

VAPING DANGERS THAT MAY LEAVE YOU BREATHLESS



DRUGS AND HEALTH

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Dr Murad Ibrahim, a respiratory specialist from Melbourne, presented the following information on vaping at a webinar on Tuesday January 31 for the Drug Advisory Council of Australia (DACA). DACA national president Jan Kronberg chaired the evening.

Vaping is defined as the process of inhaling an aerosol that is created by heating a liquid or wax containing various substances such as nicotine or cannabinoids as well as additives such as flavours. The device that is used to heat and deliver the aerosol is known as an e-cigarette

Vaping had its origin in China in 2003 and it reached the West in 2006. Originally, e-cigarettes were manufactured by several small companies, but large tobacco companies soon took them over and embarked on major production.

It is easy to see the conflict of interest here because these companies promote vaping products as a method of reducing or ceasing tobacco smoking. Different generations of the e-cigarette devices have evolved in recent years to include disposable e-cigarettes as well as the original rechargeable ones.

Ingredients of e-cigarettes can include nicotine, ranging from six to 36 milligrams per millilitre, and a humectant, to keep the mixture moist in a liquid form. Propyl glycol/glycerol and ethylene glycol are the two most common humectants. Something like 7,000 different flavours are available, including mint or fruit.

But studies on e-cigarettes have shown that they can contain other substances such as tin, lead, nickel, chromium, manganese and arsenic. Also found were tobacco-specific products such as nitrosamines, volatile organic compounds and phenolic compounds. Vaping devices can also be used to aerosolise tetrahydrocannabinol (THC) or cannabinoid (CBD) oils.

According to research conducted by Curtin University in 2020 for the Lung Foundation, of 52 e-liquids examined, 100 per cent were inadequately labelled, 100 per cent contained chemicals with unknown effects on respiratory health, 21 per cent contained nicotine, despite this being illegal in Australia, and 62 per cent contained chemicals that are likely to be toxic, if used repeatedly.

Another research paper in *The Medical Journal of Australia* last year, reported on the analysis of 65 samples of e-cigarette liquids. The results showed that the measured levels of propylene glycol and glycerol often diverge from those recorded on the liquid label. All the liquids contained at least one potentially harmful chemical, such as benzaldehyde and menthol. They also contained hydrocarbons and nicotine.

In conclusion, the research found that Australian e-liquids contain a wide variety of chemicals for which information on inhalation toxicity is not available. Further analyses are required to assess the long-term effects of e-cigarette use on health.

In Australia, 22 per cent (about one in five) of people aged 18 to 24 have vaped and about 7.6 per cent of 15 to 17-year-olds have vaped. These numbers are likely to be underestimations, according to the Australian Bureau of Statistics.

LEGALITY?

The situation in Australia is that it is illegal to sell or buy nicotine for use in e-cigarettes to anyone without

a prescription. Unfortunately, this is not very well regulated. Most of these products are imported from overseas with very little control over how they are manufactured or what is in them.

The government has done quite well in raising awareness of the dangers of tobacco but now it is time to deal with the vaping issue more strictly.

Vaping is a very topical issue at the moment. Both the Australian Medical Association and the Heart Foundation are requesting action to enforce stricter regulations around nicotine vaping products (NVPs). Also, the Therapeutic Goods Administration has proposed that these reforms include changes to border controls for nicotine vaping products pre-market assessment by the TGA, and strengthening of the product standards regarding minimum quality and safety for NVPs.

These organisations are also asking for clarification of the safety standards of NVPs and their status as “therapeutic goods”.

ADVERSE EFFECTS

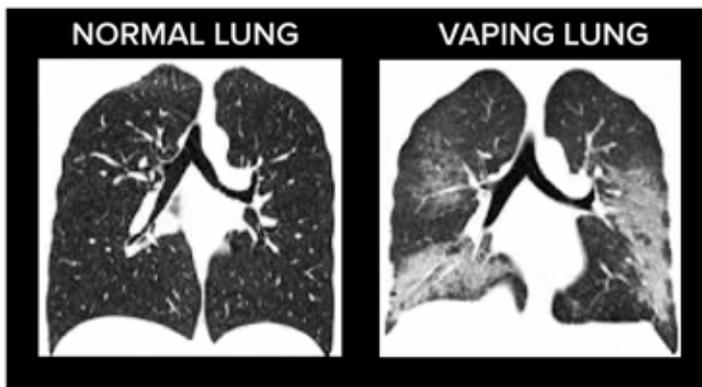
We know that nicotine can cause heart attacks. It can cause rapid heart rates. It can promote thrombosis or lead to blood clots and can lead to strokes. It has negative effects on the developing brain in adolescence, and it can also lead to addiction.

It is well known that vaping is associated with an increased risk of future uptake of cigarette smoking.

However, there is a condition that can happen with e-cigarettes: what we call EVALI or “e-cigarettes or vaping product use associated lung injury”. It was recognised in the United States in the summer of 2019 and, by February 2020, the U.S. had more than 2,800 cases hospitalised. Eighty per cent of these were younger than 35 years of age and 22 per cent had underlying asthma.

The incidence was generally higher with THC consumption in the vape

Normal lungs v vaping lungs

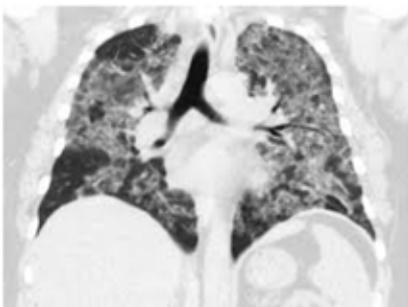


These pictures show the effect of vaping on lungs.

Above: On the left-hand side is a normal lung. A normal lung is generally dark grey with white dots in the middle, which are the blood vessels. You can see the heart and the blood vessels in the middle. On the right-hand side is the vaping lung. The lighter shade is severe inflammation from vaping.

Below: On the left-hand side you can see a relatively normal lung but it is only a small area. The rest of the lungs look very white and inflamed. Similarly in the view from above on the right-hand side.

Severe inflammation from vaping



but 30 to 58 per cent used nicotine with or without THC. Five hundred and seventy-three cases reported using products off the street or given to them by family or friends, hence unlabelled.

THE PATHOLOGY OF EVALI

EVALI is a type of acute lung injury and it includes a spectrum of conditions including inflammation, haemorrhage inside the lungs, allergic reaction to the vape and what we call respiratory bronchiolitis-interstitial lung disease (RBILD). This is associated with smoking. So, for those people who say that vaping is less harmful than smoking, there is now a growing body of evidence that you can get similar conditions from both cigarettes and vaping.

The symptoms of EVALI include shortness of breath, chest pain, nausea and vomiting, diarrhoea, fever

and chills, coughing up blood and low oxygen levels.

Thirty per cent of the people who were admitted to hospital with EVALI required life support. Seven per cent of them could not be sustained on a ventilator and they required a heart-lung machine; that is to say, cannulas were put in the groin to supply them artificially with oxygen straight into the bloodstream, bypassing the lungs because they could not oxygenate through their lungs.

Unfortunately, 68 patients died, a death rate of about 2.4 per cent. The prognoses are generally worse when patients have other health problems.

BROADER HEALTH CONCERNS

There are broader public health concerns that come with the high rates of admissions to hospital, effect on adolescent health, and reversing the gains made in smoking cessation

because vaping can actually promote cigarette smoking. There have been reports of poisoning from children with exploratory exposure. There are also concerns about second-hand aerosol exposure.

KEY MESSAGES

Many e-cigarettes are manufactured by tobacco companies. They put in a range of flavours to make them more attractive, particularly for young people. The contents are frequently mislabelled, so it is difficult to know what you are vaping.

Vaping has been promoted as an effective method for ceasing to smoke tobacco, but this is not supported by robust evidence, although most people who have vaped believe it is a tool to quit or reduce smoking. And, crucially, vaping can cause serious complications such as EVALI.

COMMON-SENSE CONCLUSION

Let's just talk common sense. Our respiratory system is designed to breathe air in and out, not other things. We do not as yet really know the long-term side effects of these products.

If you want to think about it, the simplest parallel example is tobacco in the early 1900s. Over the years, we realised that cigarettes can cause cancer of the lungs, the stomach, the bladder and the colon, and it can cause emphysema.

In the mid-1900s, asbestos was found to be the cause of mesothelioma, which is a nasty type of cancer. Again, similarly, we learned about occupational lung diseases: that, if you inhale silica, you can get silicosis.

The lungs are designed just to breathe air in and out.

These other products are addictive, so it is best to resist them from the beginning. Medical authorities are calling for stricter regulations around vaping, so this is obviously a signal of concern.