**Assignment 8.1**

**A comparison of the various stances for the use of vaporizing devices for delivery of cannabinoids.**

There are many ways to consume cannabis. Orally, Buccally, Sublingually, Trans dermally. All these methods have advantages and disadvantages and are all new. However, the most common way cannabis is consumed is by smoking. Smoking by passes the liver metabolic function by going directly from the lungs into the bloodstream of the body, and to the brain creating the euphoric effect immediately. Similarly, “vaping” or inhaling vaporized cannabis oil takes the same route and can have the same effects a smoking depending on factors such as potency of the oil or flower and length of inhale. While vaping can be done through a myriad of devices on the market, e-cigarettes have become extremely popular and have caused some concern as the product use has been associated with lung injury or EVALI. With the first reports happening in August 2019 and 52 deaths, and 2400 patients hospitalized since. It has brought great attention to this area of cannabis. Especially as there were extraordinarily little health hazards associated with cannabis prior to “vaping”.

Typical e-cigarettes consist of battery or power source, a heating element, a mouthpiece, and a cartridge that holds the e-liquid or butane hash oil (BHO) [1]. The battery powers the heating element causing the oil to vaporize as it is inhaled into the lungs. The same route as smoking cannabis. However, the oils that are used have other chemical and solvents in them. And while some of these solvents are FDA approved, none have been approved for inhalation.

As reports of lung injury began to surface, biopsies were being done on some patients that gave new insight into how human lungs were being injured [2]. Results showed that there was “chemical injury” similar to what you would expect from poisonous gasses or toxic agents. There were lipid-laden macrophages due to such elements as vitamin E acetate and heavy metals that are in the vapor or aerosol. The heavy metals are believed to come from the heating coil used in the device. While studies show that the solvents used that bind to the lungs prevents the transfer of oxygen to the blood stream, disrupt the fluid lining of the lungs and even cause lung cell death. These surfactants such as Propylene Glycol (PG) or Glycerol (GLY) break down with heat “thermal decomposition” that creates the vitamin acetate that was found in 94% of patients in which a bronchoalveolar lavage was performed.

In studies using “cold trap” and impinger methods showed that the higher the voltage of the device the more metals such as Nickel, Lead, Chromium, and Manganese were present. All these elements were found to be exceeding health-based limits. With Nickel and Chromium 57% and 68% above their limits.

All the concern around vaping created a “Safe Vaping” task force. The National Cannabis Industry Association formed with the mission to call attention to and push for requirements regarding the quality of ingredients used in vape pens.

From my own experience with vaping, I have come to prefer more traditional methods of consuming cannabis. Vaping was an alternative to smoking, which besides not being ideal for the lungs came with a smell that, shall we say, does not leave a cannabis smoker anonymous in the room. Vaping offered a way to consume cannabis discretely. And because it is a vapor instead of smoke it allowed for consumption indoors, something that cannabis smokers are unable to do. Vaping quickly became popular. However, prior to the incidents of lung injury that made headlines in the news, I stopped using vape pens as I experienced some discomfort with the vapor and my lungs. I experienced the vapor as being much thicker than smoke and would take longer for my lungs to process. I felt like I was literally breathing under water. And occasionally I would feel the heat and a metallic taste from the vape pen coil. Both the heat and the metallic taste were not good signs to me and furthered preference to consume cannabis in other ways than vaping. Just recently I was asked, by a close friend of mine, if I recommended vaping over smoking. I answered him by saying while ultimately it is healthier to take cannabis orally than to inhale either smoke or vapor into the lungs. I would still recommend smoking over vaping as the industry is still in the trail phase of vaping. Companies are producing products with very little information about how the product, or the device being used will affect the lungs. It is for this reason that smoking, filtered through water, is still a much healthier choice as there are no additional ingredients entering the lungs.

**References:**

1. US Department of Health and Human Services. [*E-cigarette Use Among Youth and Young Adults: A Report of the Surgeon General*pdf icon](https://www.cdc.gov/tobacco/data_statistics/sgr/e-cigarettes/pdfs/2016_sgr_entire_report_508.pdf) . Atlanta, GA: US Department of Health and Human Services, CDC; 2016.
2. Dye LR. [Vaping hazards: What are the danger signs and how can we prepare?](https://www.elsevier.com/connect/vaping-hazards-what-are-the-danger-signs-and-how-can-we-prepare?sf222060145=1)Elsevier Connect [Online]. Published October 8, 2019. Accessed March 13, 2020. Retrieved