



Research paper

“Is it banned? Is it illegal?”: Navigating Western Australia’s regulatory environment for e-cigarettes



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ABSTRACT

Background: In Australia, there is no Federal legislation that directly applies to e-cigarettes, instead, several existing laws relating to poisons, therapeutic goods and tobacco control apply. Across all Australian States and Territories, it is illegal to sell nicotine-containing e-cigarettes, however, users can legally import nicotine-containing vaporisers through the Personal Importation Scheme. Western Australia differs from other Australian States and Territories in that products which resemble tobacco products are banned, effectively prohibiting the use of e-cigarettes. This study aimed to understand how e-cigarette users navigate Western Australia’s regulatory environment to access vaping products and the health and safety issues encountered.

Methods: Working from a constructionist epistemology and a symbolic interaction framework, in-depth interviews were conducted with a purposive sample of 37 current (89%) and former (11%) adult vapers (70% male, mean age of 32.5). Data was analysed via thematic analysis.

Results: Vape retailers were said to be circumventing Western Australia’s e-cigarette restrictions by selling the components of ‘open system’ devices that do not resemble a tobacco product when sold individually. Participants were unsure of the legality of importing, accessing and using nicotine and e-cigarettes, however, the majority continued to use nicotine-containing vaporisers and implemented strategies in an attempt to avoid detection and safeguard their health. The internet facilitated access to desired products, information on health and safety, and discussions of personal experiences.

Conclusions: The Australian Therapeutic Goods Administration has recently (21 December 2020) confirmed that from 1 October 2021 smokers who have tried quitting with other approved cessation pharmacotherapies will be required to obtain a prescription for nicotine-containing vapouriser products from a registered medical practitioner. The results of this study suggest further consideration of regulatory measures are however required to support the different characteristics of vapers and to mitigate the health and safety concerns experienced by e-cigarette users.

Background

Electronic cigarettes (also referred to as e-cigarettes, personal vaporisers and vapes) have generated intense debate amongst the public health community who are perceived to champion opposing opinions on the health and population-level effects of these products (Fairchild, Bayer, & Lee, 2019). However, in reality, it is likely that relatively few of the public health community categorise themselves within either of these two polarised stances and rather acknowledge the

overlapping views of e-cigarette harm prevention and cigarette harm reduction (Carroll et al., 2020). Those who oppose relaxed regulation of e-cigarettes are concerned by the potential adverse effects on users, particularly non-smokers and youth who would otherwise not smoke or use nicotine-containing products (Bunnell et al., 2015); and the prospect of sustained e-cigarette use amongst ‘dual users’ (Miller, Smith, & Goniawicz, 2020). Conversely, e-cigarette advocates emphasise the potential benefits of smokers who are unable or unwilling to quit smoking

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switching to a 'reduced risk' product (Hajek, Etter, Benowitz, Eissenberg, & McRobbie, 2014).

Authoritative groups such as the National Health and Medical Research Council (2017); Office of the Surgeon General (2019); World Health Organization (2016), Commonwealth Scientific and Industrial Research Organisation (CSIRO) (Byrne et al., 2018) and the National Academies of Sciences Engineering and Medicine, 2018 have undertaken reviews to evaluate the available evidence of the health effects related to e-cigarettes. These groups report that there is substantial evidence to suggest e-cigarettes expose users to potentially toxic substances at significantly lower concentrations than tobacco cigarettes. However, they also conclude that there is substantial evidence indicating e-cigarette aerosols induce acute harm and the long-term consequences and outcomes of prolonged exposure are uncertain.

The rise in popularity of e-cigarettes, and the diversity of devices, has left many Governments grappling with how best to regulate these products. At present, 70 countries had enacted e-cigarette specific policy, with other countries applying a range of product classifications to suit existing policies, including 'tobacco products' (57 countries), 'medicinal products' (24 countries), 'consumer products' (18 countries), and 'nicotine as poisons' (4 countries) (Institute for Global Tobacco Control, 2020). In Australia, there is no Federal legislation that directly applies to e-cigarettes, instead, several existing laws relating to poisons, therapeutic goods and tobacco control apply. Across all Australian States and Territories, it is illegal to sell nicotine-containing e-cigarettes because liquid nicotine is classified as a 'Schedule 7-Dangerous Poison', however, users can legally import nicotine-containing e-cigarettes through the Personal Importation Scheme which states users must obtain a prescription from a physician (Therapeutic Goods Administration, 2019). E-cigarettes that do not contain nicotine can be sold in some Australian jurisdictions, provided manufacturers do not make therapeutic claims. However, in Western Australia, the context of this study, it is an offence under the *Tobacco Products Control Act 2006* (Government of Western Australia, 2019) to sell products that resemble tobacco products, regardless of whether they contain nicotine or not, and therefore the sale of e-cigarettes is prohibited. The sale and use of flavoured e-liquids are permitted provided they do not contain nicotine (Greenhalgh, Grace, & Scollo, 2018). Advertising of e-cigarettes is also restricted, although exposure to advertising and promotion of these products does occur in Australia via the internet (Amin, Dunn, & Laranjo, 2020; McCausland et al., 2020a,b).

Australians have access to nicotine-containing e-cigarette products via the internet and those who choose to import nicotine-containing products without a medical prescription are not currently actively prosecuted. Surveillance data reports approximately 70% of Australian e-cigarette purchases are made online (Australian Institute of Health & Welfare, 2020b; Euromonitor International, 2018), and Australian data from the International Tobacco Control Survey found more than 40% of vapers use nicotine-containing products (Yong et al., 2015). While there have been efforts to weaken Australia's tobacco control laws and reclassify nicotine to legalise nicotine vaping and heated tobacco products (Henderson, 2020; Philip Morris Limited, 2017, 2018, 2019a, 2019b), the Australian Therapeutic Goods Administration recently announced tighter restrictions which will "align the current domestic restrictions under State and Territory law that prohibit the supply of nicotine-containing e-cigarettes in Australia without a valid medical prescription" (Australian Government, 2020a). As of 1 October 2021, smokers who have been unsuccessful in quitting smoking with cessation methods approved by the Therapeutic Goods Administration and wish to use nicotine in a personal vaporiser will be required to obtain a prescription from a medical practitioner to fill at a pharmacy (either a physical community pharmacy or an Australian online pharmacy) or to legally import nicotine-containing e-cigarettes and/or liquid nicotine from overseas using the Personal Importation Scheme (Australian Government, 2020b). Nicotine-containing vaporiser products imported from overseas will be subject to Australian Border Force interrogation and those orders with-

out a valid prescription may be destroyed by the Therapeutic Goods Administration (Australian Government, 2020b). Further, the new requirements (Australian Government, 2020a) necessitate that all liquid nicotine products include child-resistant closures, and in response to concerns regarding the safety and quality of unapproved nicotine e-cigarettes and the need for prescribing guidance, additional resources and standards will be developed before the changes are implemented on 1 October 2021, including: public consultation in early 2021 on product safety and quality; provision of educational resources to support health professionals; and consumer education activities.

The United States, where e-cigarette sales are subject to very few restrictions, recently observed an exponential increase in vaping, particularly amongst youth, which was referred to as an 'epidemic' (Food & Drug Administration, 2018). Although the most recent National Youth Tobacco Survey reported a substantial decline in current e-cigarette use since 2019, 3.6 million young Americans (19.6% of high school and 4.7% of middle school students) continue to use e-cigarettes, preferring flavoured pre-filled cartridges and disposable e-cigarettes (Wang et al., 2020). In contrast, the prevalence of vaping in Australia remains relatively low, however, a significant increase in current and lifetime use has been reported (Australian Institute of Health & Welfare, 2020c). The most recent national survey estimates that 2.6% of the Australian adult population currently use e-cigarettes, up from 1.2% in 2016, with use amongst smokers (4.4% 2016, 9.6% 2019) more prevalent than non-smokers (0.6% 2016, 1.4% 2019) (Australian Institute of Health & Welfare, 2020a).

This study aimed to understand how e-cigarette users navigate Western Australia's unique regulatory environment to access vaping products and the health and safety issues they encounter. Specifically, an environment with a flourishing retail market that has not legislated total prohibition, although is relatively unaccepting of promoting e-cigarettes as a population health strategy. Understanding e-cigarette users' behaviours within this environment will provide valuable insight for decision-makers as they develop e-cigarette specific regulations.

Methods

Theoretical framework

Symbolic interactionism is situated in a constructivist epistemology and is a micro-level sociological theory providing the theoretical framework underpinning this study. Symbolic interactionism has a history of being used to investigate drug use and the creation of deviance (Becker, 1953, 1963), and provides a frame of reference to better understand how individuals interact with one another to create symbolic worlds and how these worlds shape individual behaviours (Blumer, 1969; Charon, 2001). Symbolic interaction is a framework that helps understand how society is preserved and created through repeated interactions between individuals, and in this research, facilitated consideration of vapers' realities, social network processes and interactions with others and their environment.

Sampling

Participants were purposively sampled for maximum variation in demographic characteristics (i.e. sex, age, Socio-Economic Indexes for Areas index (a ranking resulting from a value derived from income, educational attainment, employment status and skill level (Australian Bureau of Statistics, 2018)). Current and former vapers over 18 years of age were recruited between March and November 2018 from the Greater Capital City Statistical Area (GCCSA) of Perth, Western Australia. Participants were categorised as either a current vaper if at the time of data collection they vaped at least weekly, or a former vaper if they had vaped within the last 12 months but did not currently do so. There are 16 GCCSA regions within Australia, which provide a stable and consistent boundary that reflects the functional extent of each of Australia's

capital cities and includes people who regularly work, shop and socialise within the city, but live in surrounding areas (Australian Bureau of Statistics, 2012). Western Australia is Australia's largest state by total land area (Geoscience Australia, n.d) and Perth is the capital of Western Australia with very few neighbouring city centres.

Recruitment

Recruitment utilised a multipronged approach with recruitment flyers and posts placed on four online vaping forums (AussieVapers, Vaping in Australia, Vaper Café Australia and E-Cigarette Forum); seven subreddits on Reddit; and approximately 30 closed vaping groups on Facebook. The lead author created personal accounts on each of the forums and Reddit and used their personal Facebook account to access the closed Facebook groups. Facebook groups were accessed by requesting permission to enter the group as a researcher to recruit participants to the study. Vape retail stores, online and bricks and mortar, within the GCCSA of Perth were contacted via email, social media and webpage submission forms. Snowball sampling was also utilised.

Interested individuals were invited to contact the lead author via email or telephone to express their interest in participating and receive further details about the project and what their participation would entail. Once potential participants had read the participant information statement and agreed to participate, a meeting was arranged at a convenient, safe public location (e.g. local café, university campus). The lead author, who has experience in qualitative data collection, conducted all interviews in English. Interviews lasted on average 49 min (range 25–86 min) and were audio-recorded with participant consent. Participants were provided with an AUD \$25 gift voucher at completion of the interview as an honorarium for the time they provided.

Data collection

A data collection guide (Supplementary File 1) was developed and used to capture participants' demographic and behavioural information, and observational field notes during and after the interview. Photographs were regularly taken of the vaping equipment participants had with them during the interview, and interview settings that were relevant to the study (i.e. vape store, e-liquid manufacturing laboratory).

The data collection guide included a semi-structured interview guide which focussed broadly on several topic areas (i.e. devices and products used, means of accessing product, emergent subculture, regulation) guided by relevant literature and discussions with the research team. The interview guide was field-tested with two people who were eligible to participate in the study which enabled the lead author to assess the flow and sequencing of questions, confirm the coverage and relevance of the content, receive feedback on the language used and questions asked, and implement changes based on participants advice (Kallio, Pietilä, Johnson, & Kangasniemi, 2016). The semi-structured approach permitted flexibility and adaptability within each interview whilst ensuring the preconceived areas of enquiry were explored (Turner, 2010). As new ideas and concepts emerged from the data these data-driven concepts were fed back into the data collection process and further guided sampling and the adaption of the interview guide (Skeat, 2010). Sampling was terminated when thematic saturation was reached and few new data were being generated (Morse, 1995).

Analysis and interpretation

All interviews except one (file corrupt) were transcribed verbatim by an independent professional transcription service and checked for accuracy by the lead author. The detailed notes taken by the lead author of the corrupted interview were sent via email to the participant who checked the data for accuracy and validation. Transcripts and interpretations were not provided to other participants for respondent validation.

Data analysis occurred simultaneously with data collection to facilitate the assessment of existing data and the creation of strategies to collect subsequent, richer data until saturation (Corbin & Strauss, 2015). Interview transcripts were anonymised and imported into NVivo (v12). The lead author conducted all coding, this allowed for a single researcher to be immersed in both the data collection and analysis, thereby ensuring that the coding frame adequately described the intentions and content of the data (Elliott, 2018).

The analytical process followed the steps proposed by Braun and Clarke (2006) to conduct thematic analysis and drew upon the initial and axial coding process of grounded theory (Corbin & Strauss, 2015). The lead author played an active role in the analysis by searching for and identifying themes "to theorise the sociocultural contexts, and structural conditions, that enable the individual accounts that are provided" (Braun & Clarke, 2006, p. 85).

Line-by-line analysis was undertaken to look for patterns of meaning and issues of interest important to the research objective and to generate a diverse range of initial codes (Corbin & Strauss, 2015). Codes were developed based on theoretical interest and emergent concepts that arose during interaction with and interpretation of the data. Axial coding examined the initial codes at a conceptual level to combine and connect codes to form overarching 'candidate' themes and sub-themes in a meaningful way regarding the phenomenon of investigation (Corbin & Strauss, 2015) (Supplementary File 2). Revision of the candidate themes then occurred at two levels. Level one (Supplementary File 3) involved reviewing all of the data collated under each candidate theme to consider whether the data formed an intelligible pattern (Braun & Clarke, 2006). Some themes and sub-themes were refined during this process to create new themes/subthemes and to separate and combine others (Braun & Clarke, 2006). Level two (Supplementary File 3) involved a similar process, whereby the data was reviewed and further refined. This process, however, concerned the validity of the individual themes in relation to the entire data set to ensure participants meanings and voice were accurately reflected (Braun & Clarke, 2006). A detailed analysis was then written for each theme to report the content and meaning of patterns (Braun & Clarke, 2006). Working theme titles were reviewed to ensure they accurately reflected the respective analysis and the most vivid quotes were selected which best illustrated the essence of the point being demonstrated (Braun & Clarke, 2006). A codebook was developed to provide structure and agreement about code definitions, constructs and themes (Liamputtong, 2013). Throughout the analysis, there were regular discussions amongst authors regarding the lead author's interpretations of the data and conceptual maps to improve the dependability of the findings (Given, 2008). Records of study processes, decisions, and methods were documented through meeting minutes, ethics amendments and annual reports, field notes, and personal reflections and analytic memos, contributing to a rigorous analysis process (Birks, Chapman & Francis, 2008; Liamputtong, 2013).

The study is reported following guidance from the consolidated criteria for reporting qualitative research (COREQ) checklist (Tong, Sainsbury, & Craig, 2007) (Supplementary File 4).

Demographic and behavioural data were analysed using descriptive statistics (SPSS v26).

Ethical considerations

Participants gave written consent at the time of the interview or signed and scanned a consent form via email before the interview to the lead author. One participant provided verbal consent which was audio recorded. Thirty-five face-to-face and two telephone interviews were conducted. All procedures were performed in compliance with relevant laws and institutional guidelines and the study protocol was approved by the Human Research Ethics Committee of Curtin University (HRE2017-0144). Quotes have been attributed pseudonyms to protect participants' identity.

Results

Participants

Thirty-seven interviews were conducted with current ($n = 33$, 89%) and former vapers ($n = 4$, 11%) (Table 1), with a mean of age of 32.5 ($SD=7.411$, range 20–45 years). Thirty-two participants (86.5%) were current or former cigarette smokers and five participants (13.5%) vaped despite having never been a regular smoker. Former ($n = 24$, 65%) and current ($n = 8$, 22%) smokers had been using tobacco on average for 14 years ($SD=8.268$, range 3–38 years). In comparison, participants had been vaping on average for 2.4 years ($SD=2.011$, range 1 month – 7 years).

Findings

The narrative summary describes how e-cigarette users navigate Western Australia's unique regulatory environment to access vaping products and the health and safety issues they encounter. Quotes from participants are provided in italics, followed by their pseudonym and age.

Circumventing Western Australia's regulatory framework to access e-cigarette paraphernalia

Participants provided insight into how local retailers were circumventing Western Australia's regulation which prohibits the sale of products that resemble tobacco products (i.e. e-cigarette) by selling parts (i.e. tank or mod) of 'open system' e-cigarettes that do not necessarily resemble a tobacco product when sold individually. Therefore, some local retailers had created two businesses (often side by side, or one brick and mortar and one online), enabling the whole device to be purchased through two separate transactions.

"I have moved to a different supplier now, just up the road and they have their shop set up in two different halves, just for legal reasons. There are all sorts of legal loopholes that they've got to abide by ..." Kai (38)

Table 1
Summary of participant's demographic, smoking and vaping characteristics.

Characteristic	Total ($n = 37$)
Age (years)	
20–29	15 (40.5%)
30–39	15 (40.5%)
40–49	7 (18.9%)
Sex	
Male	26 (70.3%)
Female	11 (29.7%)
Education	
< High school certificate	6 (16.2%)
High school certificate	8 (21.6%)
Technical certificate (TAFE)	14 (37.8%)
University degree	9 (24.3%)
Employment status	
Employed	33 (89.2%)
Unemployed	2 (5.4%)
Full-time student	2 (5.4%)
Vaping status	
Current vaper	33 (89.2%)
Former vaper	4 (10.8%)
Nicotine vaping	
Yes	26 (70.3%)
No, but did initially use nicotine	4 (10.8%)
No	7 (18.9%)
Smoking status	
Current smoker	8 (21.6%)
Former smoker	24 (64.9%)
Never smoker	5 (13.5%)

Alternatively, a larger franchise was able to sell the complete device by ordering through their interstate counterpart, which was based in a state that permits the sale of the device, providing it does not contain nicotine.

If hardware was not purchased locally, or within Australia, it was imported, or purchased while overseas (e.g. Indonesia, Philippines).

"I've brought in [imported], to date, 5000 machines. ... because Australia's so desperate for it." Archie (45)

Accessing nicotine concentrate and nicotine-containing products

Importation of nicotine concentrate and nicotine-containing products

Many participants were unsure about the legality of importing, accessing and using nicotine, and the potential consequences of breaking these directives, which was conveyed by Caleb:

"Like my brother ... he couldn't believe that I had bottles of 100-milligram nicotine at home and I said, 'well, nicotine's not– It's not illegal you know?'" Caleb (34)

Twenty-five of the 26 participants who were using nicotine were illegally importing nicotine-containing e-liquid and/or nicotine concentrate from countries with more liberal e-cigarette and nicotine regulations, predominantly the United States and New Zealand. Only one participant was going through the approved Personal Importation Scheme. No one reported having their nicotine-containing order confiscated by the Australian Border Force and participants had different theories about how to successfully get nicotine through customs, which included using certain mail providers, express shipping, and only ordering small quantities.

Participants who ordered nicotine concentrate or nicotine-containing products from overseas were charged hefty shipping charges and had to wait extended periods for their order to arrive, which caused many to feel anxious if they were running low on nicotine. In an attempt to avoid running out, most participants ordered large quantities of nicotine concentrate (i.e. 1 litre) and purchased nicotine-free juice from local retailers (i.e. vape stores, newsagents, smoke shops) and home vendors which they, or someone else, spiked with nicotine.

Spiking nicotine-free e-liquid

Vapers purchased nicotine-free e-liquid locally, interstate or internationally, which was then "spiked" (Lisa, 41) with nicotine. Participants explained there are two ways to do this: they could do it themselves, which would require them to order nicotine concentrate and know how much nicotine was required for the quantity of e-liquid they were using to obtain the desired strength, or, they could seek advice and/or assistance from someone with experience (i.e. friend, retailer or home vendor).

"I know it's illegal, but there is a place around here where you can get people to [spike your e-liquid]. They try and find ways around it. It's probably still not legal, but where they'll gift you the nicotine in it, rather than making you pay for it, so, therefore, it's not a sale. There are people that will still charge you, but they just do things out of their own house. Or you can buy imported [nicotine]." Levi (29)

Felix, an owner of a small vape store explained how he was regularly approached by vapers who were buying large quantities of nicotine and did not know how to undertake the spiking process, which would leave him in a compromised position if he were to help them:

"People will bring in[to the store] bottles of nicotine and I'm like [exasperated looked]. ... because they buy like 100 mg strength. They don't know what to do with it!" Felix (45)

The interplay between Western Australian vapers' and the internet

Facilitating access to experienced global e-cigarette users to increase knowledge and ability

Participants utilised the online vaping community, which constituted an international network of vapers with varying levels of technical ability and expertise, to discuss personal experiences, acquire relevant skills, information on health and safety, the meaning of vaping specific language and jargon, and troubleshooting techniques.

"[Being involved in the online vaping community is] more so for my own personal research and helping people out if they need the help or if I need the help. It's just a very quick avenue to post something and someone can respond because there's people from Australia or the UK or America." Dylan (21)

Buying, selling and trading e-cigarette paraphernalia

Dedicated vaping groups on social media enabled the buying, selling and trading (swapping) of vaporisers, and e-liquid and accessories, with some participants conceding *"I'm not sure if that's legal though"* (Rowan, 35). Some participants were therefore particularly wary of who they sold/gifted vaporisers and nicotine-containing products to, for fear of getting into trouble with the authorities as instances of homes and businesses being raided by the authorities had permeated through the online vaping community.

"If someone messages us, 'I want to buy a mod. Do you know anyone?' If ever I encounter something like that and I wanted to buy their mods or sell the mod to them, I never invite anyone in my house. I always go to the closest petrol station, the closest food court, and things like that. In case that they're [authorities] going to raid my house ..." Rowan (35)

Being aware of and abiding by the rules of online engagement

It was generally understood by most participants who engaged in formalised vaping specific online forums and social media groups that the sale of vape equipment to minors (<18 years), and sale and exchange of nicotine were prohibited, with the rules usually presented upon entry into these online communities. Although private messages exchanged amongst vapers online could result in the sale or acquisition of nicotine-containing e-liquid. Eli described a time when he tried to sell nicotine-containing e-liquid on a Facebook vape group and was told by another member that was not allowed, and subsequently, he ceased this behaviour:

"The Facebook groups got angry with me. ... I think a lot of them say that you're not allowed to promote nicotine juice. I got in on one of those [groups] and they got really upset. ... this guy sent a message to me saying, 'You can't do this, it's illegal. I'm going to report you to the ACCC [Australian Competition and Consumer Commission].' ... Then I said, 'I think I'm pretty sure I'm not doing anything wrong.'" Eli (35)

People who broke the group's rules were commonly ostracised, and for this, some participants viewed the vape community as *"self-regulating"*.

"You'll find that the vape industry itself actually self-regulates. What you will see in the Facebook groups is— Say we're obviously enemy vendors and I hear that you've sold vape gear to a 17-year-old, then I will feather and tar you on Facebook and people would avoid you because you've supplied something. So this is how they self-regulate. As nasty as it is, and it does get very nasty, people are self-regulating. ... If you ask for nicotine you'll get kicked from a lot of the [online] groups. If you supply nicotine, you'll definitely get kicked. ... Vendors are calling the Health Department on other vendors and there's raids happening all the time. ... That's keeping a lot of people honest as well. No one wants to supply nicotine illegally because it is illegal and there's a very heavy fine [up to AUD \$40,000], and they're scared that someone's going to do them in." Victoria (43)

Consequences of Western Australia's e-cigarette regulatory framework

Some participants remarked that Australia's current restrictions on e-cigarette use had stigmatised current vapers by making them feel like criminals, which had acted as a catalyst for some vapers to open their own business or become home vendors supplying product to *"help people out"*.

"Not everyone follows the rules. I know I certainly don't follow all the rules, selling stuff [vape products], and I don't think I'll ever follow the rules. I'm risking it to help people out. I don't really care if I get in trouble anymore. I'd just tell the government where to stick it." Soren (33)

"I was selling out of my front room for a little while before I was working full time down here [vape retail store]. At first, I was meeting people down at 7-Eleven [convenience store] and stuff, and it ... felt like a drug deal or something you know? All I'm doing is giving this guy a tank so he can get off the cigarettes." Jasper (42)

A couple of participants had also conceded they had relapsed to cigarettes while waiting for their nicotine order to arrive. For others, the process of obtaining nicotine products or mastering the vaping process was too difficult and one of the reasons they had ceased using e-cigarettes, opting to keep smoking.

Health and safety concerns

Nicotine handling and storage

Participants purchasing nicotine concentrate were storing it at home, usually in a cool, dark place, such as the fridge/freezer or in a cupboard to prevent oxidation and to increase its lifespan. Participants frequently sought help from the internet when they were unsure of the nicotine spiking process, and many used an online nicotine mixing calculator to work out the correct strength required for their volume. Spiking e-liquid was perceived as a process which had to be learnt and required skill, appropriate equipment and protective wear.

"Initially, yeah I did [find spiking my juice with nicotine difficult] because I wasn't sure what strength I wanted and then what size— Because you have to know what size bottle you've got, whether you've got singles² or doublers,³ it is very complicated and it shouldn't be. It really shouldn't be. And I mean you need a syringe, you need a blunt needle tip, you really should be wearing gloves, you should be in a ventilated area. You know, that's avoidable, that whole process is avoidable if they were to legalise it in premix juice. ... It's very dangerous and it's really intimidating for someone who doesn't know what they're doing." Victoria (43)

Device handling and safety

Battery safety was a priority for most participants, although it was something that needed to be learnt and *"not something that is really forced down on you"* (David, 38). Participants recalled receiving little information about battery safety when purchasing batteries or devices and took it upon themselves to undertake the research due to accounts of batteries exploding in vaporisers. Understanding how to use batteries correctly (e.g. not exceeding specified amps) and the processes required to maintain them (e.g. battery case for transportation) was frequently learnt through social media (e.g. Facebook), content sharing platforms (e.g. YouTube), vape specific forums, and *"experts"*.

"Basically you have to just know what battery to use with them [mechanical mods] and what Ohm's to run your coils at, if they're too high, it could be bad, and if they're too low, it could be bad. I talked to a bunch of experienced vapers about the battery and Ohm's laws regarding those"

² Singlers are a full bottle of e-liquid which is ready to vape and is not designed to have any nicotine added.

³ Doublers are designed to make it easier for people to add nicotine to their e-liquid. These bottles come half filled, but the flavour is double concentrated.

devices. I'm pretty confident with how mine are going. ... [I found these people through] Facebook, from vape groups and stuff, and some local people that live here in Perth. There's a guy ... he's like an expert coil-maker, so I video chatted with him while I was playing around with my mods. He was basically just telling me the ins and outs and making sure that I'm running it safely." Holly (27)

One participant explained that up until recently there were no batteries specifically manufactured for vaporisers and so batteries made for other devices, such as torches, had been adopted which can be dangerous depending on how the vape is used. For example, customising the device to produce more power and bigger vape clouds. Several participants believed that batteries need to be regulated to stop the manufacturing of "knock-off" batteries, which can be extremely hazardous to users.

"That's the other thing they really need to get on top of, the batteries, they really need to regulate batteries. And it's not just Australia that does it, it's worldwide that need to regulate batteries. You got companies that are making knock-off batteries that have got stupidly high ratings on them. They're rated for four and a half thousand mAh [milliamp hours], which is not possible. Chemically, it's not possible at 40 amps or whatever, which if people believe that they'll blow their faces off." Hugo (29)

In an attempt to mitigate the risk of a device malfunction, participants explained the methods they employed. Commonly, participants purchased chargers that shut off once the battery was fully charged, never left charging batteries unattended or on charge for extended periods, purchased only regulated devices which have a safety cut-off installed, and purchased from trusted and reputable brands referred by the vaping community. Axel described the range of mods available and their respective safety mechanisms:

"You've got your regulated mods, your hybrid mods and your mechanical. I'm still sitting on regulated, simply because your regulated has got all your cut-off switches, all of your circuit breakers, everything like that, and then so that's just pretty much turn it on and you're good to go. Even if you've got hybrid that has circuit breakers in it, but you still have to follow Ohm's law which is dependant on pretty much, the output that the coil produces. Then you move to mechanical mods which are basically a battery, you basically connect the battery up and you're good to go. That's where it starts getting dangerous if you don't know what you're doing, because otherwise, you put the wrong Ohms in there, you put the wrong output batteries, you put high drain batteries in it, that's when the batteries start venting and pulling up and it's just awful, it's not good at the end of the day." Axel (20)

Product quality and control

Quality control and assurance of e-liquid were important to several participants, and the lack of regulation in Australia was a concern.

"I'd like to see some regulations. To put a house on a roof, you've got to be a carpenter. To sell tobacco products, you've got to show that you've got a license and half a brain. ... Then you've got guys that are building, essentially moonshine [e-liquid] and trying to sell it. It needs to be regulated ... There's not a set of guidelines in place to go, you have to use lab quality, PG [propylene glycol], VG [vegetable glycerine]. They do whatever the frick they want! And that's scary." Hugo (29)

Commonly reported side effects of vaping including dehydration, dry mouth, nausea, dizziness, sore throat and a dry cough. Less commonly experienced side effects included a stomach ache, vomiting and loss of voice. Some participants were therefore hesitant to purchase e-liquid that was made in China or other Asian countries and preferred to purchase from the United States or New Zealand because they felt that their manufacturing standards were higher.

"I trust the US [United States] and I trust New Zealand, but ordering it anywhere else, yeah I'd be a bit sceptical." Chloe (34)

Others knew little about where their juice was produced or to what standards.

"I would have no clue [where my e-liquid comes from]. They come in like these little plastic squeeze bottles with like blue lids. [Laughs] They're quite like pretty generic. I wouldn't have any clue about quality or consistency ..." Bodhi (20)

Alternatively, participants chose to buy locally produced juice from retailers and home vendors colloquially referred to as "back yard blenders" (Victoria, 43) or "bathtub mixers" (Miles, 28). Participants who purchased from home vendors reported that the e-liquid was prepared in a "clean room" (Holly, 27) within the seller's home. Participants were generally happy with the quality of the juice and cleanliness of the at-home setup, however, some had refused to purchase from home vendors due to unsanitary conditions.

"I've been to some people's houses that want me to sell their juice. I've walked in and gone, 'No' and walked straight back out, because there's animals and there's— Whereas I've got a clean room at home that is a [with emphasis] clean room." Felix (45)

Some participants were also concerned about incorrectly labelled nicotine concentrations on e-liquid bottles.

"... some of them do say 0% nicotine on the bottles. Doesn't mean that you can believe the label that it's zero nicotine just because it's written there, doesn't mean it might not have it in there though." Seb (27)

Miles, an owner of a local vape store and e-liquid manufacturer described how he was working towards getting his laboratory certified in anticipation of e-liquid manufacturing standards being introduced in Australia. His motivation for this was the expectation that his business would be in a superior position to continue to market and sell their product compared to other retailers. Miles, along with several other participants, who were also local retailers, had regular contact with the Department of Health to ensure they were following all directives. However, they felt that even the Department of Health was unsure of the rules, which Miles described as "frustrating" because "it makes it very hard to try and conduct business, you don't really know where you stand".

"I mean regulation [of e-liquid] will be coming sooner or later, whether which way it goes [nicotine vaping legalised or not] ... getting it [laboratory] HACCP⁴ certified ... [for] when the regulations do come I'll be in a better position to hopefully meet them a lot faster than the rest of the market. ... At the moment, there's no real regulation on it [e-liquid], the closest thing is just calling it a food product because it contains food ingredients but some people say that, some don't ... I mean I speak to the Health Department quite regularly, the tobacco control guy seems to still manage this and even he's not really 100% on the exact requirements ... I just figure just follow the basic food grade standards for manufacturing, the sealed packaging and all that sort of stuff, and it's all you can do it until they tell you otherwise." Miles (28)

Participants expressed similar concerns about the quality of devices being bought and sold in Australia and imported from overseas, as they did e-liquid. As a novice vaper starting, it was described as a "daunting" (Krissy, 24) experience sifting through the assortment of devices available to purchase online which fluctuated in price, technical proficiency and quality (e.g. some brands are known to leak). Quality of a device proved to be more difficult to establish as a novice vaper and in the search for a vaporiser that satisfied their budget and ability had purchased some poor quality devices and paraphernalia that had resulted in disconcerting experiences, such as melting chargers. More experienced vapers explained that they learnt over time that there are several "ma-

⁴ HACCP Australia offers its accreditation to organisations that actively apply a good safety programme or incorporate food safety principles in their design which meet the approval and standards of HACCP Australia.

“reputable” (Levi, 29). This knowledge was diffused through online vaping forums and social media groups, product reviews on retail websites and YouTube, and word of mouth. These sources of information were heavily relied upon in an attempt to steer clear of cheaply manufactured devices and to obtain the best vaping experience possible.

“Probably the only thing I’d say is just the amount of education that people have got about it [device quality] is probably the biggest issue. Because the first place people tend to go when buying things online is eBay. As soon as you buy it [mods] on eBay, you’re getting clones of certain things and that’s when stuff starts going very, very wrong. On most of the [Facebook] pages you’re a part of, they’ve usually got a pinned post at the top with all like your proper vendors and everything like that, you can trust those vendors.” Axel (20)

Discussion

This study aimed to gain an understanding of how e-cigarette users navigate Western Australia’s regulations which ‘ban’ nicotine vaping and the sale of e-cigarettes to access vaping products, and the health and safety issues they encounter in an environment that is relatively unaccepting of the promotion of e-cigarette use as a population health measure. Despite Australia’s nicotine restrictions, 81% ($n = 30$) of participants used nicotine or had implemented ‘self-titration’ methods to “wean” themselves off nicotine. Furthermore, several participants were unsure of the legality of importing, accessing and using nicotine and e-cigarettes, however, the majority continued to import high strength nicotine concentrate or nicotine-containing e-liquid from overseas, store large quantities of high concentrate liquid nicotine in their homes, and handle nicotine when spiking non-nicotine e-liquid, sometimes without appropriate protective equipment. Liquid nicotine is highly toxic, and ingestion of just 1–2 ml of nicotine within pre-mixed e-liquid can kill a child (Wylie et al., 2019). Since 2013, there has been a significant increase in the number of calls to the Australian Poisons Centres involving incidences of exposure to e-liquid (Wylie et al., 2019), and in 2018 an Australian toddler died from nicotine poisoning (The Hon Greg Hunt MP, 2020). Similarly, coinciding with the increased rates of e-cigarette use within the United States, poisoning exposure cases have increased, and there have been at least two fatalities between 2010 to 2018 (Wang, Liu, & Persoskie, 2020).

There are thousands of e-liquid flavours available for retail purchase (Hsu, Sun, & Zhu, 2018) and from home vendors (Cox et al., 2019). These products have been found to contain various excipients, flavourings, additives, potentially hazardous ingredients (Chivers, Janka, Franklin, Mullins, & Larcombe, 2019; Cox et al., 2019) and inaccurately labelled nicotine content (Buettner-Schmidt, Miller, & Balasubramanian, 2016; Chivers et al., 2019; Goniewicz et al., 2015; NSW Government, n.d.; Trehy et al., 2011). Many of the flavouring compounds present within e-liquid have been recognised as safe for ingestion, however, none have been assessed as safe for inhalation via an e-cigarette (Commonwealth of Australia, 2020). Further, incorrect labelling and discrepancies between the labelled amount and actual nicotine content have been documented, and are misleading and may result in unintended addiction to nicotine and other adverse health effects (Buettner-Schmidt et al., 2016; Chivers et al., 2019). Some participants in our study reported mild adverse effects after using some e-liquids, including dizziness, sore throat, dehydration, and nausea. These experiences are not uncommon and have been documented elsewhere (Chen et al., 2020; Cooper, Harrell, & Perry, 2016).

The internet played a vital role for participants in circumventing Western Australia’s restrictions and facilitated access to nicotine and vaping products. The dedicated vaping forums and social media groups that participants regularly accessed created virtual spaces to network and form trustworthy and reliable underground markets. The online environment normalised use, as those who accessed these communities

were exposed to supportive viewpoints on e-cigarettes from local vapers and those in countries with more liberalised regulations. Other studies, both Australian (Morphett, Weier, Borland, Yong, & Gartner, 2019) and international (Russell, Dickson, & McKeganey, 2018), have also discussed the significance of the online environment in e-cigarette initiation, maintenance, and knowledge sharing, with one study stating that experienced vapers involved in online fora could significantly increase smoker’s awareness of the variety of vapouriser products available and increase their motivation to experiment with e-cigarettes (Russell et al., 2018). The potential for online forums, groups, and social media to raise awareness and facilitate access to e-cigarette products amongst internet users is a particularly pertinent and concerning issue in regard to minors, who can readily access this content.

Participants in this study implemented risk reduction strategies to avoid law enforcement detection via the internet (e.g. private messaging) and potential adverse health and safety consequences (e.g. purchasing from reputable brands) even though they were pursuing a behaviour that is not sanctioned by society. They also learnt that formalised vaping forums were an ‘unsafe’ environment to discuss nicotine acquisition, while ‘direct messages’ and face-to-face discussions with other vapers were ‘safe’ social environments to discuss such transactions. Despite participants’ fear of what could happen if they were found to be procuring or selling nicotine-containing products, their experiences and those of the majority of the wider vaping community suggested their fears were rarely warranted as instances of where vapers’ behaviours were formally sanctioned were rare. Subcultural community norms of online communities have been found to foster beliefs in the acceptability of these exchanges and the proliferation of nonconformity into the online milieu where traditional jurisdictional boundaries that inform policy are indistinct creates challenges for law enforcement to maintain public health and safety (Stalans & Finn, 2016).

The current regulatory framework for accessing nicotine vaping products in Australia is partially determined by the Therapeutic Goods Administration who have recently (21 December 2020) confirmed that from 1 October 2021 smokers who have tried quitting with other approved cessation pharmacotherapies will be required to obtain a prescription for nicotine-containing vapouriser products from a registered medical practitioner (Australian Government, 2020a). The new legislation will “align the current domestic restrictions under State and Territory law that prohibit the supply of nicotine-containing e-cigarettes in Australia without a valid medical prescription”, effectively closing the loophole currently being circumvented by vapers and retailers in this study. Further, the impending legislation will clarify the restrictions on the sale, possession and use of nicotine e-cigarettes under state and territory law, and make explicit the circumstances under which the Australian Border Force may seize e-cigarettes containing nicotine that are imported into Australia (Australian Government, 2020a).

Some cigarette smoking participants in this study detailed times of relapse due to the difficulty in obtaining nicotine-containing vapouriser products, or had ceased using e-cigarettes entirely and started smoking again because the process was deemed “too difficult”. The imminent prescription-only regime will position medical practitioners centrally within individuals smoking cessation endeavours, enabling them to advise on how to reduce the risks associated with liquid nicotine use, assess progress, and reduce reliance on nicotine (The Royal Australian College of General Practitioners, 2019). Recently, The Royal Australian College of General Practitioners (2019) undertook a substantial revision of their guidelines for health professionals to support smoking cessation, stating e-cigarettes may be a reasonable intervention for individuals who have been unsuccessful in achieving smoking cessation with approved pharmacotherapies, remain motivated to quit smoking, and have raised the issue with their healthcare provider. Studies have shown that smokers who discuss their quit goals and progress with a counselor have a greater likelihood of success of quitting and avoiding relapse (The Royal Australian College of General Practitioners, 2019). Efforts to curb tobacco smoking rates have stigmatised smokers, which can act as a

barrier for people to seek support and treatment (Bell, Salmon, Bowers, Bell, & McCullough, 2010). All smokers must be offered non-judgmental, evidence-based support to quit smoking and ensure that smoking cessation is fully integrated into the health system (White, McCaffrey, & Scollo, 2020).

Most Australian medical colleges and public health researchers support the federal government's precautionary approach to e-cigarette use (Australian Government Department of Health, 2020) and have recently confirmed their support for the now confirmed prescription-based model during the latest *Senate Select Committee on Tobacco Harm Reduction* (Commonwealth of Australia, 2020). Implementation of the new legislation will provide an opportunity for decision-makers and public health authorities to convey to the Australian population the latest national requirements for accessing nicotine-containing vaporiser products for smoking cessation. The legislation will also assist in addressing the confusion amongst some vapers, as demonstrated in this study and other Australian based research (Morphett et al., 2019), about the legality of vaping and nicotine use. However, any information will need to be clear and concise, as previous research has reported that e-cigarette health information and advice published by reputable Government organisations are more difficult to comprehend than content published by for-profit entities promoting e-cigarette use (Park, Zhu, & Conway, 2017). Given the health literacy levels of the Australian population are generally low (Australian Bureau of Statistics, 2008, 2019) and that biases in algorithms underlying online search query recommendations have been found to drive less literate users towards health-related misinformation (Susaria, 2020), these present findings have important implications. Those implications include, but are not limited to: increasing the capacity of current and potential e-cigarette users to locate, understand and use web-based information to promote and maintain health; the reinforcement of e-cigarette use; and organisations to improve the health literacy of e-cigarette information to ensure web-based resources are written at an appropriate literacy level, factually correct and regularly updated.

In addition to the prescription-based model, regulation of product quality and safety standards are required to address the health and safety concerns illuminated by the experiences of the e-cigarette users in this study. Further considerations for regulation include the setting of maximum nicotine concentrations in e-liquid, minimum standards for manufacture and safety, appropriate restrictions on advertising, prohibiting supply to minors under 18, and mandatory standards for the labelling of e-liquid (e.g. the inclusion of risk-proportionate health messages concerning toxicity and addictiveness, list of ingredients, advice to keep out of reach of children, and advice on overdose management) (Commonwealth of Australia, 2020). Currently, e-cigarette users and health professionals are being encouraged to report any suspected side effects related to e-cigarette use to a Therapeutic Goods Administration managed website for reporting generic side effects to medicines and medical devices (Australian Government, 2020b). The efficacy of this reporting system should be monitored and changes to the system be made as required. Alternatively, a specific system for the reporting of harmful effects of e-cigarette use and the recall of unsafe e-cigarette products and other related issues could be created. Several other jurisdictions including Canada, the European Union, the United Kingdom and the United States have introduced elements of the aforementioned safety measures (Commonwealth of Australia, 2020) which we could learn from in order to develop safe and appropriate regulations for Australia.

Limitations

This study was exploratory and was conducted with a purposive sample of current and former vapers in one Australian state and specifically one region of Western Australia. Therefore, these results may not be generalizable to the broader vaping community or e-cigarette users abroad due to Australia's regulatory environment, absence of mass media advertising and lack of Government endorsement as a smoking cessation

aid (National Health & Medical Research Council, 2017). However, the consistency with other research suggests these findings are not atypical. The researcher who undertook this study is a non-vaping, non-smoking female, this may have presented some challenges with participants viewing the interviewer as an 'outsider' (Dwyer & Buckle, 2009). Some participants, therefore, may have provided answers to certain questions about their behaviour which they deemed to be more socially acceptable (Lavrakas, 2008).

Conclusion

This research found some vapers were unsure about the legality of importing, accessing and using nicotine, however many continued to circumvent Western Australia's restrictions to obtain e-cigarette and liquid nicotine products through importation, local retail stores and home vendors. The Australian Therapeutic Goods Administration has recently (21 December 2020) confirmed that from 1 October 2021 smokers who have tried quitting with other approved cessation pharmacotherapies will be required to obtain a prescription for nicotine-containing vaporiser products from a registered medical practitioner. The results of this study suggest further consideration of regulatory measures are however required to support the different characteristics of vapers and to mitigate the health and safety concerns experienced by e-cigarette users.

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Ethical considerations

Participants gave written consent at the time of the interview or signed and scanned a consent form to the lead author via email before the interview. One participant provided verbal consent which was audio recorded. Thirty-five face-to-face and two telephone interviews were conducted. All procedures were performed in compliance with relevant laws and institutional guidelines and the study protocol was approved by the Human Research Ethics Committee of Curtin University (HRE2017-0144).

Declaration of Interest

The authors declare no conflict of interest.

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Supplementary materials

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