in 24 hours because it was so toxic it killed the cells too quickly. The e-cigarette vapour exposures ran for up to eight weeks.

...when you want to look for effects such as inflammation or DNA breaks you need to have cells which have survived the exposure to the medium. In the case of tobacco cigarette smoke, it is so toxic that cells die so you cannot measure any effect. However, what you SHOULD DO is dilute the smoke extract to levels that are not cytotoxic (so that cells survive). Then, you should do the same with the e-cigarette aerosol extract. The problem (for the researchers) was that if they had done that they would see almost no adverse effect from e-cigarette aerosol exposure.

The main problem with the coverage is the irresponsible and wildly inaccurate hype in the press release. But there is also the making of a scandal in scientific terms. Why did they include cigarette smoke, but not then run the experiment in a way that allows for like-for-like comparison, as Farsalinos suggests? When they

say 'cells treated with cigarette smoke extract [...] are shown for comparison' repeatedly in the article, what exactly does this comparison tell us if the cigarette and e-cigarette vapour were treated differently? Did they expect to find cytotoxicity in e-cigarette vapour comparable to cigarette smoke and then have to rethink when everything on the cigarette cell lines was dead in 24 hours? Why did the researchers not use realistic exposures and therefore not have to say this in the press release?

"In this particular study, it was similar to someone smoking continuously for hours on end, so it's a higher amount than would normally be delivered," she says. "What we're looking at now is to dose-control these. We want to know at what dose it causes that critical switch-over to where we see the damage."

Update 12 January 2016.

A clarification/correction has been added to the press release:

CLARIFICATION/CORRECTION: *Contrary to what was stated or implied in much of the news coverage resulting from this news release, the lab experiments did not find that e-cigarette vapor was as harmful to cells as cigarette smoke. In fact, one phase of the experiments, not addressed in the news release, found that cigarette smoke did in fact kill cells at a much faster rate. However, because similar cell-damage mechanisms were observed as the result of both e-vapor and regular cigarette smoke, Dr. Wang-Rodriguez asserts, based on the evidence from the study, that e-cigarettes are not necessarily a healthier alternative to smoking regular cigarettes. As stated in the journal paper and the news release, further research is needed to better understand the actual long-term health effects of e-cigarettes in humans.*

This muddled statement is a crude attempt to stop defending the indefensible, while trying to create enough distracting waffle to divert blame away from the obvious culprit, Wang-Rodriguez. In any sensible field, the reputation of a scientist voicing then reiterating completely baseless statements about risk would be destroyed *by her own peer group*. We should always remember, that there are plausible causal pathways from Wang-Rodriguez statements (and irresponsible reporting of them) to a person dying an agonising and humiliating death by cancer. It isn't just a remote debate.

Everybody involved is covered in disgrace.

Oh, and rather than replying to this letter, Sarah Knapton has responded in the way that only true fanatics know how...



Update 13 August 2016

Sarah Knapton writes to me requesting that I publish an IPSO finding about this article. Even though it's not me who made an IPSO complaint, I am happy to do this. Because it reveals something quite interesting about journalistic ethics involved, I have put this into a new blog: [Telegraph science editor Sarah Knapton puts the record straight. Not really.](#)