

From *Studies On The Slab*, Of Vapors And Vapers

The FDA Study

To start with the most damning of the two, let's look first at the FDA analysis done in 2009.ⁱ The FDA examined two of the most popular brands of e-cigs at the time, NJoy and Smoking Everywhere, and eighteen varieties of the e-liquids¹ that were used in them. It is the FDA study that has been the basis for the widespread claim, mentioned in almost every news report I've ever heard discussing e-cigs, that e-cigs have antifreeze in them.

In reality, the study found that *one* of the eighteen varieties of e-liquid tested had very small amounts of diethylene glycol, a chemical that is not toxic in the quantities measured – about 1/10th of a milliliter (mL) in even a heavy daily use of 10mL by a vaper – but which is also used, just as water or salt is, in antifreeze. The actual toxic level would be about 100 times that amount, and since it would regularly be excreted far faster than absorbed, it would never build up to toxic levels in vapers even if it was indeed normally present at such quantities in their products.

Unfortunately, the researchers do not seem to have performed what a normal person might consider to be the simple and responsible action of extending their research a little by purchasing a few more samples of the type of e-liquid that they had found the contaminant in. It would seem to have been a pretty obvious and important question to examine in the course of their study. Was such a contaminant a one-time occurrence? Or was it something likely to be found on a regular basis? Personally, I cannot imagine why any responsible researchers in such a situation with

¹ E-liquid is the general term for the flavored mixtures of glycol, water, and often nicotine, that are vaporized to produce the visible emissions exhaled by vapers.

such a potential for significant public impact would not have simply ordered/purchased a few more samples from different sources to see if the unusual result was repeated. Since they were only testing for a very few elements, and since they had specially picked diethylene glycol to be one of those elements, it was obviously something that they expected they might find and which they must have been concerned about.

So why would they avoid just a little bit more research while they were all set up and running? Could it be that they *wanted* a negative finding about e-cigs? Could the diethylene glycol have just been a simple experimental error that could not be shown to be common? Could that be why the researchers deliberately avoided testing further samples? Could it be that each run of such a test is so unusually and so enormously expensive that their research grant couldn't pay for even a few extra tests on top of the hundreds² that they'd already run, despite the importance of the question?

I don't know the answer, though from what I've seen in this field over the years and have examined so far in these *Slabs*, I might have my suspicions. It's been almost three years since the FDA study was done. E-cig usage has grown to millions of consumers. And yet no one at the FDA or elsewhere seems to have replicated this result despite over a dozen further investigations by other researchers?³ My concerns would seem to be well-founded.

Now the FDA studied a number of other elements as well, but an analysis of their report seems to speak far more to the safety of the e-liquids than to their dangers with regard to these elements. For example, one measurement was of a tobacco smoke element known as anabasine. The LD 50 (i.e. lethal dose for half the population) of anabasine for a 110-pound person is about fifty milligrams. The FDA study declared that it

² This study tested levels of over a dozen compounds in 18 separate brand samples of various e-liquid flavors, formulas, brands, and manufacturers. Running a test for just a single compound using a few extra samples of that one brand would certainly not have been onerous, and there is no indication anywhere in the report that the researchers might have tried to double-check the anomalous result in any way at all.

³ As referenced in the overview by Cahn and Siegel, which will be discussed in a few pages.

was able to detect at least 14 parts per billion (ppb) of anabasine in about half the samples tested. Even a heavy vaper going through a full 10 mL bottle of e-liquid per day would be getting at most only 0.14 picograms. To reach fifty milligrams a vaper would have to vape roughly three billion such bottles in a day. As a threat, compare that to the few dozen ordinary aspirin tablets needed for the same effect.ⁱⁱ

A standard garden hose puts out perhaps ten gallons of water a minute at the highest pressure. If we substituted e-liquid for water in someone's water system and then tied them down and taped a garden hose into their mouth, how long would it take for us to pump a 50% lethal dose into their system if we turned the faucet on full blast? If I've done my figures correctly, it would take roughly three million minutes. That's 50,000 hours, or about 2,000 days... over five years. At that point, about half the subjects tested – if they had all been prevented from going to the bathroom while that water gushed into their bellies at a rate of close to 15,000 gallons a day for five years – would have died from the amount of anabasine found in the vapor of some of the e-cigs. For the rest of the e-cig users it might take considerably longer.

So here, within the single most “damning” study presented to the public as part of the drive to condemn e-cigs, we see just how weak the evidence really is. It's exactly the same sort of game we've seen repeated over and over and over again with regard to claims about secondhand and thirdhand smoke, but now it's being aimed at people who are trying to make their lives healthier by quitting smoking and switching to e-cigs for enjoying the nicotine and sensation of smoking instead. And it's being aimed with the same manipulative intent and the same disregard for true human welfare – and all because people who are vaping simply *look* like people who are smoking.

ⁱ <http://www.fda.gov/downloads/Drugs/ScienceResearch/UCM173250.pdf>.

ⁱⁱ Material Safety Data Sheet – Acetylsalicylic acid. <http://fscimage.fishersci.com/msds/00300.htm>.