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# Science Fictions



Stuart Ritchie

## **Are vapes 95% safer than smoking? Probably, and scientists should be blunt about it**

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***Welcome to the Science Fictions newsletter. Or if you're one of my previous subscribers from [Substack](#), welcome to the newsletter's new home. Science Fictions is continuing here at [i](#), and will now come out every Thursday. I'll keep covering controversies in science, picking apart bad research papers, and digging into the data on interesting scientific questions.***

***As ever, I'd love for you to get in touch with any stories of bad science, or anything you'd like me to look into - my contact details are at the bottom of this email.***

Vaping is 95 per cent safer than smoking.

That's a statement that you see repeated all over the place, not just from companies who make e-cigarettes but from respected government sources.

But according to Dr Mike McKean, vice-president for policy at the Royal College of Paediatrics and Child Health, publicising this number has been a very bad idea.

Telling the public that vaping is 95 per cent safer than smoking, McKean argued [in a BBC interview this week](#), was "a very unwise thing to have done and it's opened the door to significant chaos". Specifically, he thinks that by spreading the message that vaping is very safe compared to cigarettes, we've encouraged children to take up vaping – and now we have very many children who are addicted to nicotine via e-cigarettes.

McKean isn't necessarily claiming that the "95 per cent safer" statistic isn't true – at least, he isn't quoted as saying it's false in the BBC story, and if he thought it was false you'd imagine he'd have said so rather prominently. It's particularly interesting that he isn't questioning the figure, but instead questioning whether we should be telling the public about it.

We'll return to the issue of public communications below, but first, let's check whether the "95 per cent" figure is true in any case.

## **95 per cent safer?**

Some academics are convinced the figure is fake news. In [an article in \*The Conversation\*](#) in April this year, University of Melbourne psychologist Michelle Jongenelis called the 95 per cent safer statistic "the most cited piece of vaping misinformation globally".

The article is quite light on actual arguments and mainly refers to some expert statements, including [a 2015 editorial in the journal \*The Lancet\*](#) which stated that the 95 per cent figure was "extraordinarily flimsy".

That's because it originally comes from [a 2014 paper](#) where a panel of experts rated different nicotine-delivery products (such as cigars, pipes, sprays, patches) in comparison to the harms of the most common such product, cigarettes. Their discussions led them to rate e-cigarettes at about 5 per cent on the scale where cigarettes had been set to 100 per cent.

So the number doesn't come from a precise statistical analysis of a dataset, let alone from some kind of experiment that directly compared the harms of cigarettes to those from e-cigarettes over time (whatever that would look like). It was just a subjective judgement. Does that mean it can be completely discounted, as many anti-vaping campaigners would say?

We first have to ask: 95 per cent safer in what way? What's actually being claimed here – what outcomes are being used to say that vaping is safer?

Let's take cancer, since it's the most prominent bad outcome linked with smoking. Looking purely at the chemical composition of cigarettes versus vapes, [a 2017 study](#) used statistical modelling to estimate the cancer risk from each. Although there were some e-cigarette products available that had a much high risk, the models found that the majority of products were less than 1 per cent as carcinogenic as tobacco smoke.

It was from looking at this and a vast number of other studies that the UK Government's Office for Health Improvement and Disparities (OHID; this is the body that used to be called Public Health England) [stated in 2022](#) that they're still on board with the 95 per cent figure. This was on the basis of their [huge, systematic review](#) of the evidence on vaping compared to smoking.

In the review, they looked at studies of cancer-causing chemicals, which are generally lower in vapers compared to smokers; they looked at lab studies where human cells are exposed to tobacco smoke and vape smoke and which generally find that the latter does less damage; they looked at studies of how much carbon monoxide is exhaled by smokers versus vapers (the vapers were a lot lower); they looked at studies of heart rate and blood pressure in vapers versus smokers, and found that vapers looked healthier on both measures.

It's difficult to summarise it all because the full OHID review runs to more than 1,400 pages. The evidence was very patchy: we don't have great studies on very many of these questions, and in some cases the conclusions were unavoidably based on low-quality data. But in aggregate, it's hard to avoid the impression that smoking is extremely bad whereas vaping is far healthier in a relative sense.

OHID note that trying to summarise across this vast array of different outcomes and lots of different products is over-simplistic, to say the least. But so long as you understand the 95 per cent figure as a kind of aggregate of many different pieces of evidence, and not a number derived from one specific study, I think it holds up pretty well. In any case, they end with a statement that does away with the false precision of “95 per cent”, and instead say their current view is that “vaping poses only a small fraction of the risks of smoking”.

## **The noble lie**

Which brings us back to the new statements by Dr Mike McKean: should scientists and health authorities be telling the public about the conclusions of the OHID report, that vaping is much safer than smoking?

The first response might be: well, if it's true, of course they should be saying it. It's the job of our health organisations, and of scientists more generally, to tell the truth and keep us well-informed. A “noble lie” - telling people that vaping is in fact very dangerous when we know it's not, just to stop them from giving it a try - might seem noble, but these kinds of statements can be ticking time-bombs. When people find out they've been lied to, they react badly, and they might not trust what you have to say ever again.

At the very start of the Covid pandemic, you'll remember that many health authorities told us in no uncertain terms that [masks weren't effective for stopping transmission of the virus](#). When they eventually U-turned into telling us that masks were essential, some people argued that they'd been telling a [noble lie](#) about the ineffectiveness of masks in order to preserve dwindling supplies for healthcare workers. That is, they knew masks actually were effective, but since there were so few of them, major health figures lied to the public to make sure there were still enough to be used by doctors and nurses.

I doubt if that's really true (I think a lot of people were just genuinely convinced that masks didn't work at the time). But if it was, this would have been a terrible idea. Lying would have undermined the integrity of the health authorities and contributed to the kind of backlash we saw after masks became mandated.

It's easy to see where McKean coming from: if it's the case that young people - who aren't legally allowed to purchase e-cigarettes, but of course often get their hands on them regardless - are vaping more because of this public health message, that's very unfortunate. It maybe means that we have to rethink how the message is conveyed: maybe it's possible to make it clearer that, although vaping is very safe in a relative sense compared to smoking, it's not risk-free in an absolute sense (it should be said that the [2022 OHID report](#) states this very clearly).

It also implies that, if we're really worried about young people vaping, we should think about how to properly enforce the current bans on their sale.

But are children actually vaping more due to the "95 per cent safer" claim? I don't see much evidence for this. In fact, I see evidence for the exact opposite phenomenon: over time, more and more children are becoming convinced that vaping is just as harmful as cigarettes. In 2013, 73 per cent of 11-17 year olds [agreed with the statement](#) "vaping is less harmful than smoking". Ten years later, that number is just 33 per cent. Those agreeing with the converse statement that "vaping is about the same or more harmful than smoking" has risen from 15 per cent to 54 per cent.

So overall, it doesn't seem as if children are becoming more and more convinced of the harmlessness of vaping: in fact, it's the complete reverse, and they're becoming more misinformed over time. The fact that more children are giving it a go (7.6 per cent of 11-17 year-olds are current vapers, up from 0.8 per cent a decade ago) seems, at least from the surveys, to be more to do with curiosity, peer-pressure, and the fact they like the flavours, as opposed to "the government told me they were safe".

The fact that a prominent doctor, head of policy at a major medical organisation, seems to be arguing that people should become even less informed - that medical organisations should dilute the truth of their message that vaping is relatively safe - seems quite perverse. A noble lie, after all, is still a lie.

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## Other things I've written recently



Baby-led weaning means presenting them with options of different foods that they can pick up and eat themselves (Photo: Antonio Hugo/Getty)

Ever heard of “baby-led weaning”? It’s the alternative to buying jars of pureed food for your baby as they move from a milk-only diet to more solid foods. I looked into whether there’s [any convincing evidence for its claimed benefits](#).

Chris Pratt from the Marvel films was apparently told by his personal trainer to drink six or more litres of water per day. Is this necessary? Are there any health benefits to staying constantly “hydrated”? I [wrote about it here](#).

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## Science link of the week


Here’s [a great story in the Wall Street Journal](#) on the three psychologists who run the blog called *Data Colada* – and who devote endless amounts of their time, *pro bono*, to fixing errors in the scientific literature.

Contact me

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