Public Submission

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA
CREATE CHANGE

Parliamentary Joint Committee on Law Enforcement

Prepared by

Daniel Stjepanović PhD, Vivian Chiu, Jack Y. C. Chung, Lily Davidson, Ben Johnson, Carmen C. W. Lim, Brienna Rutherford, Tianze Sun, Janni Leung PhD, Gary C. K. Chan PhD

on behalf of

National Centre for Youth Substance Use Research

The University of Queensland

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Committee Secretariat

Parliamentary Joint Committee on Law Enforcement
PO Box 6100
Parliament House
Canberra ACT 2600

le.committee@aph.gov.au

Dear Committee Secretariat,

The National Centre for Youth Substance Use Research (NCYSUR), at The University of Queensland, would like to provide a public submission to the *Parliamentary Joint Committee on Law Enforcement*.

The submission covers all areas listed in the Committee's terms of reference:

a) trends and changes in relation to online drug availability;
b) the impact of technologies, including online communications, cryptocurrency, and encryption and anonymising technologies on law enforcement responses to the online illicit drug trade;
c) supply chains and sourcing online, including the role of individual suppliers and criminal organisations;
d) impacts on at-risk groups, young people and their families, and the community due to the availability of illicit drugs online;
e) the dangers of purchasing drugs online, including the chemical content of 'recreational' drugs;
f) the impact of legislation and policies that seek to decriminalise drug use and possession on the online availability, quality control and the capacity of law enforcement agencies to police illicit drugs; and
g) any related matter.

Evidence presented in this submission was drawn from the published peer reviewed literature and original research conducted by NCYSUR.

Yours sincerely, on behalf of the co-authors,

Dr Daniel Stjepanović

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Background to New Technologies in Drug Sales and Access

The last two decades have seen the emergence of new internet technologies that are increasingly leveraged in drug trade and drug markets. These new technologies have enhanced existing means of drug purchasing to be more anonymous and less risky, with online marketplaces coming into existence that make it possible for drug markets to exist entirely as virtual marketplaces, removing many of the physical components previously inherent to such marketplaces. The borderless nature of emerging online drug markets and drug selling carry enhanced risks for young and other vulnerable people.

While many of the technologies being leveraged are new, the use of the internet to trade in drugs is not a recent phenomenon. The earliest example occurred in 1999 when increased illicit pharmaceutical shipments to the US were traced to three suppliers in Thailand (INCB, 2000). The suppliers were using early internet technologies such as email and websites to sell these substances to individuals across the globe. More recent developments are the use of social media sites , messaging platforms and e-commerce platforms on the surface web (the portions of the internet visible to search engines such as Google and accessible using standard web browsers), and dark web pseudonymous channels known as 'cryptomarkets' (purposefully obscured sections of the internet requiring specialised software and not accessible via standard web browsers).

Technological developments

The development of a number of key technologies has resulted in the emergence of e-commerce platforms known as dark web markets or cryptomarkets. These cryptomarkets replicate many of the features of surface web marketplaces such as eBay or Amazon but are purposefully obscured so as not to be accessible using standard internet browsers. Cryptomarket operators provide a space where independent drug vendors and users can transact with one another, the cryptomarket operator taking a commission of completed exchanges. Cryptomarkets rely on three core technological features: (i) anonymising internet technologies such as the Tor network or i2p that enable anonymous browsing and hosting, (ii) cryptocurrencies that enable 'digital cash' transactions that do not rely on global payment processing or banking networks, and (iii) escrow payment systems that facilitate trust in anonymous financial transactions. The primary attraction for users of cryptomarkets is the anonymity and security afforded by the technology (Hout & Bingham, 2013). Indeed, drugs are typically delivered by post, meaning that participants of cryptomarkets never have to make face-to-face contact (EMCDDA Project Group et al., 2016; Hout & Bingham, 2013).

Cryptomarkets can only be accessed through specialised browsers such as Tor, which uses a layered encryption system and a random computer network across

multiple countries to hide the IP and geolocation of users on the network (Martin, 2014a). Communications between sellers and buyers are often encrypted and can only be decrypted by the intended receivers (Broséus et al., 2016). The use of the Tor network complicates many strategies employed by law enforcement against illegal online activity, as they cannot block these websites or order the website administrators to shut them down (Jardine, 2021). However, cryptomarkets are nearly all centralised, meaning their servers are hosted in a single location. This means that if the central operator goes down, so does the network. Law enforcement has taken down cryptomarkets in the past by identifying the location of the central administrator. In response to this vulnerability, decentralised marketplaces have recently emerged. Decentralised marketplaces distribute the operation and security of the network over multiple independent operators, eliminating the single point of failure seen in centralised services (Nadini et al., 2021). Increased utilisation of decentralised networks would significantly increase the difficulty of taking the darknets down as the servers have no single hosting location (Kermitsis et al., 2021).

Payments on cryptomarkets were initially accepted only in the form of the digital currency Bitcoin (Chertoff, 2017). This is because Bitcoin addresses can be separated from the user's real-world identity, providing anonymity that traditional financial institutes (e.g., banks and credit card companies) do not (Martin, 2014b). However, users of Bitcoin are not completely untraceable as all Bitcoin addresses and transactions are publicly stored on the network, or blockchain (Biryukov & Tikhomirov, 2019). This has been used in the past by investigators to link Bitcoin address owners to their real-world identities (Irwin & Turner, 2018). Subsequently, a new generation of cryptocurrencies where all addresses and transactions are obscured (Foley et al., 2019) have become the primary currency with which to conduct illicit activity (Horton-Eddison et al., 2021). This added anonymity further increases the difficulty for law enforcement in tracking transactions. While researchers have proposed techniques to trace payments, ongoing improvements to these cryptocurrencies have allowed their encryption algorithms to remain 'uncracked', keeping the identity of their users anonymous (Chervinski et al., 2021; Möser et al., 2017).

Cryptomarket vendors are very mobile as they do not require a fixed, physical location for their business. When marketplaces are taken down, vendors can quickly resume their business elsewhere (Horton-Eddison et al., 2021). This creates difficulty for law enforcement as disrupting the cryptomarket does not typically influence supply. Within two months of Operation Onymous (a joint operation of the FBI and Europol) which shut down hundreds of darknet markets, the number of online drug sales more than doubled (Décary-Hétu & Giommoni, 2017).

The global scope at which darknet markets operate complicates the process further. Vendors and administrators are distributed worldwide, meaning offenders providing illicit goods and services in a given jurisdiction may be

outside the country's legal authority (Décary-Hétu & Giommoni, 2017). The challenges of policing the online drug trade are comparable to those faced by international drug enforcement in the past. Pursuing overseas offenders often requires international policing operations and cooperation from local law enforcement (Crick, 2012). Additionally, charging overseas offenders can become an exhausting process with international treaties or extradition agreements often required (Ghappour, 2017).

Lastly, despite capturing a large amount of media attention, cryptomarkets account for only a small fraction of the drug trade due to the technical difficulty of accessing cryptomarkets and ensuring anonymity (Kowalski et al., 2019; Van Buskirk et al., 2016). For example, annual European spending on cryptomarkets is estimated at over €270 million (Christin & Thomas, 2019), just under 1% of the total estimated European drug market of at least €30 billion (EMCDDA & Europol, 2019). The utility of shutting down cryptomarkets which account for only a small volume of total drug trade remains to be examined.

> *The use of new technologies in the online drug trade greatly increases the difficulty for law enforcement. Online drug marketplaces make use of anonymous web services, cryptocurrencies and encrypted messaging to protect the identity of users and obscure admissible information. The global nature of cryptomarkets means that successful takedowns require international police agencies and extradition agreements. However, the mobility of vendors allows them to swiftly reinstate their business after marketplaces are shut down, and individual cryptomarkets account for only a fraction of total drug trading by volume.*

Cryptomarkets, social media platforms, and secure messaging in drug markets

Emerging data indicate continued use of the aforementioned technologies to facilitate drug sale and purchasing. The Global Drug Survey 2019 showed a marked increase in the proportion of respondents purchasing drugs through online cryptomarkets with the largest increase reported by Australian respondents. Of the Australians who completed the survey, 12.4% stated that they had used cryptomarkets in 2014, with this number rising to 28.6% in 2019 (GDS, 2019). The most popular drugs purchased through cryptomarkets were MDMA, LSD, and cannabis. The increasing popularity of cryptomarkets among Australians needs further study to understand what substances are purchased and what proportion of the drug market cryptomarkets capture. It is unclear at present if cryptomarkets are being utilised to, for example, procure small quantities of niche substances rather than acting as a primary source to procure illicit substances.

Despite this growth in popularity, cryptomarkets are difficult to use given the technical proficiency required to access these websites, and the rapidly shifting nature of individual cryptomarkets being shut down by law enforcement. In addition to this, the high degree of convenience and fast transaction speed afforded by social media relative to cryptomarkets, has gained popularity, particularly among adolescent purchasers (van der Sanden et al., 2021). A qualitative study of drug dealing in Nordic countries found that social media platforms (platforms that allow users to interact and share information in a public forum such as Facebook or Instagram) had a higher prevalence of drug trade than private digital messaging platforms (platforms that allow user interaction without a publicly accessible format such as Snapchat, WickR, and Facebook Messenger) (Demant et al., 2019). Public digital platforms provide an opportunity for sellers and purchasers to network, with initial contact made between parties in closed groups (e.g., individuals must apply for membership to gain access to the group) before moving to private digital platforms (Demant et al., 2019). Additionally, social media platforms provide individual suppliers the opportunity to advertise their products by sharing publicly available posts and sending non-encrypted text messages to any social media user (Bakken & Demant, 2019; Moyle et al., 2019).

Convergent work examining the content of Instagram posts documented high volumes of drug advertising and solicitation on that platform (2019), and the most recent annual New Zealand Drug Trends Survey found that 60% of respondents who had used social media to purchase drugs reported using Facebook to do so (van der Sanden et al., 2021). The use of social media platforms to facilitate the sale of drugs has garnered much media attention (Lerman & De Vynck, 2021; Nichols, 2020; VICE Staff, 2020; Wilding, 2018) in recent years, and the popularity of these platforms for this purpose appears unlikely to wane.

Additionally, there is heavy use of private digital platforms and encrypted messaging tools. Data from the Drug Use Monitoring in Australia (DUMA) program, during July and August 2018, found that 59% (N=487) of police detainees interviewed at police stations and watch houses in Brisbane, Perth, Adelaide and Sydney, had used their phone to buy, deliver or supply drugs (Sullivan & Voce, 2020). Among the 278 detainees who used their phones for drug related communications, 98% purchased drugs, 48% sold drugs and 41% delivered drugs using their phones. Facebook Messenger (42%), followed by Wickr (26%), Snapchat (15%), WhatsApp (15%) and Signal (10%) were the leading messaging apps for detainees' drug supplying and purchasing behaviours.

Impact of COVID-19 on online drug markets

Public health responses to the novel coronavirus epidemic have reshaped most aspects of day-to-day life, requiring individuals to avoid physical interaction in

favour of digital or digitally-mediated alternatives. Grocery shopping, business meetings, and family gatherings switched to online alternatives when physical interaction became risky or unfeasible. A similar pattern of shifting towards digital was noted in a preliminary rapid report of drug activity on three European cryptomarkets, which noted an increase of 25% in review activity—taken as a proxy of sales—during the first three months of 2020 (EMCDDA, 2020). This sharp increase in sales was considered by European Union drug monitoring agency EMCDDA to be, at least in part, driven by COVID-19 and governmental responses to the spread of the virus.

Building upon this observation by the EMCDDA, Bergeron and colleagues (2022) created an online platform to collect information from participants in cryptomarkets to understand the effect of lockdowns and other strategies intended to mitigate COVID-19. The researchers collected over 500 responses from 1 January to 21 August 2020. Data indicated a steady increase in the proportion of unsuccessful transactions, rising from a low of under 20% in January, prior to the introduction of national lockdowns in any of the countries being examined, to more than half of all transactions by August that year. This large increase in the number of unsuccessful transactions likely reflects strain upon global shipping networks and ensuing delays and failures to deliver.

A report by EMCDDA (EMCDDA, 2021) did, however, note that while there was an increase in online sourcing of drugs submitted to a drug checking service, this was unlikely to be a shift towards the use of cryptomarkets. Based on evidence from professionals working broadly within the harm reduction space it appears that their clients shifted to using encrypted messaging to interact with sellers operating within local online communities.

> *Increasing numbers of people are using internet technologies—cryptomarkets, public and private social networks, and encrypted messaging—to source drugs online. Cryptomarkets continue to be technically challenging to use, with most users relying on social media and messaging apps to facilitate purchases. Public health responses to COVID-19 may have accelerated transition from street to online-mediated drug purchasing.*

Exposure to drug material on social media

Traditional forms of marketing such as TV, print and point-of–sale advertising are increasingly being replaced by digital marketing which uses the internet to promote products or services. Robust regulatory frameworks that prohibit the broadcast of certain advertising, for example alcohol during times that children are likely to be viewing television, do not apply to internet media, and are often ill suited to the medium. The lack of regulation runs the risk of exposing young people to substance-related content. Recent work conducted by the National

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Centre for Youth Substance Use Research (NCYSUR) at The University of Queensland sought to understand the type of drug related material young people may be exposed to on social media platforms. To do this, our team collected and analysed more than 120 videos hosted on YouTube that related to cannabis vaping. We analysed the type of content and the viewer metrics of these videos. Content on controlled narcotic and other illicit drugs are prohibited on the platform under YouTube's terms and conditions, unless this content is for educational purposes. Despite this, we found that one-third of the videos that we examined were advertisements for or reviews of cannabis products. There were a significant number of content creators promoting cannabis products sent to them by cannabis companies. This form of advertising is effective, because messages conveyed by these so-called digital influencers are perceived as more 'credible' and 'attractive' (X. J. Lim et al., 2017). Worryingly, more than half of these videos were not age restricted for viewers under the age of 18, thereby possibly exposing young people to drug promotion material.

An extension of the above work by NCYSUR examined how cannabis-related videos are portrayed on TikTok, one of the most popular social media platforms, with over 1 billion monthly users globally (Sun et al., 2021). TikTok terms and conditions also prohibit content related to illicit or controlled drug use. From the sample of 808 vaping-related videos, a majority portrayed vaping positively (63%; collectively viewed over 1.1 billion times), 24% portrayed vaping neutrally (290 million views), and only 13% portrayed vaping negatively (193 million views). The most popular video theme was "comedy and joke" (52%: total of 618 million views), followed by "lifestyle and acceptability" (35%; 459 million views), "marketing" (29%; 392 million), "vaping tricks" (20%; 194 million), "creativity" (16%; 322 million) and "warning" (11%; 131 million). The large number of highly viewed vaping-related videos were available without age-restrictions. Similar findings were also reported on another study from NCYSUR, which investigated how cannabis vaping related videos are depicted on YouTube (C. C. W. Lim et al., 2021).

Exposure of young people, particularly minors and children, to unregulated drug use promotion material on popular social media and media platforms is a growing concern as exposure to uncritical positive content may influence attitudes, risk perceptions, intentions to use and purchasing behaviour (Moreno & Whitehill, 2014; Pokhrel et al., 2018). A growing body of work has demonstrated the prospective link between exposure to substances on social media and subsequent drug use (Kelleghan et al., 2020; Moreno et al., 2018). For example, Kelleghan and colleagues (2020) found that frequent digital media exposure is associated with a two-fold increase of subsequently initiating cannabis use, and Pokhrel et al. (2021) found that exposure to e-cigarettes on social media influenced e-cigarette use initiation and escalation.

In summary, social media platforms and apps provide an easy and accessible way for individual drug suppliers to connect with buyers and

to promote their products to young people. Although monitoring content on social media can be challenging, more effective strategies (for example, deep learning models) are needed to detect drug dealers on social media platforms and more effective policies (such as age restrictions) are needed to reduce adolescents' potential exposure to substance-related content, particularly those that portray substance use positively.

Impact on At-Risk Groups, Young People and Families, and the Community

For young people, many of whom are likely to experiment with substance-use (Milne et al., 2007), the internet is a convenient platform on which to purchase licit and illicit drugs. This is due to the anonymity that the internet affords both the buyer and dealer (Barratt et al., 2014), and due to young peoples' familiarity with current technologies and online media. Currently, research indicates that young people buying drugs online is still a relatively rare phenomenon (Oksanen et al., 2021). A recent general population study of 2,424 young people across the United States and Spain found that among the 21% of respondents who reported using drugs, only a minority (about 10%) had purchased drugs online (Oksanen et al., 2021). The proportion of young people using drugs, and using online tools to purchase them, is increased in at risk populations, such as the aforementioned forensic sample in the DUMA study.

While young people purchasing drugs online is currently not common in the general population, the evidence that popular social media sites are the most common forum for purchasing drugs online indicates the need for increased research, monitoring and restrictions of online drug sales to young people, especially via social media sites. In the aforementioned study (Oksanen et al., 2021), about 77% of young people who purchased drugs online did so through social media, and a minority of respondents purchasing drugs online did so only via cryptomarkets (Oksanen et al., 2020). The most used social media sites for drug trading were Instagram (42%), Facebook (38%), and Craigslist (19%) (Oksanen et al., 2020). The prevalence of young people obtaining drugs through social media sites, compared to other online platforms, is related to the popularity of social media use among young people, since over 75% of internet users under 25 years-old have a social media profile (Lenhart, 2009). The prevalence of young people on social media also means that drugs sales on these platforms may disproportionally affect young people, although further research is needed to understand the impact of online drug sales (especially through social media sites) on young people and their families.

Despite the need for such research, relatively few studies have investigated young people buying drugs online. Some researchers have argued that online drug transactions may benefit the wellbeing of buyers and sellers, since virtual

transactions may decrease the likelihood of violence occurring during drug-sales, compared to in-person transactions (Morselli et al., 2017). However, there is also evidence for harms to young people, as a result of having access to substances online. For example, a recent study (Oksanen et al., 2020) of 1,212 American adolescents and young adults (aged 15–25-year-olds; *M* = 20.05; 50.17% female) showed that young people who buy drugs online report higher levels of impulsivity and lower self-control compared to other young people who had used drugs but had not bought drugs online. These online buyers also reported multiple problems with mental wellbeing, including psychological distress, problem gambling, and compulsive Internet use. Many of the personality traits reported by online buyers have also previously been associated with problematic substance use (e.g. psychological distress, problem gambling, higher impulsivity and low self-control) (Barnes et al., 2005). Together, these findings indicate that young people who buy drugs online are a particularly susceptible cohort for incurring problems related to substance use, since they display a range of psychological and social risk factors for problematic substance use and related harms. For an already-vulnerable population, having easy access to substance-purchasing via online platforms is likely to increase their risk of experiencing harm, as well as increasing harm to their families and the broader community who suffer from the ramifications of substance-use and related consequences.

Given the likely negative impacts of online drugs sales on young people and their families, and the evolving nature of this problem, increased monitoring of online drug trade should be a high public health priority, requiring further research (Kazemi et al., 2017). Existing drug surveillance systems are limited because of: a lack of standardised surveillance systems across jurisdictions, a lack of efficient algorithms to isolate drug-relevant items, being slow and costly, and being unable to detect new or emerging illicit drugs trends and being often dependent on retrospective data (Centers for Disease Control and Prevention (CDC) et al., 2013; Kazemi et al., 2017; Shillington et al., 2012; Substance Abuse and Mental Health Services Administration, 2013). To improve the current weaknesses with surveillance of online drug trading to young people, systematic approaches need to be developed to efficiently detect, extract and investigate drug-related content from social media services (Kazemi et al., 2017). Data from social media platforms can also be used advantageously, to identify patterns of drug use among young people, and data mining techniques can supplement existing and new surveillance methods (Chary et al., 2013), for social media platforms that are reportedly used for drug-trading (e.g., Instagram and Facebook; Oksanen et al., 2020). Alongside improving monitoring of online sales, health service providers (e.g., GPs, emergency workers, psychologists), and other relevant stakeholders (e.g., teachers, law enforcement officials) should be trained to understand the role of online services, especially social media, as a means of young people accessing drugs.

While general population surveys indicate that online drug purchasing appears to be uncommon among young people, there are several reasons that online drug sales should be of concern for the wellbeing of young people and their families. These reasons include (but are not limited to): 1) ease of access to drugs for young people and the potential ramifications of this for themselves and their families (e.g. legal, financial, social or health consequences); 2) prevalence of drug sales on social media sites that are widely-used by young people; and 3) existing vulnerabilities of young people most-likely to buy drugs online, including mental health problems and potential to be exploited by drug-dealers.

Dangers of Purchasing Online

Drug content

Similar to illicit drugs purchased on the street, those purchased online can vary in content from what the purchaser intended to receive in a number of important ways. Drugs can be mislabelled in that the drug does not contain the intended substance. An example would be an individual purchasing ecstasy and receiving a pill that contains no MDMA. The purity of a drug can differ from that indicated by the seller, typically indicated as a percentage or a potency judgment ("strong" vs "weak", for example). Purity can be quantified by measuring the degree to which the desired substance comprises a drug, and is typically established by quantifying the amount of impurities or adulterants that are added. For example, the purity of an ecstasy pill refers to the amount of MDMA in a pill, and determined by the absence of adulterants such as caffeine. Two ecstasy pills purchased from different vendors could be 70% and 100% pure where the former is 30% caffeine in addition to 70% MDMA, whereas the latter contains only MDMA. And, finally, drugs can be adulterated or cut with other substances which can be inert, or other potent agents such as the use of new psychoactive substances to cut controlled drugs (Giné et al., 2014), or the addition of fentanyl to increase the potency of heroin. The extent to which online purchasing of drugs affects the safety or danger of consuming these substances is poorly understood, with little work to date examining the contents of drugs purchased online, and even less work contrasting against street purchases.

Rhumorbarbe and colleagues (2016) received an exemption from the Swiss government to purchase illicit substances from the *Evolution* cryptomarket. The authors purchased three individual grams of cocaine from two vendors and one gram of cannabis concentrate. Two MDMA pills that were not ordered were received in addition to one of the cocaine grams purchased, possibly an attempt to build customer loyalty. All four orders were successfully received, with all originating in Switzerland, congruent with the vendors' listings on *Evolution*.

Chemical analysis of the three grams of cocaine revealed that each contained the advertised substance, namely cocaine, but each was significantly lower in purity. Two of the grams of cocaine were advertised as at least 95% pure, but were on average 30.2 and 33.2% pure cocaine. The other was advertised as at least 85% pure, but was on average 69.0%. The observed purity levels, and the cutting agents used in the cocaine samples, were in line with seized street cocaine in Switzerland. The authors further determined the purity of the cannabis concentrate to be 49.6% and MDMA to be 26.7%. However, it was not possible to contrast these against street seizures as these are not routinely evaluated in Switzerland.

Similar work has been conducted in Spain by the non-governmental organisation *Energy Control* beginning April 2014 (Caudevilla, 2016). Users of cryptomarkets were encouraged to submit drugs they wanted to be tested, and to indicate the substance that they believed they had purchased. Of 129 samples received, only 9 samples (7%) were mislabelled such that the substance revealed by the analysis differed from those which users thought they had purchased. In those cases, the sample contained a different drug, a mixture of drugs, or indeterminate substances.

Cocaine and MDMA were the most frequently submitted items, with high levels of purity, though more than half of the cocaine samples were adulterated with cutting agents. Neither MDMA pills nor crystal were adulterated. The MDMA pills that were examined contained very high dosages of MDMA that could result in adverse or toxic effects. The levels, however, did not differ from other drug testing programmes that focussed on street drugs rather than those purchased on cryptomarkets (TEDI, 2013).

A subsequent project by *Energy Control* tested the purity and chemical content of heroin purchased from cryptomarkets (DoctorX and his Chemical Brothers & Sisters, 2018). Chemical composition analysis revealed that 5 of the 67 samples contained no heroin, with the remaining 62 having an average purity of 39.2%. Thirty-three samples contained one or more adulterants: most prevalent were caffeine and paracetamol. Where other drugs such as cocaine were present, these were in low quantities and not deemed to be dangerous. More concerningly, eleven samples contained fentanyl or a fentanyl derivative as an adulterant. Fentanyl is a highly potent synthetic opioid that has led to a rise in heroin-related deaths in the United States (Dowell et al., 2017), and may have been associated with a spike of heroin-related deaths in Melbourne in 2015 (Rodda et al., 2017). Given the potency of fentanyl, its undisclosed presence places users at increased risk of harm due to overdose.

A final line of evidence on the chemical composition of drugs purchased online is a collaboration of five EU member states that tested new psychoactive substances (NPS) purchased on the surface web (Brunt et al., 2017). NPS is a class of continuously emerging psychoactive substances that mimic the effects

of controlled substances such as cocaine, ecstasy or amphetamines. Because these substances are typically novel, they are usually not included in international drug control treaties and are available for sale on the surface web. Indeed, the aforementioned work only examined NPS for sale on easily accessible surface web marketplaces. This makes NPS much more accessible as individuals do not require the technical skills to access a cryptomarket.

Most of the NPS advertised on the examined marketplaces indicated a purity of at least 99%. While purity was high with most purchased substances exceeding 65%, only a small number of substances attained the high levels of purity that were advertised. Similarly, to the drugs purchased from cryptomarkets, substances were generally not mislabelled with only 10% containing a different drug class than indicated and 8% containing a compound of the same chemical class. While NPS are intended to mimic the function of banned substances, the molecular alterations inherent to any individual NPS can produce unique and unpredictable effects that could greatly increase the potency, and therefore overdose risk, of the NPS relative to the substance that it is mimicking. Unlike established drug classes, it is not possible to infer the effects of NPS given a particular chemical structure, purity and dosage, as the physiological, cognitive and behavioural effects are typically not understood. This can make NPS a particularly dangerous class of drug that is readily available on easily accessible websites.

Drugs which are legally available but sourced from unregulated black markets, including online markets, run the risk of adulteration and harm to users. A prominent example of this was the widespread lung damage experienced by users of black market cannabis vaping products in the United States. This outbreak of vaping-associated pulmonary injury resulted in more than 2,800 cases of lung damage and at least 68 deaths, many among young people (Hall et al., 2021). Work by the Centres of Disease Control amongst others determined that these cases of lung damage were likely caused by the use vitamin E acetate to dilute black market cannabis products (Centers for Disease Control and Prevention (CDC), 2019). Most cases involved individuals who were adults and purchased these tainted products from informal sources including online sales, and a large proportion of cases occurred in states such as California where these products are available for purchase from regulated retailers.

Physical violence and exploitation

Hout (2013) sought to understand the motives to use cryptomarkets by monitoring an online forum used by customers of the *Silk Road* cryptomarket. Users cited circumvention of drug market violence and the creation of distance between vendors and buyers as reasons for choosing cryptomarkets to purchase drugs. Bancroft and Scott Reid's (2016) analysis of comments posted on *Merkat*, a user forum for cryptomarket customers, found that users indicated valuing easy access to specific products that may not be available in the local markets

and a view that vendors on cryptomarkets were more accommodating and responsive to messages than street dealers were key benefits noted by users.

Interviews of vendors operating on cryptomarkets revealed similar motivation to remove risk of physical violence inherent in face-to-face sale of drugs (Martin et al., 2020). Because cryptomarket transactions do not require contact between sellers and buyers, they remove the risk of predatory standover tactics where suppliers may be robbed, assaulted or killed by customers or competitors. As transactions in cryptomarkets remain anonymous the risk of customers informing on their suppliers is also removed. Interestingly, the absence of violence attracted a number of the interviewed individuals to become cryptomarket vendors who were previously naïve to the drug trade, never having sold drugs offline.

In addition to reducing the risk of violence between purchasers and sellers, online cryptomarkets may reduce the violence, intimidation and territorialism involved in the distribution of drugs prior to sale. Aldridge and Décary-Hétu (2014) examined all drug listings on the cryptomarket *Silk Road* in September 2013. They noted that a substantial proportion of the drugs for sale were high volume intended for resale or precursor chemicals that would be used to make drugs for consumption. The business to business nature of these listings was unique, and the authors argued that the use of cryptomarkets for such transactions could reduce the likelihood of violence that is characteristic of organised criminal groups that typically engage in such wholesale or broker market level drug transactions (Reuter, 2009).

The increasing use of technology can result in other avenues of exploitation that overwhelmingly target vulnerable populations such as young people. A report from EMCDDA noted a sharp increase in the exploitation of young people due to shifts in technologies used during drug trades (Søgaard et al., 2021). A growing problem in Denmark has been the use of vulnerable young people as money mules to facilitate drug trading. Money mules are individuals that are used to interrupt a paper trail in transactions that link individual purchasers to criminal networks that sell drugs. In practice, money mules are typically persuaded to relinquish their debit card and PIN, giving criminal drug networks access to their bank accounts. These accounts are then used to facilitate large transfers between criminal drug networks, or to facilitate street trade of drugs. The latter is a response to shifts away from cash towards payment apps in Danish society. A person purchasing drugs from a street seller is given the option to transfer payment via an app. The buyer, however, is in fact transferring their payment into the account belonging to a money mule. This may then be transferred to other money mules before being withdrawn as cash which is then passed to the seller. The use of money mules breaks or obscures the payment chain between sellers and buyers, implicating the exploited young person in criminal acts.

Internet resources as harm reduction

Young people's experimentation with drugs and alcohol is not new, but the internet is offering opportunities for young people to be exposed to drugs or facilitate their drug use. Communities of drug users are formed to facilitate the exchange of information on how to buy or make drugs, how to combine different drugs and products to get high, and how to beat drug tests. Members of these online community forums seek to 'learn' from the collective experience of how to avoid adverse health effects and optimise the experience of intoxication from the substances being used (Rönkä & Katainen, 2017). These online anonymous forums ostensibly provide a platform for people to discuss non-medical substance use, facilitating communication of drug use experiences, knowledge on harm reduction strategies and the effects of various drug dosages as well as poly-substance use.

Relative to substances purchased from street dealers, online cryptomarkets typically include rating systems that are used to provide information to users about quality and potential risks. The Silk Road, for example, allowed users to provide feedback and ratings of the items that they purchased (Cox, 2014). This provides an avenue for users to track the quality of the products and trustworthiness of individual vendors. This could provide a source of harm reduction, in that individuals are less likely to purchase from vendors whose substances vary in purity levels.

> *In summary, use of online technologies to purchase drugs, particularly the use of cryptomarkets, may reduce the risk of physical violence inherent in drug purchasing by limiting or removing face-to-face contact. Very little data has been analysed to date comparing the chemical content and purity of the substances for sale in online markets. What data does exist, however, indicates a mixed picture with some drug classes resembling those available on the street and others being notably adulterated.*

Impact of Legislation and Decriminalisation

Introduction of drug decriminalisation

In response to the significant health, social and economic burden caused by criminalisation of drugs, decriminalisation has been promoted as an alternative regulatory model to minimise harms, reduce demands and increase treatment seeking behaviour among individuals who use drugs (Wodak, 2014). In the simplest terms, decriminalisation eliminates criminal penalties for some or all offences.

Drug laws in Australia concerning use and possession of illicit drugs differ across the states and territories. The drug decriminalisation system in Australia consists of (a) *de jure* decriminalisation of cannabis such as in South Australia, ACT and

Northern Territory in the form of civil penalty schemes; and (b) *de facto* decriminalisation in the form of police referral to education, assessment or treatment. Most states provide *de facto* decriminalisation for cannabis while six jurisdictions (except New South Wales and Queensland) provide *de facto* decriminalisation for other illicit drugs, e.g., cocaine and heroin. Possession of illicit drugs remains a criminal offence in Australia, and while a number of jurisdictions have held or are holding inquiries into alcohol and other drug policy and law, momentum for change appears slower than that of other nations (Seear, 2020).

Many countries have decriminalised the use of some illicit drugs in various ways, but much of the research to date has focussed on cannabis decriminalisation. The most notable drug decriminalisation model is Portugal, which in 2001 implemented laws that decriminalise the purchase, possession and consumption of all drugs for personal use, with an option of imposing administrative sanctions (Hughes & Stevens, 2010). The Portuguese experience indicates reductions in problematic use, crimes committed while intoxicated and drug-related harms and mortality, all without significant increase in the overall levels of drug use. However, the retention of the criminal penalties for other forms of drug dealing (e.g., selling, growing and manufacturing) means that black market continues to exist and remains unregulated. The extent to which decriminalisation and legalisation measures have impacted online drug markets remains to be explored, especially as many substances that are popularly sold via online sources continue to remain illegal. Recreational cannabis markets in the USA and Canada, on the other hand, comprehensively regulated all aspects of cannabis production, sale and consumption. Nevertheless it may be more than a decade before these markets mature (Caulkins et al., 2016) and the effects of specific policies and regulatory frameworks can be understood. If the regulation of alcohol can act as a guide (Babor, 2010; Silver et al., 2020), then it is likely that legal drug industries, such as the multibillion-dollar cannabis industries in North America, will seek to maximise profits by increasing the number of regular, heavy users, lobby government to reduce taxes, oppose caps on potency, and campaign for easier and greater access via the likes of, for example, cannabis-vaping lounges and home delivery.

> *A number of jurisdictions have moved to legalise the use of previously illicit substances, cannabis being the most consistently decriminalised and legalised formerly controlled substance. The effect of legalisation on the online trade of cannabis remains to be understood. North American retail cannabis industries are immature industries, but may be seeking to model the alcohol industry in seeking greater access and reduced public health initiatives such as taxation and potency caps.*

Recommendations and Conclusions

- Cryptomarkets, social media platforms and secure messaging platforms are increasingly used to facilitate the purchasing and sale of drugs.
- The use of anonymising technologies challenges the ability of law enforcement to reduce supply. Disruption of cryptomarkets appears to have short-lived effects on the larger market, with new cryptomarkets quickly replaced those shut down.
- Content promoting illicit substances is publicly present on social media platforms such as YouTube and TikTok and accessible to minors. Exposure to such content can increase likelihood of future substance use.
- Young people are particularly vulnerable to negative consequences of online drug availability. Targeted campaigns should seek to educate young people on the dangers of substance use, and surveillance monitoring systems and research should seek to better monitor the rapidly developing online drug market.
- The content of drugs purchased online is poorly understood, potentially increasing the risk to users through adulteration of substances. Cryptomarkets and use of online-facilitated drug trade has the potential to reduce violence, though novel forms of exploitation may emerge.
- The drugs most commonly purchased online in Australia remain illegal, though a number of local jurisdictions have held inquiries on established drug policy. The effects of cannabis legalisation in North America will provide important lessons for Australia, but the full effects of US and Canadian legalisation are unlikely to be fully assessed for another decade as these markets mature.

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