

**Submission  
No 39**

## **E-CIGARETTE REGULATION AND COMPLIANCE IN NEW SOUTH WALES**

**Organisation:** University of Wollongong

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**Re: Parliament of New South Wales Inquiry: E-cigarette regulation and compliance in New South Wales**

Thank you for the opportunity to make a submission to the Current Parliament of New South Wales Inquiry on E-cigarette regulation and compliance in New South Wales.

We are a group of chemists from the University of Wollongong who have been studying electronic cigarettes and their content since 2019. We are the preeminent experts in this field in Australia. As part of these studies we have examined: accuracy of nicotine concentrations in domestic and international e-fluids available to Australian consumers; nicotine concentration in aerosol following vaporisation in electronic cigarettes; flavouring molecules in electronic cigarette fluids and DIY flavour concentrates available to Australian consumers; reactions between flavouring molecules and carrier fluids in electronic cigarette liquids; packaging and labelling of electronic cigarette fluids; content of disposable devices; market availability and preference trend among youth users, and the effect of the 2021 changes to e-cigarette regulation on packaging and labelling and the content of products available to Australian consumers. We have provided past consultative work to the TGA, made submissions at each step of the TGO110 regulatory changes, and carried out work in collaboration with the NSW Ministry of Health examining vaping products.

When we first started analysing e-cigarette products in 2019, all products available on the market were e-liquid bottles containing free-base nicotine for vaporisation in refillable e-cigarettes. The past few years have seen a significant change in the e-cigarette market in Australia with a marked shift in ~2020 to mostly nicotine salt products in both refillable e-liquids and disposable devices. Disposable e-cigarettes, which have become prolific in the past 18 months in Australia, are at the forefront of the black market of nicotine-containing vaporisation devices. These devices, which almost always contain nicotine, usually have no mention of the word nicotine on the packaging and labelling of the product in order to circumvent the current regulation in Australia.

For our [most recent study, in collaboration with NSW Health](#), we analysed a total of 750 e-cigarette devices for their chemical content (the largest number analysed in any Australian study to date). These devices were from two main sources. The first was 428 products which were collected from retailers in NSW who were selling these products illegally over the counter and the second set was 322 devices which were confiscated by teachers from school-aged children in NSW high schools. This study determined that more than 98% of e-cigarette devices analysed contained nicotine. This included 314 of the 322 (97.5%) devices confiscated from school-aged students as part of this study. All devices confiscated from students in this study were disposables. This provides clear evidence that young people in NSW are overwhelmingly using nicotine-containing disposable style devices.

Even though most devices were shown to contain nicotine, the packaging for almost all of these disposable devices had no mention of the word nicotine, either through the removal of nicotine from ingredient lists or the alteration of warning messages on the packaging to remove any mention of the word nicotine. See **Figures 1a** and **1b** for sample packaging from before and after the October 2021 regulatory changes were announced by the TGA (TGO110) for the same brand and model. It is important to note that most disposable products we have tested in our laboratory which were specifically labelled as “0%” or “0 mg” were not found to contain nicotine (see **Figure 2** for an example of this packaging). A small number of products, however, were found to contain nicotine despite being specifically labelled as being nicotine-free. This nicotine free labelling is only present on a very small number of products, most do not have any mention of nicotine at all on the packaging.

The removal of nicotine from the packaging, despite its presence, is a potential health risk as individuals may not be aware the devices they are using contain nicotine. This also means that appropriate health warnings associated with nicotine, including that nicotine is addictive and ‘keep out of reach of children’ warnings will often not be present.



**Figure 1:** Disposable e-cigarettes analysed at the University of Wollongong on behalf of NSW Health. Packaging on HQD Cuvie Plus disposable e-cigarettes available on the Australian market with manufacture dates before (a) and after (b) the regulatory changes which came into effect on 1 October 2021 were announced. Note the removal of the word nicotine from the warning label on the box and the removal of the concentration of nicotine (5.0%) from the sleeve.



**Figure 2:** Disposable e-cigarettes purchased online from Australian websites and analysed at the University of Wollongong. Examples of two different disposable devices (a) and (b) labelled as 0 mg which were found to be nicotine free when analysed.

The average concentration of nicotine in our study with NSW Health was 40.0 mg/mL. This concentration is considerably higher than was observed in [previous analysis of e-liquid bottles](#) we have performed in our laboratory and shows a clear upward trend in nicotine concentration in disposable style devices. In almost all devices the nicotine was present as the nicotine benzoate salt.

The current separated regulation of nicotine vaping products (NVPs) and nicotine-free vaping products, has allowed a black market of non-labelled nicotine-containing disposable devices to flourish. These devices can be readily accessed by young people over the counter at a wide variety of stores (tobacconists and convenience stores in particular) and via social media sites. Despite preliminary announcements from the TGA earlier this year (Jan 2023) and a consultation period for proposed changes to the current regulation, no concrete announcement on when these changes will be implemented has been made to date. The simple removal of the word nicotine and the concentration from the packaging, despite the fact these devices contain nicotine (only assessable by chemical analysis), has inadvertently created a loop-hole which means the Standard for Nicotine Vaping Products (TGO110) is not being applied to the vast majority of disposable devices currently available illegally on the Australian market. There is overwhelming evidence that young people's uptake of vaping in Australia appears to be dominated by the almost exclusive use of these black-market nicotine-containing disposable devices.

The fact that virtually all disposables contain nicotine and these devices are freely available both online and over the counter suggests that upcoming proposed changes to the personal importation scheme (complete cessation of this scheme under upcoming proposed changes) will have little impact on the availability of NVPs to young people. The majority of these products used and accessed by youth are unlikely to be from diverted personal importation scheme stock and further restrictions to the personal importation scheme will be limiting the access of ex-smokers to their nicotine supply.

Other countries (for example New Zealand) have successfully approached this problem by regulating these vaping products like other available tobacco products, whilst decreasing future availability and access to cigarettes. The current state of the legislation in Australia and the intended pathway planned by the government (total ban) will likely, instead of regulating access, push the available products further into a black market. We have already seen the appearance of ‘stealth vaping’ devices where vaping products are disguised as another object, for example, [a highlighter](#), a [phone case](#), a [watch](#) or even a [medical puffer](#) (the current version of this is a cannabis vape). Regulation of e-cigarettes in line with other tobacco products (with an excise and tax) instead of a complete ban would not only generate revenue for the government, but in addition would allow a better enforcement of access (licensed retailer only, ID check at purchase).

Changes to regulation will also have some repercussions on the quality of these products. While products distributed via pharmacies will definitely result in a higher quality product and improve the confidence medical practitioners have in prescribing NVPs to those wishing to quit smoking via this pathway. Any products available outside of this regulated pathway will be pushed further into an illicit black market. This will likely see products of a poorer quality and standard flourish. Our recent study in collaboration with NSW Health found that 4% of the disposable devices analysed contained at least one compound banned under the TGO110, including the first identification of ethylene glycol (anti-freeze) in Australian vaping products. These compounds are banned due to the risk of adverse health effects from their inhalation. We are concerned that in an unregulated black market we may see an increase in these dangerous products.

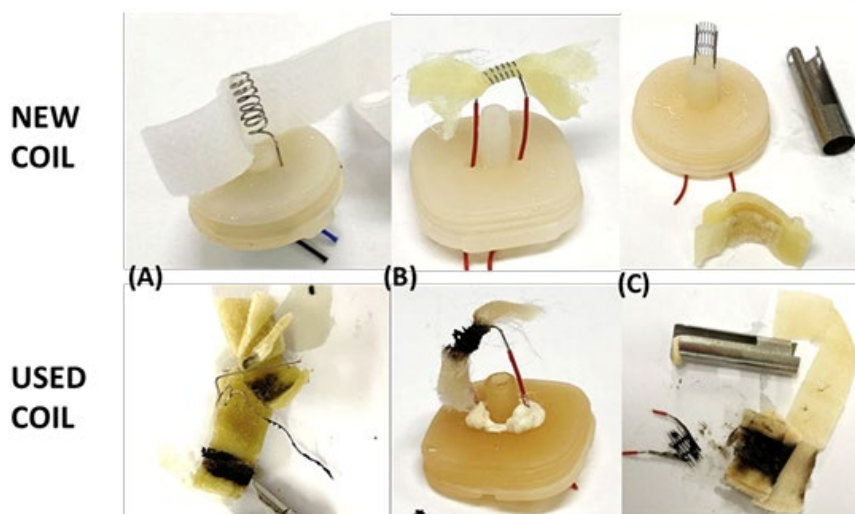
Preventing access to disposable devices in Australia would be a positive step forward. These devices are not only appealing to youth, and the main device types used by school aged children (100% of products confiscated from school students in our recent study were disposable), but are also an environmental hazard with these devices increasingly being inappropriately disposed of after use. While it is important to prevent youth access to these products, it is equally important to allow for continued supply of NVPs to ex and current smokers who are using these products, any pathway which restricts access will lead to individuals who have successfully transitioned to vaping returning to smoking.

One other future suggested change from the TGA, is the ban of all flavours except for tobacco and mint flavours. Whilst the number of different flavours on the market appears to be constantly increasing, fruity flavours being preferred by both youth and current legal adult NVP users, chemical analysis has not seen a significant change in the number or type of flavouring molecules appearing in these products (with the exclusion of the recent increase in use of coolants, see below). As a result, despite effort toward regulation wanting to reduce the number of available flavours, two points need to be highlighted. Firstly, there is not a specific flavouring molecule or set of molecules which can be described as “tobacco” flavour. This flavour varies significantly in its content but is often a combination of sweet flavoring agents which varies considerably by vendors/brands. Chemical analysis shows that these e-cigarettes contain similar molecules to those present in fruity flavoured vapes. Secondly, the presence of an already available market of flavour concentrates. These are small bottles of liquid and/or powders which can be added to legally purchased e-liquids. The availability of

these concentrates will render the flavour restriction irrelevant as users wishing to access other flavours will be able to do so via the addition of these flavour concentrates. This also introduces a possible increased pathway of harm as the individuals will need to be adding these concentrates themselves and may accidentally produce concentrations of flavouring molecules which are dangerously high, or could spill nicotine containing e-liquids leading to the risk of dermal or oral nicotine exposure.

A clear change to the chemical composition of e-cigarettes in recent years is the increase in the use of cooling agents. Cooling agents (particularly the compound named WS-23) are highly prevalent in disposable e-cigarettes, possibly as a mechanism for covering the burning sensation from the high concentration nicotine salts present in these products. WS-23 was present in virtually all disposable vaping devices analysed in our recent study with NSW Health (99.5%), usually at high concentrations (relative to other flavouring molecules) and is present in devices without 'ice' / 'iced' or a similar indicator in the name.

Having analysed a wide range of disposable products in our laboratory over the past 12 months, including products which had been used by school aged children and confiscated by teachers, another concern about disposable devices is the scorching of the wick material, which increases over time. **Figure 3** below shows examples of scorching on disposable devices which were confiscated from school-aged children in NSW. As the coil is not replaceable in disposable devices and the size and associated number of puffs for these disposable devices increases this scorching will likely become worse. This is an important area of future research as we are particularly concerned about the inhalation of heavy metals which leech from the heating coil due to repeated heating-cooling cycles.



**Figure 3:** Comparison of new (top) and used (bottom) metal heating coils of types (A) vertical coil, (B) horizontal coil and (C) mesh coil. This figure shows the clear fabric scorching and degraded coils visible in used e-cigarette devices.

In addition to the points above our research output to date can be accessed via the links below. A number of the themes described above appear in these reports/articles. A full copy of all articles can be obtained on request.

Government submissions:

- [NSW E-Cigarette Analysis Project - Summary Report - Tobacco and smoking](#)
- TGA submissions to Nicotine Regulation Changes:  
[A Public Submission to the Select Committee on Tobacco Harm Reduction \(Submission Number 220\), 2020](#) with submission from 2023 not yet publicly available  
[Nicotine Vaping Product Analysis: Evidence from the University of Wollongong | Therapeutic Goods Administration \(TGA\), 2021](#)

Scientific Literature:

- [Chemical Analysis and Flavour Distribution of Electronic Cigarettes in Australian Schools | Analytical Chemistry](#)
- [A Wide Range of Flavoring–Carrier Fluid Adducts Form in E-Cigarette Liquids | Chemical Research in Toxicology](#)
- [Chemical analysis of fresh and aged Australian e-cigarette liquids | The Medical Journal of Australia](#)
- [Synthetic Cooling Agents in Australian-Marketed E-cigarette Refill Liquids and Disposable E-cigarettes: Trends Follow the U.S. Market | Nicotine & Tobacco Research](#)
- [Nicotine in electronic cigarette fluid: importation pathways to unequal harm - PubMed](#)



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