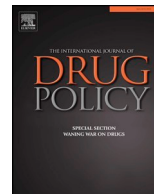Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Commentary

COVID-19 and the health of people who use drugs: What is and what could be?

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ABSTRACT

SARS-CoV-2, the virus that causes COVID-19, has changed the world as we know it, and continues to do so. How COVID-19 affects people who use drugs, the environments in which they live, and capacities of response, warrants immediate attention. This special issue begins to map how COVID-19 is altering the health of people who use drugs, including in relation to patterns of drug use, service responses, harms that may relate to drug use, interventions to reduce risk of harms, COVID-19 health, and drug policies. We emphasise the need to envisage COVID-19 and its effects as a matter of intersecting 'complex adaptive systems': that is, the impacts of COVID-19 extend beyond the virus and related illness conditions to encompass multiple social, cultural, economic, policy and political effects; and these affect the health of people who use drugs directly as well as indirectly by altering the risk and enabling environments in which they live. We synthesize emergent evidence on the impact of COVID-19 on the health of people who use drugs. A key concern we identify is how to sustain policy and service delivery improvements prompted by COVID-19. We need to maintain an ethos of emergent adaptation and experimentation towards the creation of safer environments in relation to the health of people who use drugs.

Introduction

SARS-CoV-2, the virus that causes COVID-19, has changed the world as we know it, and continues to do so. The COVID-19 pandemic has led to considerable morbidity and mortality globally (Dong, Du, & Gardner, 2020; Johns Hopkins University, 2020). Currently, there is no effective vaccine for SARS-CoV-2, and available treatments for COVID-19 have modest benefits (Siemieniuk et al., 2020). The health conditions that make up COVID-19 are also evolving, with COVID-19 emerging as a complex system of multiple conditions, including uncertain chronic effects (Roberts *et al.* 2020). As such, efforts to prevent the spread of SARS-CoV-2 infection have rested on government interventions to close borders and restrict physical interactions, resulting in unprecedented effects on the way we live and interact. While the impact of the COVID-19 pandemic has been felt by almost every member of society, these effects are differentiated across populations, by social-material conditions, and policy responses adopted by local jurisdictions (Douglas, Katikireddi, Taulbut, McKee, & McCartney, 2020). How COVID-19 affects people who use drugs, the environments in which they live, and capacities of response, warrants immediate attention. At the outset, we emphasise the need to envisage COVID-19 and its effects in relation to the health of people who use drugs as a matter of intersecting 'complex

adaptive systems' (Greenhalgh, 2020; Greenhalgh & Papoutsi, 2018; Lancaster & Rhodes, 2020; Rutter, et al., 2017): that is, the impacts of COVID-19 extend beyond the virus and related illness conditions to encompass multiple social, cultural, economic, policy and political effects; and these affect the health of people who use drugs directly as well as indirectly by altering the risk and enabling environments in which they live.

Science and policy in relation to the COVID-19 pandemic is at once uncertain and emergent, demanding an iterative adaptive response, and this becomes explicit in emergency situations (Lancaster, Rhodes, & Rosengarten, 2020). At the *International Journal of Drug Policy,* we felt it timely to collate together a mix of analyses and reflections on the emerging effects and potentials of COVID-19 in relation to the health of people who use drugs. This special issue thus offers a series of viewpoints and commentaries, some commissioned but most unsolicited, to stimulate thought, entice discussion, uncover gaps in our current understanding, and prompt new research questions. Here, in this commentary, we also synthesize emergent evidence on the impact of COVID-19 on the health of people who use drugs. We hope that the material collated in this special issue can contribute to the development of research, services, and policies that serve to protect and nurture the health of people who use drugs in the time of COVID-19. A key concern

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we identify is how to sustain policy and service delivery improvements prompted by COVID-19, such that these are not undone as temporary interventions or left to ebb away in a future 'post crisis' scenario.

The risk and enabling environment in the time of COVID-19

When considering the range of potential effects that COVID-19, physical distancing, and other restrictions might have on people who use drugs, it is helpful to consider the established body of work in the field of harm reduction and drug policy that accentuates health as a matter of contingency in relation to environment (Collins, Boyd, Cooper, & McNeil, 2019; Duff, 2007, 2013; Rhodes, 2009). This has led to various articulations of 'risk environment' and 'enabling environment' which appreciate health and harm as emergent dynamics of reciprocal relations produced in adaptive systems in which drugs, individuals, technologies and environments are entangling elements (Duff, 2014; Rhodes, 2009). Such 'risk environment' frameworks have tended to offer social-ecological models, parallel to those developed in social epidemiology (Krieger, 2008), to emphasise how bio-social and political-economic elements create conditions which shape proximity to risk as well as capacities to respond. Health, and harm reduction, are viewed as contingent effects of the coming together of multiple social, economic, and political factors. Table 1 illustrates how 'risk environment' thinking has been applied in the drug policy field to prompt a depiction of risk and harm as an effect of intersecting environments at differing scales [See, for example: (Bluthenthal, Kral, Erringer, & Edlin, 1999; Bourgois, 2003; Collins, et al., 2019; Cooper, et al., 2016; Hunter, et al., 2018; Kolak, et al., 2020; Rhodes, 2002; Strathdee, et al., 2008; Strathdee *et al.* 2015; Thomas, van de Ven, & Mulrooney, 2019)]. At the same time, articulations of 'risk environment' translate health improvement as an effect of the 'enabling environment' by accentuating health as contingent upon social interventions and structural changes (Collins, et al., 2019; Rhodes, 2009). Harm reduction becomes a matter of building and sustaining *safer environments,* be these the spaces and places in which drugs are used and acted upon or the settings in which people who use drugs live or find themselves (Lafferty, Rance, & Treloar, 2018; McNeil, Small, Wood, & Kerr, 2014; Richard, et al., 2020; Strathdee, et al., 2015).

We can then apply the general logics of risk environment and enabling environment as frameworks for mapping the entangled effects of COVID-19, and how social interventions might come together to build structural responses in the time of a pandemic. Certainly, the contributions in this collection emphasise both COVID-19 and the health of people who use drugs as entangling elements in complex adaptive systems. There is an increasing focus towards envisaging health as an effect of complex adaptive systems; that is, health is not treated as stable or fixed but *emerges* as an effect of the reciprocal relations and adaptations occurring in a given network or system in a given time and space (Rutter, et al., 2017). Accordingly, research, intervention, and policy responses are also *adaptive*; that is, they are situated as emergent responses in relation to localised practices in unfolding situations (Greenhalgh, 2020; May, 2013; Rhodes & Lancaster, 2019). This is generally what is invoked by 'practice-based' approaches (Nettleton & Green, 2014), which emphasise science and policy as 'adaptive' (Lancaster & Rhodes, 2020; Rhodes & Lancaster, 2019). COVID-19 makes particularly visible the processual character of science and policy (Lancaster, et al., 2020). This is because COVID-19, as with novel viral outbreaks and health emergencies more generally, draws attention to, as well as amplifies, a sense of uncertainty, in which 'knowledge' *emerges*, iteratively, and through *negotiation*, in which systems *adapt* accordingly. The risk environment, and by extension the enabling environment, is not as 'flat' or as 'fixed' as the depiction in Table 1 implies. Rather, the intersecting environments affecting the health of people who use drugs, in which COVID-19 now enters as a critical actor, are fluid and becoming, never stable, always adapting (Rhodes & Lancaster, 2019). We therefore draw attention, through this special issue, to the urgent need to map some of the alterations that COVID-19 might bring about. For us, ideas of risk and enabling environments are starting points, no more than crude heuristics to orientate towards mapping what are complex evolving environments, which affect the health of people who use drugs differently in their particular situations. We therefore need to trace COVID-19 in its multiple effects as an element of the environments which make up the health of people who use drugs, and how community, science and policy interventions are adapting in response. The material presented in this special issue begins to map various elements affected by COVID-19 which alter ecologies of the

Table 1

Environmental contexts of the risk environment (Collins, et al., 2019; Rhodes, 2009).

	Micro-environment risk	Macro-environment risk
Physical	• Drug use settings and characteristics (e.g. supervised injection facilities, public spaces) • Sex work locations • Homelessness and housing instability • Neighbourhood deprivation, urban development, and spatial inequalities • Exposure to violence or trauma • Prisons and detention centres	• Drug trafficking and distribution routes • Geographic population shifts (e.g. neighbourhood and population mixing) • Population mobility and cross border migration
Social	• Gendered power relations • Dynamics of assisted injection • Drug-related stigma in interactions with health care professionals • Violence and interpersonal conflicts • Local policing practices and crackdowns • Peer group dynamics and social norms	• Gendered inequities and gendered risk • Stigmatization and marginalization of PWUD • Racial or ethnic inequalities • Public discourses around public health, drug use, and welfare policies
Economic	• Cost of living (e.g. drug-related costs, health treatments, housing costs) • Sex trade or sex work engagement • Lack of income generation and employment opportunities • Food insecurity	• Investment in health and social services infrastructure • Growth of informal economies • Investment in social housing • Criminal justice expenditures
Political	• Access to low threshold and social housing • Abstinence-only drug policies and drug criminalization in healthcare settings • Coverage and availability of harm reduction services • Operating regulations at supervised injection facilities • Local policing practices and crackdowns	• National and international drug laws • Policies and laws for harm reduction programs and services • Policies and laws criminalizing sex work • Universal access to healthcare • Laws governing protection of human rights • Policies and laws governing pregnancy and drug use for women who use drugs

health of people who use drugs, including drug use, service responses, harms that may relate to drug use, interventions to reduce risk of harms, COVID-19 health, and drug policies.

Drug markets

The COVID-19 pandemic is impacting on illicit drug markets in multiple ways (CCENDU, 2020; EMCDDA and Europol, 2020; UNODC, 2020). The impact on drug production and transportation for opioids, cocaine, and synthetic drugs varies greatly depending on the substance and geographical location of its production (EMCDDA and Europol, 2020; UNODC, 2020). As highlighted by an article in this special series, radical restrictions in national and international transportation during COVID-19 have seriously disrupted the coca economy in Columbia (Sanin, 2020). Further, the eradication of coca crops has continued in the background of COVID-19 with increased pressure from law enforcement (accompanied by brutal state-violence) within a complex political environment with domestic and international actors (Sanin, 2020). Reduced international trade has also made it more difficult to access precursors for production of cocaine, opioids, and synthetic products which has the potential to reduce consistent and quality production (UNODC 2020). While drug trafficking may be impacted, trafficking using maritime shipping seems to have continued at levels pre-COVID-19 while trafficking by air passengers has decreased dramatically (EMCDDA and Europol, 2020). In Canada and Europe, the disruption to the supply chain and logistics of drug trafficking has been most evident at the distribution level due to physical distancing restrictions (CCENDU, 2020; EMCDDA and Europol, 2020).

Not only are drug markets potentially altered by the arrival of COVID-19, they also adapt in response. Barratt and Aldridge (2020) consider some of the adaptive potentials of drug cryptomarkets, especially in their capacity to navigate around physical distancing restrictions related to COVID-19. They propose that buying and selling drugs through cryptomarkets may become more appealing than in-person trading. However, they also note that cryptomarket trading might not be an option for many people who use drugs, given the requirement for buyers to forward plan (typically waiting days or longer), to have reliable internet access, the technological skills to effectively use anonymising software (e.g. Tor), encrypted methods of communication (e.g. PGP), and payment (e.g. currencies such as Bitcoin) (Barratt & Aldridge, 2020). Further, the requirement to have a physical address may be a barrier. Data from Europe suggest that there has been an increase in activity levels in cryptomarkets, mainly related to cannabis products (EMCDDA, 2020a). But, as noted by Bergeron et al in this special issue (2020), these trade shifts are themselves unpredictable, as even cryptomarkets are not immune to COVID-19 effects. They suggest that the proportion of problematic cryptomarket orders (those that had issues or were never received) increased from 20% prior to COVID-19-related lockdowns to 79% during the lockdown (Bergeron, Decary-Hetu, & Giommoni, 2020). However, these interruptions were reasonably short-lived with the number of failed deliveries dropping to 0% by the middle of April 2020, suggesting rapid adaptation of the underground economy to the new circumstances of drug markets in the time of COVID-19.

While COVID-19 will continue to have an impact on drug markets in a range of ways, predicting these, especially in the long-term is inherently difficult. Attempts to predict the impacts of COVID-19, as with pandemic projections generally, can be viewed as an effort to manage uncertainty by enabling policy decisions in the face of empirical unknowns, and is inevitably a process which in itself generates uncertainty (Rhodes, Lancaster, Lees, & Parker, 2020). COVID-19 has given rise to much speculation in relation to future drug markets (CCENDU, 2020; Dietze & Peacock, 2020; EMCDDA and Europol, 2020; Giommoni, 2020; UNODC, 2020). Given the unpredictability of predictions in relation to novel events, Dietze and Peacock (2020) propose that we can look back to previous historical events to inform 'models' of major drug market disruptions on supply, such as the effects of abrupt

changes in heroin supply in Australia in late 2000/early 2001 (Degenhardt, et al., 2005; Dietze & Fitzgerald, 2002) and the 2008 Global Financial Crisis in Europe (Dom *et al.* 2016). In Australia, the heroin shortage was characterized by a drastic decrease in the purity and availability of heroin, leading to an increase in the purity-adjusted price, (Dietze & Peacock, 2020; Moore *et al.* 2005) and increases in cocaine, methamphetamine, and benzodiazepine use (Degenhardt, et al., 2005). It is unclear whether COVID-19 might lead to similar impacts on drug markets as observed in the heroin shortage (Dietze & Peacock, 2020). Friedman et al have also theorized the role of "Big Events" as a potential for creating risk environments for drug-related harm (Friedman, Rossi, & Braine, 2009). Drug markets are open to disruption by large events, including wars, conflicts, political transitions, and recessions (Bretteville-Jensen, 2011; Costa Storti, De Grauwe, & Reuter, 2011; Friedman, et al., 2009; Pacula, 2011; Rhodes, et al., 1999). As we move forward in the time of COVID-19, it will be critical to understand the impact of COVID-19 as a "Big Event" on a range of different outcomes (Vasylyeva, Smyrnov, Strathdee, & Friedman, 2020).

Notwithstanding the lessons drawn from theorising the potential disruptive impacts of COVID-19 through analyses of past events – from recessions to wars to political transitions to drug droughts – there is the sense with COVID-19, as voiced in this special issue by Giommoni (2020), that "we have never been through anything like this before". While previous pandemics, such as HIV, represented major shocks to expert systems, disrupting trust in the capacity of science and policy to respond with certitude (Bekker, et al., 2018), and were thus also linked with generalised uncertainty, according to Giomanoni, COVID-19 represents something altogether 'new' in relation to its impacts on drugs and drug markets (Giommoni, 2020). We have very little empirical knowledge as to what impact an infectious disease pandemic might have on drug markets (Giommoni, 2020). The emergent effects of pandemic responses, such as 'lockdowns', are also unknowns, and highly differentiated locally, both in how they are applied and how different communities adapt, and are affected by these, over time (Douglas, et al., 2020; Giommoni, 2020). The potential continued emergence, or re-emergence, of COVID-19 in waves or flows of infection, and how these prompt a continuation of altering lockdowns and infection controls, make the drug market, as with any economic market or social network, highly fluid in the time of COVID-19. We have always known that drug markets are highly adaptive. They have to be to survive. COVID-19 therefore enters as one of many elements in the 'complex adaptive system' of drug markets, and these will present themselves differently according to local events and situations.

The use of drugs

Restrictions associated with COVID-19, including lockdowns and physical distancing, are having variable effects on patterns of alcohol and drug use (CREW, 2020a, 2020b; Dietze *et al.* 2020; Dietze, Maher, & Stoove, 2020; EMCDDA, 2020b, 2020c; Sutherland, et al., 2020; Winstock, et al., 2020). Data has rapidly emerged from cross-sectional online surveys of people who use drugs in Australia (ADAPT study) (Sutherland, et al., 2020), Europe (CREW and European Web Survey on Drugs) (CREW, 2020a, 2020b; EMCDDA, 2020c), and globally (Global Drug Survey) (Winstock, et al., 2020), with data starting to emerge from cohort studies in Australia (Dietze, Fetene, et al., 2020; Dietze, Maher, et al., 2020). Combined, these studies highlight the *heterogeneity* of COVID-19 impacts on alcohol and drug use, since these vary by individuals, substances, geography, and situation; that is, by *environment*.

To date, most epidemiological work has sought to trace the effects of COVID-19 in relation to the substances used and how such use is distributed in populations (CREW, 2020a, 2020b; EMCDDA, 2020c; Sutherland, et al., 2020; Winstock, et al., 2020). These are obviously extremely partial and blunt measures of how drug use is shaped by complex environments adapting in response to COVID-19, but they are

Table 2

Changes in drug use during COVID-19 in cross-sectional online samples of people who use drugs in the Global Drug Survey (Winstock, et al., 2020) and the ADAPT Study (Sutherland, et al., 2020).

	Global Drug Survey (Global)			ADAPT (Australia)		
	Decreased	No change	Increased	Decreased	No change	Increased
Cannabis use	21%	38%	40%	15%	29%	57%
Alcohol use	26%	30%	44%	33%	26%	41%
Benzodiazepine use	17%	48%	35%	16%	55%	29%
Pharmaceutical opioid use	NA	NA	NA	18%	56%	26%
Methamphetamine use	NA	NA	NA	37%	39%	24%
Cocaine use	39%	41%	20%	45%	39%	16%
MDMA use	42%	46%	13%	49%	36%	15%
Heroin use	NA	NA	NA	39%	46%	15%

measures of rapid assessment and surveillance, nonetheless. As shown in Table 2, available data suggests *decreases* in substance use, such as cocaine and MDMA, in settings of 'social use' in the time of COVID-19. Decreased use of cocaine and MDMA is linked to reduced opportunities to use and reduced social contacts with other people who use (CREW, 2020a; Winstock, et al., 2020). The closure (or reduced operation) of night-time venues linked to lockdowns and restrictions in population movement, as well as physical distancing measures, as part of the response to COVID-19 is speculated to have led to reduced social interaction in turn reducing the frequency of use of cocaine and MDMA (Dietze & Peacock, 2020).

A different epidemiological pattern may be emerging in relation to alcohol and cannabis (Dietze, Fetene, et al., 2020; Dietze, Maher, et al., 2020; EMCDDA, 2020c; Sutherland, et al., 2020; Winstock, et al., 2020). Here, the frequency of use, according to some indicators, is *increasing* in the time of COVID-19 (Table 2). Among people who use drugs surveyed in the Global Drug Survey, 44% reported that alcohol use had increased, 30% had stayed the same, and 26% had decreased (Winstock, et al., 2020). In the Global Drug Survey, while 24% reported an increase in binge drinking (consuming more than five drinks in a single session), 31% reported only a slight increase. Among those who increased alcohol consumption, reasons included having 'more time to drink' and 'feeling bored more often'. Among those with decreased alcohol consumption, reasons included reduced exposure to people they drink with and settings they usually drink in (consistent with reduced social interaction and opportunities for cocaine and MDMA use). An increase in alcohol consumption has also been reported from cross-sectional online surveys (Sutherland, et al., 2020) and from cross-sectional samples from cohort studies (Dietze, Fetene, et al., 2020; Dietze, Maher, et al., 2020) in Australia. Data on alcohol consumption during COVID-19 from other settings globally are needed.

Turning to cannabis, among people surveyed in the Global Drug Survey, 40% reported an increase in cannabis use, 38% had stayed the same, and 21% had decreased (Winstock, et al., 2020). Both 'having more time' and 'being bored', while addressing mood and worry, were cited as determinants for increased use, indirectly linked to the pandemic situation. As shown in Table 2, increases in cannabis use have also been observed in online cross-sectional surveys in Australia (Sutherland, et al., 2020) and Europe (EMCDDA, 2020c). Increases in other substance use have also been noted, such as benzodiazepines (Sutherland, et al., 2020; Winstock, et al., 2020). Here, emergent theories of causation suggest use as a 'coping strategy' to manage anxiety, or as an alternative given lack of access to preferred drugs of choice. Shifts to increased benzodiazepine use is an obvious concern given the potential for harm, including through dependence, polysubstance use (McHugh, Votaw, Taghian, Griffin, & Weiss, 2020; Votaw, McHugh, Vowles, & Witkiewitz, 2020), and increased risk of drug-related morbidity and mortality (particularly among people who are opioid dependent) (Dasgupta *et al.* 2016; Macleod, et al., 2019; McCowan, Kidd, & Fahey, 2009; Park, Saitz, Ganoczy, Ilgen, & Bohnert, 2015).

To date, there has been little epidemiological evidence that COVID-19 has led to an increased use of methamphetamines, prescription opioids, or heroin, with the majority reporting no changes in use, or decreases in use (Dietze, Fetene, et al., 2020; Dietze, Maher, et al., 2020; EMCDDA, 2020c; Sutherland, et al., 2020). Of significance, are reported shortages of heroin, given altering drug markets (see above), which are speculated to link with evidence of reduced use in some countries (CCENDU, 2020; EMCDDA, 2020c; EMCDDA and Europol, 2020). Critical here, is tracing how use patterns adapt in the face of altering drug markets and availability. There is emerging evidence of switching between substances as drugs fall in and out of drug market availability during COVID-19, and among people who are opioid dependent, reports of the increased use of fentanyl and other alternatives to heroin (CCENDU, 2020; EMCDDA, 2020c; EMCDDA and Europol, 2020). At the same time, there are reports of increased engagement in opioid agonist therapy (OAT) in some countries, perhaps linked to a reduction in heroin availability or due to the closure of some services, which in turn has increased pressure on those remaining open and able to provide services (EMCDDA, 2020c).

Clearly, these epidemiological indicators are emergent and uncertain, and will develop iteratively as additional empirical data is triangulated. They offer indicators of *possibility* in an unfolding adaptive situation. We therefore view these epidemiological studies as offering momentary cases of '*emergent causation*' (Connelly, 2004; Rhodes & Lancaster, 2019). While there might be a thirst for prediction and explanation in the face of uncertainty, it is important to recognize the uneven and uncertain nature of currently available data. Such epidemiological data to date are largely generated from rapid cross-sectional online surveys comprising convenience samples which are prone to response bias and not generally representative of all people who use or inject drugs (CREW, 2020a, 2020b; EMCDDA, 2020c; Sutherland, et al., 2020; Winstock, et al., 2020). While data are starting to emerge from longitudinal cohort studies (Dietze, Fetene, et al., 2020; Dietze, Maher, et al., 2020), these comprise small samples in targeted locations. Moreover, if epidemiological indicators are to trace the effects of COVID-19 in social practices – such as alterations in social interactions, social networks, rationales for use, and social-material environments (Bretteville-Jensen, 2011; Costa Storti, et al., 2011; Darke, 2013; Dietze & Peacock, 2020; Dom, et al., 2016; Friedman, et al., 2009; Pacula, 2011; Rhodes, et al., 1999) – we will need to move beyond generalised surveillance indicators to multi-method collaborations incorporating ethnography and qualitative research which will help to better attune epidemiological indicators of COVID-19 to their social contexts.

Service responses

Harm reduction, drug treatment, and other services for people who use drugs have been faced with considerable challenges, including restrictions on face-to-face contact to prevent COVID-19 transmission, increased demand for services (in particular drug treatment), and the redeployment of staff to support COVID-19 efforts (Dietze & Peacock, 2020; Dunlop, et al., 2020; EMCDDA, 2020b).

As highlighted in the special issue, data from England (Whitfield, Reed, Webster, & Hope, 2020) and the United States (Bartholomew,

Nakamura, Metsch, & Tookes, 2020) suggest reduced access to harm reduction services since the arrival of COVID-19. In a study evaluating needle and syringe program (NSP) access during COVID-19 across 115 sites in North England, although 91% of sites remained open, 45% had reduced hours or additional access restrictions in place. Overall, the numbers of NSP clients decreased by 35%, visits by 36%, and needles distributed by 29% (Whitfield, et al., 2020). Findings of reduced harm reduction service access are consistent with data from a study surveying 65 NSP sites in the United States (Bartholomew, et al., 2020). While the majority of NSP sites remained open (85%), 15% of programs discontinued all operations during COVID-19 (distributed across 9 states) and 72% were operating under restricted hours of operation (Bartholomew, et al., 2020). Only 26% of programs have continued to provide HIV/HCV testing onsite, with the majority discontinuing medical services. In response, 25% switched to mobile delivery of new injecting equipment. Data demonstrating an increased closure of NSP sites, reduced operating hours and a decreased availability of other services at NSP services as a result of COVID-19 is consistent with other reports from the United States (Glick *et al.* 2020). These data are also consistent with a recent survey of 25 countries in Europe (EMCDDA, 2020b). Overall, 60% of these European countries reported a decrease in the availability and provision of harm reduction services and 50% reported the closure or significant reduction in access to drug consumption rooms since COVID-19 (EMCDDA, 2020b). There is an abundance of evidence linking reductions in NSP access and service use to increased sharing of used injecting equipment (Broadhead, van Hulst, & Heckathorn, 1999; Ivsins, et al., 2012; Macneil & Pauly, 2010), putting people at increased risk of acquiring infections, such as HIV and HCV. As highlighted in this special issue, the COVID-19 pandemic has presented people working in harm reduction with a stark challenge in determining how best to reconfigure interventions that hinge on the physical, social, and emotional intimacies of drug use (Schlosser & Harris, 2020).

COVID-19, physical distancing, and other restrictions have also resulted in reduced access to drug treatment services (Dunlop, et al., 2020; EMCDDA, 2020b). Among 25 countries surveyed by the EMCDDA, 60% reported a decrease in the availability of and provision of drug treatment services since COVID-19 (EMCDDA, 2020b). In an online study from CREW, 58% of people reported difficulty in getting support related to drug use, 32% reported difficulty accessing prescriptions, and 28% reported unintended withdrawal (CREW, 2020a). Decreases in the availability and provision of other drug services have also been observed, including residential treatment, drop-in centres, shelters and outreach services (EMCDDA, 2020b).

But an important part of the emerging story of COVID-19 is how harm reduction and treatment services are *adapting* in relation to their altering environments. Here, we accentuate the multiplicity of COVID-19 effects, not only as elements in the production of 'risk environments' but as elements in the production of 'enabling environments'. The adaptive effects of COVID-19 are potentially adverse – linked to risky substance use or reduced access to services – as well as *productive* for health – linked to how services and interventions and policies innovate in response. Drug treatment services globally have responded with a range of changes to the provision of OAT in an effort to reduce physical interactions since COVID-19 (Basu, Ghosh, Subodh, & Mattoo, 2020; Crowley & Delargy, 2020; Dunlop, et al., 2020; EHRA, 2020; EMCDDA, 2020b; Heimer, McNeil, & Vlahov, 2020). Historically, the system for OAT provision in many countries is based on supervised daily dosing of methadone and buprenorphine treatment, with the exception of buprenorphine treatment in the United States and France (Dunlop, et al., 2020). Prompted by COVID-19, many countries have relaxed regulations or legal frameworks governing the provision of take-home doses (unsupervised doses) of both buprenorphine and methadone as an alternative to daily dosing (many countries have allowed take-home doses ranging from 5 to 14 days, but up to a month in some situations) (EMCDDA, 2020b). This is a significant adaptation to service provision

offering greater flexibility to people who have historically been required to attend a clinic or pharmacy daily to receive treatment. In the future, it will be critical to examine the impacts of increased take-home doses on health outcomes among people receiving OAT. In a similar fashion, drug treatment services have adapted by extending OAT medication prescriptions for longer periods, reducing or removing urine testing, and providing mobile outreach OAT provision for the more vulnerable (Crowley & Delargy, 2020; Davis & Samuels, 2020; Dunlop, et al., 2020; EMCDDA, 2020b; Samuels, et al., 2020). These adaptations arguably begin to move drug treatment from a tool of discipline among the socially excluded (Fraser, 2006) to an intervention of *social inclusion*, for the first time in some settings, thereby making services amenable and adaptable to people who use drugs. These are significant policy moves in a pandemic situation which otherwise emphasises social distancing, and is adversely affecting the socially disadvantaged (Douglas, et al., 2020).

Another area of service adaptation in some countries concerns the availability of long-acting injectable depot buprenorphine, which affords the opportunity for people to switch to a once-weekly or once-monthly injection (Dunlop, et al., 2020; EMCDDA, 2020b). In a study of people with opioid dependence in Australia, 68% of people thought that long-acting injectable buprenorphine would be a good treatment option for them (Larance, et al., 2020). People currently receiving OAT with shorter treatment episodes, fewer unsupervised doses, and longer travel distance were more likely to perceive that long-acting injectable buprenorphine would be a good option for them (Larance, et al., 2020). This is consistent with other surveys and qualitative research demonstrating positive perceptions and potential benefits of long-acting buprenorphine, including the potential for reduced stigma, reduced negative rituals and habits, greater choice and flexibility, and a reduced need to frequently attend pharmacies and clinics (Gilman, et al., 2018; Neale, Tompkins, McDonald, & Strang, 2018; Tompkins, Neale, & Strang, 2019). However, people have noted important concerns about long-acting injectable buprenorphine, including being unable to control the medication dose or stop treatment easily once started, having something foreign inside of them, potential side effects, potential reduced social interactions, and reduced choice and control (Neale, et al., 2018; Tompkins, et al., 2019). The adaptive potentials of long-acting buprenorphine in the COVID-19 era require close monitoring in order that these treatment innovations can be attuned to patient preferences and need (Neale, Tompkins, & Strang, 2019), ensuring that patient choice remains at the centre of treatment decision making.

There are, of course, some very specific and pragmatic challenges for altering how clients engage with services during COVID-19. Drug treatment services often require face-to-face contact with individuals, and this is a valued element in their therapeutic effect. Services are adapting through operational changes to provide personal protections to both clients and staff, including through the provision of personal protective equipment, physical distancing protocols, and alterations in the timing and triaging of service delivery (Dunlop, et al., 2020; EMCDDA, 2020b). The capacity of services to deliver is contingent on protecting staff safety, with exposures to COVID-19 resulting in considerable disruption, as illustrated by a case study in this special issue (Rosca, Shapira, & Neumark, 2020). This case study traces the disruptive effects and practical challenges linked to staff members becoming exposed to COVID-19, including the handling of ethically charged decisions about how to respond in relation to the imposing of quarantine and hospitalisation measures.

Where feasible, many drug treatment services have adapted by replacing face-to-face intervention with telephone, video or internet-based alternatives (Bruneau, et al., 2020; Davis & Samuels, 2020; EMCDDA, 2020b; Samuels, et al., 2020). As noted above, the development of community outreach, especially to those most socially marginalized, is a key feature of service adaptation prompted by COVID-19 (EMCDDA, 2020b). Task-shifting is another feature of adaptive response (Guilamo-Ramos et al, 2020). In this special issue,

Guilamo-Ramos (2020) emphasize the potentials of leveraging the global nursing workforce to expand access to drug treatment and care, outlining recommendations for how this might be done. What we see here is the pandemic situation, a sense of crisis, leading to adaptations which enable services to innovate in new ways where they might otherwise have been held back (as in the case of opening up OAT to more relaxed models of provision to maximise engagement, or developing new intervention technologies) or to expand in their reach to maximise their potential (as in the case of expanding community outreach and experimenting with task-shifting).

Drug harms and risk reductions

Changes in drug markets, drug use, and service provision in response to the unfolding COVID-19 pandemic have the potential to introduce as well as exacerbate harms that may relate to drug use (Degenhardt, et al., 2019; Farrell, et al., 2019; Hall, et al., 2019; Peacock, et al., 2019). Of particular note here are reports of an increased availability of domestically produced fentanyl and other novel psychoactive substances (CCENDU, 2020; EMCDDA, 2020c). It is possible that physical distancing and other restrictions might lead to an increased likelihood of injecting at home or injecting alone. Furthermore, disruptions to drug treatment services may impact access to OAT treatment. Collectively, these changes may produce a risk environment, especially for overdose, as has been witnessed in various parts of North America (AMA, 2020; British Columbia Coroners Service, 2020; Slavova, Rock, Bush, Quesinberry, & Walsh, 2020). Fentanyl (Ciccarone, 2019; Gomes, et al., 2018), alcohol (Tori, Larochelle, & Naimi, 2020) and benzodiazepines (Dasgupta, et al., 2016; Macleod, et al., 2019; McCowan, et al., 2009; Park, et al., 2015) increase the risk of overdose, particularly when used in combination. The concurrent use of opioids with alcohol and/or benzodiazepines might be particularly problematic in settings where a decreased availability of heroin may lead to reduced tolerance after periods of abstinence, increasing the potential for overdose risk (Merrall, et al., 2010; Stowe, Scheibe, Shelly, & Marks, 2020). We highlight the implementation of strategies to address overdose as particularly critical to managing the risk environment in the time of COVID-19.

As highlighted by Collins, Ndoye, Arene-Morley, and Marshall (2020) in this special issue, although take-home naloxone has been a critical evidence-based intervention for minimizing fatal overdose (Strang, et al., 2019), COVID-19 has impacted on the ability for services to effectively distribute naloxone. Reduced harm reduction service hours and physical distancing have resulted in the need for digital naloxone training and the mail-out of naloxone kits. Street outreach and distribution have become more difficult with fewer people in public and the closure of public spaces (e.g. parks, buildings) where outreach and distribution have often occurred. There is an urgent need to implement and scale-up public health approaches to reduce fatal overdose risk in the COVID-19 era, including removing regulatory barriers to expand naloxone distribution, through community-based distribution and broadening distribution points (Collins et al. 2020). Community-based drug user and harm reduction organizations are well-placed to design and implement such programs (Collins, et al., 2020).

Despite the important role that naloxone can play in saving lives through intervening in overdoses once they occur, naloxone does not prevent overdose or fundamentally alter the underlying social conditions which generate drug harms, including those linked to drug supply and policing (Cooper, 2015). Overdose-related harms in many settings, including in parts of North America, have occurred as a result of the increase in fentanyl and fentanyl analogues creating an unsafe drug supply (Beletsky & Davis, 2017). In this special issue, Tyndall (2020) argues that providing access to a safer supply of opioid drugs is a critical, yet often overlooked, strategy to reducing overdose and creating an environment enabling safer drug use. In response to COVID-19, the British Columbia Centre for Substance Use provided guidelines to support clinicians willing to provide pharmaceutical-grade opioids for people with COVID-19 or at risk of exposure, including hydromorphone tablets or long-acting morphine capsules for opioid dependency, dextroamphetamine or methylphenidate for stimulant dependency and nicotine patches for nicotine dependence (BCCSU, 2020; Tyndall, 2020). However, a major barrier has been the lack of physicians willing to prescribe and take on the liability for these medications (Tyndall, 2020). One innovation in this area, as described by Tyndall, is the development of a biometric storage locker where people can pick up prescribed medications (the MySafe machine), offering a low-barrier, scalable, distribution model for a safer drug supply. Such innovations, prompted by the intersecting emergencies of overdose mortality and pandemic outbreak, require an implementation science that can respond rapidly to evaluate service impact and inform delivery.

In addition to highlighting overdose, and as noted above, we call attention to how service disruptions linked to COVID-19, as observed in parts of Europe (EMCDDA and Europol, 2020; Whitfield, et al., 2020) and the United States (Bartholomew, et al., 2020; Glick, et al., 2020), could exacerbate risks of viral and bacterial infections (Jacka, Phipps, & Marshall, 2020; Larney, Peacock, Mathers, Hickman, & Degenhardt, 2017). An additional concern is how exposure to COVID-19 among people who use drugs exacerbates co-occurring invasive bacterial infections, particularly community-acquired pneumonia and infective endocarditis (Jacka, et al., 2020). We note the need to better understand, as well as address, how COVID-19 entangles with other viral infections, especially HIV (Golin, et al., 2020; Vasylyeva, et al., 2020; Wilkinson & Grimsrud, 2020) and HCV (Blach, et al., 2020; Karimi-Sari & Rezaee-Zavareh, 2020). A concern here is how COVID-19 responses stretch the already limited resources available in some settings to maintain the scale-up of prevention and treatment required across multiple viral infections affecting people who use drugs, risking the disruption or slowing of progress towards achieving viral elimination targets in relation to HIV (Golin, et al., 2020; Wilkinson & Grimsrud, 2020) and HCV (Blach, et al., 2020; Karimi-Sari & Rezaee-Zavareh, 2020).

COVID-19 health

We have drawn attention to how the effects of COVID-19 entangle as part of the risk and enabling environments which affect the health of people who use drugs. It is also important to trace the direct health impacts of COVID-19 in relation to the health of people who use drugs (Dietze & Peacock, 2020; Vasylyeva, et al., 2020). Difficulties in adhering to quarantine and physical distancing increase transmission risk of COVID-19 for some populations of people who use drugs (Arcadepani, Tardelli, & Fidalgo, 2020; Deilamizade & Moghanibashi-Mansourieh, 2020; Dietze & Peacock, 2020; Vasylyeva, et al., 2020). For instance, Arcadepani et al (2020) highlight the challenges of COVID-19 prevention in public and open-air drug scenes, focusing on a case study in São Paulo, Brazil. A particular challenge is delivering COVID-19 prevention and quarantine services to homeless populations (Banerjee & Bhattacharya, 2020; Lenhard, 2020; Marcus *et al.* 2020), particularly in settings where outbreaks have been observed (Baggett, et al., 2020; Imbert, et al., 2020; Mosites, et al., 2020; Tobolowsky, et al., 2020). This special issue highlights some of the specific challenges in providing COVID-19 prevention services among homeless people who use drugs in Iran (Deilamizade & Moghanibashi-Mansourieh, 2020).

People who use drugs may face additional risk of serious illness in the event of SARS-CoV-2 infection. Older adults, people with lung disease, people with hypertension or heart disease, severe obesity, chronic kidney disease, and liver disease may be more likely to develop severe COVID-19 (Jordan, Adab, & Cheng, 2020; Richardson, et al., 2020; Sanchez-Ramirez & Mackey, 2020; Ssentongo, Ssentongo, Heilbrunn, Ba, & Chinchilli, 2020). People who use drugs have a high prevalence of many of these co-morbidities, which may place them at

increased risk of complications following COVID-19 infection. Studies suggest that people who smoke heroin or crack have a high and increasing burden of chronic respiratory symptoms (Burhan, et al., 2019; Nightingale, et al., 2020), but may often be undiagnosed, given that spirometry testing is not routine. As highlighted by Harris in this special issue, given the high prevalence of tobacco, heroin, and crack smoking, there is an urgent need to consider harm reduction services for people who smoke drugs in the time of COVID-19 (Harris, 2020). Social isolation and physical distancing measures also have the potential to alter mental health (Ballivian *et al.* 2020; Pfefferbaum & North, 2020; Sutherland, et al., 2020). Data from one online survey of people who use drugs indicated that more than half of participants reported poorer mental health in the past month since COVID-19 than in the months prior, with almost 40% seeking help for mental health reasons in the past month (Sutherland, et al., 2020).

COVID-19, as with other infections, may also become enacted as a marker of social stigma (Bagcchi, 2020; Logie & Turan, 2020). There is a large body of research tracing how social stigma entangles with illicit drug use, and how felt stigma shapes perceptions of self-worth as well as capacity to seek help and respond to risk (Room, 2005; Schmitt, Branscombe, Postmes, & Garcia, 2014). Felt and enacted stigma, and linked discriminatory practices, can reduce help seeking and access to care, and the experience of seeking help can reproduce felt stigma (Calabrese, et al., 2016; Heath, et al., 2016; McCutcheon & Morrison, 2014; McKnight, et al., 2017; Paquette, Syvertsen, & Pollini, 2018; Wilson, Brener, Mao, & Treloar, 2014). A social environment reproducing stigma linked to drug use is a risk environment, making it less likely that people who use drugs can seek help in relation to COVID-19 (Vasylyeva, et al., 2020). There is the possibility too, that people who use drugs become more publicly visible during lockdowns, further perpetuating stigma and discrimination (Broady, Brener, Cama, Hopwood, & Treloar, 2020).

Drug policies

One of the ways in which drug policies oriented towards enforcement exacerbate conditions of risk is via the prison. Prisons constitute built expressions of risk environment, representing particular challenges for the prevention and management of COVID-19, due to overcrowding, poor hygiene, and inadequate access to medical care (Akiyama, Spaulding, & Rich, 2020; Mukherjee & El-Bassel, 2020). In the United States, by June 6, 2020, there had been 42,107 cases of COVID-19 and 510 deaths among 1.3 million prisoners, with a case rate 5.5 times higher than the US population (Saloner, Parish, Ward, DiLaura, & Dolovich, 2020). As highlighted in this special issue, people who use drugs (including those with opioid dependence) are disproportionately incarcerated, often as a result of drug-related crimes (Mukherjee & El-Bassel, 2020). Policy adaptations enabled by COVID-19 have included efforts to limit the number of people incarcerated through the dismissal of criminal charges for people arrested for non-violent offences and plans to release vulnerable prisoners (e.g. elderly, those with medical co-morbidities, those with limited time remaining in their sentence, and those charged with non-violent crimes) (Mukherjee & El-Bassel, 2020). In Canada, in August 2020, the Public Prosecution Service of Canada took a historic step towards decriminalization by instructing Crown attorneys to focus on increased access to drug treatment and to no longer incarcerate some people charged for minor drug possession (Public Prosecution Service of Canada, 2020). This is consistent with a statement by the Canadian Association of Chiefs of Police which recognize substance use as a public health issue, endorsing alternatives to criminal sanctions for simple possession of drugs (Canadian Association of Chiefs of Police, 2020).

As highlighted by Del Pozo and Beletsky (2020) in this special issue, the increasing calls to abandon a culture of mass incarceration and focus on a "public health approach" to substance use provides an opportunity to drastically alter the focus of drug policy. Perhaps COVID-19 can afford policy adaptations towards enabling safer drug use environments. For instance, in addition to the rapid depopulation of prisons, jails, and other detention settings and limiting drug-related arrests, COVID-19 might act as a resource for re-thinking policies in relation to drug treatment (Del Pozo & Beletsky, 2020). As we have noted above, restrictions on prescribing of buprenorphine and methadone have been relaxed and increased opportunities for take-home doses have improved the flexibility and choice offered to people receiving drug treatment (Del Pozo & Beletsky, 2020). We cannot afford to revert to the ways of thinking and doing prior to COVID-19 (Del Pozo & Beletsky, 2020). COVID-19 has prompted an urgency to adapt and innovate, and sustaining this momentum, whilst securing it into the future, becomes a key focus of public health and drug policy (Del Pozo & Beletsky, 2020).

In this respect, Del Pozo and Beletsky (2020) begin to map the boundaries of possibility in relation to drug policy futures in the time of COVID-19. Working towards drug policies in the time of COVID-19 which orientate towards creating and preserving safer environments for health has affinity with the call made, in this special issue, by the International Network of People who Use Drugs (Chang, Agliata, & Guarinieri, 2020). This is a call that envisages COVID-19 as a *resource* to adapt, to rethink, and to act differently. COVID-19 makes visible the limits, as well as harms, of interventions or policies which discipline and punish, drawing attention to the urgent and pragmatic need for rapid access to care, as well as systemic reforms, to make environments safer for people who use drugs, and ultimately, to shift beyond a myopic rhetoric of 'war on drugs' (Chang, et al., 2020). Pandemics draw stark attention to the fundamentals of preserving population health. COVID-19 reinforces the call from the International Network of People who Use Drugs for a drug policy approach which ensures: (1) unimpeded access to harm reduction programs; (2) safe supply of drugs through a two-pronged effort of rational management of the drug market and increasing access to legal and regulated drug supplies; (3) social protection schemes for people who use drugs, particularly those who face housing and food insecurity; (4) acknowledgement that criminal justice reform is long overdue and decriminalizing drug use and possession; (5) protection of civil and political liberties as a fundamental prerequisite; and (6) safeguarding community and civil society autonomy.

Conclusion

To conclude, we draw attention to the multiple effects of COVID-19 as elements entangling in the risk and enabling environments shaping the health of people who use drugs. The effects of COVID-19 in relation to the health of people who use drugs, and interventions in response, are at once multiple and emergent, impacting iteratively and reciprocally, as well as directly and indirectly. This accentuates the need to envisage the risk and enabling environments affecting the health of people who use drugs, and the impacts of COVID-19 within these, as complex and adaptive. The material in this special issue begins to trace some of these adaptive effects as they relate to dynamics of drug use, drug harm, drug markets, and service and policy responses. Critically, we emphasise the emergent effects of COVID-19 as not only potentially adverse in their exacerbation or reproduction of risk environments, but as productive, wherein a situation of crisis and emergency has afforded innovation in rapid service developments, new harm reduction technologies, and lower threshold access to care. Examples here include the relaxation of regulations governing access to evidence-based treatments and medicines (such as OAT), the expansion of community outreach service provision, and interventions to alter the risk environment by creating access to safe drug supply, enhance access to drug treatment, reducing the risk of overdose, and reducing incarcerations. It may have taken a pandemic crisis to accelerate, and reiterate the need for, the delivery of such pragmatic and evidence-based public health interventions. COVID-19, while enormous and overwhelming in its disruptions, is also a *resource*, a power for change, for innovation, for acting

differently, for policy reform, for working towards a new normalcy for people who use drugs. The urgency to create safer and healthier environments that is accentuated in the time of pandemic is a momentum to be sustained in relation to the health of people who use drugs. How to sustain the policy and service delivery improvements prompted by COVID-19, such that these are not undone as temporary interventions or left to ebb away in a future 'post crisis' scenario, is a critical concern. We need to maintain an ethos of emergent adaptation and experimentation towards the creation of safer environments in relation to the health of people who use drugs, while at the same time building an implementation science which has the capacity not only to measure outcome but to inform how best to attune intervention experiments to their changing social contexts.

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