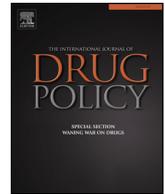




Contents lists available at ScienceDirect

International Journal of Drug Policy

journal homepage: www.elsevier.com/locate/drugpo

Drug safety testing, disposals and dealing in an English field: Exploring the operational and behavioural outcomes of the UK's first onsite 'drug checking' service

Fiona Catherine Measham

Durham University, Department of Sociology, 32 Old Elvet, Durham, DH1 3HN, United Kingdom

ARTICLE INFO

Keywords:

Drug checking
Drug safety testing
Festivals
Harm reduction
Drug use
Drug dealing

ABSTRACT

Background: In a year when UK drug-related deaths and festival drug-related deaths reached their highest on record, a pilot festival drug safety testing service was introduced with the aim of reducing drug-related harm. This paper describes the operational and behavioural outcomes of this pilot and explores the relationship between drug use, supply and policing within festival grounds.

Methods: Chemists in a temporary laboratory analysed 247 substances submitted by the public to a free, confidential testing service across four days at a UK festival in July 2016. Test results were returned to service users embedded in 230 healthcare consultations delivered to approximately 900 festival-goers (one in five drug using festival-goers) that included harm reduction advice and the opportunity to use a disposal service for further substances of concern. Consultation data were collected at point of care, matched with test results, coded and analysed using SPSS

Results: Test results revealed that one in five substances was not as sold or acquired. One in five service users utilised the disposal service for further substances of concern in their possession and another one in six moderated their consumption. Two thirds of those whose sample was mislabeled disposed of further substances, compared with under one in ten whose sample was as sold. Service users who acquired substances onsite at the festival were more than twice as likely to have been mislabeled than those acquired offsite, were nearly twice as likely to use the disposal service and were on average two years younger. Women were more likely to be using the drug for the first time and more likely to use the disposal service. Test results were shared with emergency services; alerts issued across site and an unanticipated feedback loop occurred to some drug suppliers.

Conclusion: This pilot suggests that festival-goers engage productively with onsite drug safety testing services when given the opportunity, such services can access harder-to-reach and new user groups and can play a part in reducing drug-related harm by identifying and informing service users, emergency services and offsite drug using communities about substances of concern. Disposals to the testing service for onward police destruction provide an externally corroborated measure of impact, reducing harm to the individual and others by removing such substances from site. Evidence of differential dealing onsite and its potential negative consequences has implications for future research and policing.

Introduction

Drug checking (drug safety testing, pill testing, street drug analysis) – a public health intervention that allows the general public to submit substances for content analysis – has existed for over 50 years. The first wave of analysis of street drugs by community based drugs services was in late 1960s and early 1970s California, with the origins dated to San Francisco in 1965 (Marshman, 1974; Smith, 1974). The second wave of drug safety testing occurred in 1990s Europe with the advent of acid house, rave and electronic dance music and the associated use of

synthetic 'party drugs' such as MDMA at dance events. In 1992 a Dutch government-funded Drug Information and Monitoring System (DIMS) was established and similar services sprung up across Europe in subsequent years (Brunt, 2017; Brunt and Niesink, 2011; Kriener et al., 2001). A third wave of expansion occurred in the UK, North America and Australasia in recent years as new technologies and New Psychoactive Substances (NPS) emerged, making publicly accessible forensic testing for harm reduction purposes more feasible, more accurate and more pertinent. The international opioid overdose crisis and associated contamination of illegal drug markets with fentanyl and other

E-mail address: f.measham@durham.ac.uk.

<https://doi.org/10.1016/j.drugpo.2018.11.001>

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analogues has added further impetus to consideration of this public health intervention (Tupper, McCrae, Garber, Lysyshyn, & Wood, 2018).

A global review of drug checking services identified 31 services in operation in 20 countries in 2017, with DIMS the longest running (Barratt, Kowalski, Maier, & Ritter, 2018). In the UK, some public health (Royal Society for Public Health, 2017) and police (Jamieson, 2018) bodies have endorsed the measure. Such is the growing interest in drug checking that 31st March 2017 was declared the first ‘International Drug Checking Day’. Yet whilst the value of obtaining intelligence to monitor drug markets, assist emergency service provision and inform early warning systems is recognised, concerns have been expressed about a “limited” evidence base on the behavioural outcomes for individual service users from publicly accessible safety testing (European Monitoring Centre for Drugs and Drug Addiction, 2017: 139; see also Sumnall, Bates, & Jones, 2017), and these are enhanced by concerns about potentially encouraging drug use by reducing health and criminal justice risks and their supposed deterrent value within an illegal market.

There are a number of different models of drug safety testing with all at their core comprised of the forensic analysis of suspected psychoactive drugs to directly inform individual service users and in some cases wider stakeholders of the contents for harm reduction purposes. Variations in services relate to the primary purpose of the testing; who conducts the analyses and how; the range of quantitative or qualitative analytical methods used; who disseminates test results and how; where testing is located (such as mobile/ event-based or fixed site/ community-based); whether test results go directly to users or via an intermediary; and the varying levels of engagement and support from other stakeholder groups. At the Canadian Shambhala festival, for example, test results are not shared directly between the testing service and other onsite agencies such as police (Michelou & Dowden, 2015). By comparison, Multi Agency Safety Testing (MAST), the term coined by the author for the model of drug safety testing piloted in the UK (Measham, 2016) is distinctive in that firstly, it foregrounds the sharing of test results with onsite and offsite stakeholders with the agreed aim of reducing drug-related harm and secondly, test results are delivered by healthcare staff embedded in brief interventions (Fisher & Measham, 2018). UK stakeholders preferred the term ‘safety testing’ to ‘checking’ because of the latter’s association with a ‘checklist’, problematic in the UK legislative context where encouraging or assisting a crime is itself a crime in the Serious Crime Act 2007 (<https://www.legislation.gov.uk/ukpga/2007/27/part/2>). ‘Safety’ testing emphasises the aim to help keep the public safe and distinguishes it from testing for surveillance purposes such as in prisons and workplaces.

Controversies in drug safety testing

Advocates argue that drug safety testing can reduce drug-related harm and improve health and wellbeing at a number of levels from the micro (individual service users) and the meso (festivals, nightclubs and associated stakeholders) through to the macro (national and international). This can occur through accessing hidden or hard-to-reach populations not in touch with existing health services; providing an opportunity to engage in a dialogue about health and harm by embedding feedback of test results in healthcare consultations; facilitating onward referral to local drugs services; monitoring trends in drug use and drug markets; activating alerts for regional, national and international early warning systems; identifying and informing users, onsite and offsite stakeholders of substances of concern; and also identifying misselling, for example of NPS as established street drugs (eg. Benschop et al, 2002; Brunt et al., 2016; Vidal Giné, Espinosa, & Vilamala, 2014, 2017). Uniquely, drug safety testing can make a crucial connection between the anticipated and actual contents of illegal drugs, to better understand illegal markets and retail practices, to target alerts to the most appropriate users, and to allow us to estimate “the nature and size of the

discrepancy between what people think they are taking and what they are actually taking” (Barratt & Ezard, 2016: 558).

For critics, the inevitable compromises involved in conducting forensic analyses in challenging conditions within a temporary laboratory mean that drug safety testing “at best... gives an artificial ‘shine of safety’” (Winstock et al 2001: 1139) and at worst can provide dangerously inadequate test results given the inevitable trade-off between speed, accuracy, reliability and portability of equipment (Brunt, 2017: 9). Further concerns include inter-individual user variability, tablet disintegration variability (Schneider, Galettis, Williams, Lucas, & Martin, 2016), drug dealers using the service as a quality control measure; a focus on risky substances (particularly contaminants) at the expense of risky behaviours (such as bingeing and polydrug use); a limited evidence base regarding the causal relationship between information and behaviour change; a risk of reducing the deterrent value/ increasing the appeal of illegal drugs by enhancing their perceived safety; the potential for non enforcement of drug controls within a police ‘tolerance zone’ to be the ‘thin end of the wedge’ to decriminalisation; and a broader, more nebulous concern about drug safety testing ‘normalising’ attitudes to drug use amongst the wider population.

In terms of the existing evidence base, at the macro level, the value of monitoring drug trends and informing early warning systems is evident in the substantial data collected at national (eg. by DIMS) and international level (eg. Brunt et al., 2016; EMCDDA, forthcoming). In his consideration of two decades of DIMS testing, Brunt (2012) argued that testing and associated public health alerts had not had a perverse impact on either drug use or drug-related deaths, with Dutch drug prevalence and mortality rates remaining both fairly stable and also favourable relative to other European countries. In the Netherlands in December 2014, for example, DIMS tested pink ‘Superman’ logo pills found to contain 173 mg PMMA, issued immediate red alerts on national television and no deaths occurred. In the UK by comparison, without a national testing service or pre-emptive alerts from the authorities, four people died after taking similar pink ‘Superman’ pills containing PMMA within a fortnight of the DIMS alert (Nutt, 2015; Sample, 2015). Overall there is no evidence that drug prevalence, initiation or mortality rates have increased in European countries with drug safety testing by comparison with those without (Benschop, Rabes, & Korf, 2002; Brunt, 2012; Hungerbuehler, Buecheli, & Schaub, 2011).

At the micro level, evaluations have focused on either process or behavioural outcomes (Kriener et al., 2001). A key behavioural outcome measure is whether service users intend to consume or dispose of further substances in their possession after hearing their test result, particularly if the result was different to expected. The limited research to date on behavioural outcomes estimates disposal rates ranging from 4 to 76% according to a review by Leece (2017).

Service user disposal rates have been measured by intentions after hearing test results (Kriener & Schmid, 2002; Makkai et al., 2018; Martins et al., 2017; Saleemi, Pennybaker, Wooldridge, & Johnson, 2017); self-reported historical recall (Van de Wijngaart et al., 1999); hypothetical intentions into the future (Benschop et al., 2002; Black et al, 2008; Day et al., 2018; Dundes, 2003, Dunn et al, 2007; Johnston et al., 2006; Michelou & Dowden, 2015; Wiese and Verthein, 2014); or actual disposal rates immediately after hearing test results (Mema, 2018; Sage, 2015). This last measure is the strongest of these four behavioural indicators and was used in this pilot. Furthermore it allows external corroboration of actual disposal.

This paper provides data and analysis from a free, confidential and non judgmental testing service delivered across four days at a 25,000 person capacity ‘boutique’ outdoor music festival by a non profit NGO in July 2016. Consideration is given here to the operational success of the pilot, measuring behavioural outcomes and exploring the impact of the illegal drug trade and its policing within the festival grounds. The broader context to this pilot was a heightened concern in the UK about increased drug-related deaths: including both the highest drug-related

death rates on record and the highest in Europe that year (Office for National Statistics (ONS), 2017). Furthermore, specifically in relation to this user group, 2016 saw the highest festival drug-related death rate on record (six deaths) and the highest MDMA and cocaine-related death rates on record in the UK (Office for National Statistics (ONS), 2017).

Methods

Given that this was the first pilot of a drug safety testing service direct to the public in the UK (Brooks, 2016; UK Focal Point on Drugs, 2017: 156), the decision was taken to advertise the service neither beforehand nor liberally onsite. The service was located in a large fixed tent in a designated welfare area alongside festival welfare, paramedic and psychedelic support services, between the entertainment and camping fields, in a police-negotiated ‘tolerance zone’. The tent was divided in two by an opaque screen, with a front desk and individual ‘consultation booths’ accessible to the public, then behind the screen was a pop-up laboratory accessible only to staff. Signage at the tent was implicit, with the availability of onsite testing spreading predominantly by word of mouth through welfare, medical, hospitality and general staff, as well as through artists and management on and off stage.

Members of the public could bring any substances of concern for testing and receive results as part of an individually tailored brief intervention by healthcare staff. The service operated by service users putting a dose – a pill or approximately 5 mg of powder, but not vegetable or fungal matter – into a small plastic bag which they sealed and posted in a locked amnesty bin that was regularly taken and emptied in the lab. They received a unique ID number and were asked to return about an hour later. Opening hours were approximately midday to 8 pm from Thursday to Sunday with peak usage at around 4 pm. Volunteer post graduate (predominantly post doctoral) chemists used a series of up to three analytical techniques with results triangulated where appropriate: firstly, Fourier Transform Infrared (FTIR) spectroscopy whereby sample spectra are algorithmically compared with reference library spectra (using the TICTAC ATR FTIR and Bruker ATR FTIR Library in the OPUS 7.5 software running the ‘Default’ algorithm); secondly, colorimetric reagent tests (to identify heavily diluted substances or those that might not be identified by FTIR); and thirdly, mass loss analysis, a wet chemical process using solvent washing to extract binders to allow approximate measurement MDMA content in ecstasy pills (for comparison of analytic techniques see Brunt, 2017; Kerr & Tupper, 2017; Kriener et al., 2001).

The testing service delivered 230 brief interventions, with forensic test results not collected for another 17 submitted samples. Consultation data were electronically recorded by healthcare staff at point of care for the nominated primary service user, matched with forensic test data recorded by chemists in the lab, then coded and analysed using SPSS 22. The pilot revealed that service users visited the testing service in friendship groups of four therefore resulting in harm reduction advice embedded in the local drug market context being distributed directly to approximately 900 service users. This equates to approximately one in five drug users at that festival, based on the UKFA (2017) estimate of 20.9% of UK festival-goers taking illegal drugs.

Consultations lasted approximately 15/20 minutes and followed a predetermined structure. This included a pre-scripted general warning about all drug use carrying risks and drug use not being encouraged or facilitated by the service; demographics; medical and drugs histories; current use of alcohol, drugs and medications; what the sample was bought as, thought to be and test revealed it to be; analytical and batch-specific limitations; as well as harm reduction advice tailored to the individual(s) and their consultation. Risky behaviours such as bingeing, polydrug use and specific drug combinations of concern were also discussed. Additionally there were opportunities for questions; free harm reduction leaflets; and onwards signposting to a local drugs service. Finally, all service users were offered the opportunity to use a disposal service whereby further substances of concern in their

possession could be handed over for onward safe destruction by the police. Passing substances to a testing service for onward police destruction operates in a similar legal terrain in the UK to festival security staff confiscating drugs where the primary purpose is to “deliver it into the custody of a person lawfully entitled to take custody of it” (<http://www.legislation.gov.uk/ukpga/1971/38/section/5>).

Festival-goer commitment to obtaining information about substances of concern was evident not only in queues to use the service throughout the four days of the festival but also in the higher-than-anticipated demand on the last day to find out more about substances consumed earlier that weekend. For example, one young woman who was hospitalised on Saturday night returned to the festival on Sunday especially to get a sample tested to try to find out more about what might have prompted her hospital admission. Overall, over four in ten MAST service users reported having general or specific concerns about their sample or their own health and wellbeing. These included a quarter (25.2%) having concerns about that particular sample (including already having experienced negative effects such as vomiting, ‘bad trips’ and ‘allergic reactions’ at the festival), 14.8% reporting that they or their friends had experienced negative effects from that drug in the past, and 4.3% having general concerns about how they were feeling at the time of presentation.

Results

Sample

The 230 MAST primary service users comprised 66% male, 87% White by self defined ethnic identity, with an average age of 27.6 years (median 26, standard deviation 7.5), ranging from 16 to 51. Ketamine service users were younger (24.2 years) than MDMA (27.8 years) and cocaine (27.5 years) users, as were female (25.3 years) compared with male (28.7 years) service users. By comparison, the UK WEDINOS (2017) postal drug testing service users comprised 87% male with an average age of 32.

Just 5.2% of MAST primary service users reported previously having accessed support or treatment from a healthcare professional for their drug or alcohol use (eleven men and one woman, 7.2% v 1.3%). Regarding initiation, 8.3% had never used that drug before, with a higher proportion of female than male first time users of that drug (11.7% v 6.5%).

Forensic test results

Half (50%) of MAST service users bought or acquired their substance off site and successfully smuggled it past security search procedures at entry whereas 48.3% bought or acquired their substance from a friend, acquaintance or dealer within the festival grounds. Tests revealed that 37% of samples were MDMA crystal/powder, 20% ecstasy pills, 13.5% ketamine and 10% cocaine (see Table 1), with nearly one in five samples (19.5%) at variance with what they were sold as. Substances acquired within the festival grounds were more than twice as likely to be at variance with what they were sold as compared with those bought offsite (27% v 12%, $p < .01$), with service users buying within the festival approximately two years younger than those buying offsite (26.5 years v 28.5 years old). In terms of mislabeled substances, (i) some samples were revealed to be cheaper psychoactive drugs mislabeled as more expensive drugs, for example ketamine mislabeled as cocaine (up to double the street price and greater criminal penalties in the UK, resulting in a higher reward to risk ratio for a dealer); and cathinones mislabeled as cocaine, ketamine and MDMA, including one sample of n-ethyl pentylone, a longlasting cathinone, mislabeled as MDMA (Measham & Jones, 2017). (ii) A number of samples contained pharmaceuticals and cutting agents including chloroquine (a prescription anti malaria medicine), benzocaine, caffeine, ephedrine and paracetamol all mislabeled as cocaine. (iii) Other mislabeled samples contained inactive but relatively

Table 1
Test results for MAST submissions, festival pilot, 2016.

| Drug | Count of results | % |
|-----------------|------------------|-------|
| MDMA | 131 | 57% |
| Ketamine | 31 | 13.5% |
| Cocaine | 23 | 10% |
| Cutting agents | 16 | 7% |
| Unidentified | 6 | 2.6% |
| Pill binder | 6 | 2.6% |
| Cathinone NPSs | 8 | 3.5% |
| NPS | 3 | 1.3% |
| Pharmaceuticals | 2 | 0.9% |
| LSD | 2 | 0.9% |
| Amphetamines | 2 | 0.9% |
| Total | 230 | 100 |

Pill binder - calcium sulphate hemihydrate = plaster of Paris.

harmless ingredients such as six samples of plaster of paris missold as ecstasy pills and four samples of brown sugar missold as MDMA crystal.

Individual behavioural outcomes

The provision of a disposal service for onward police destruction provided an externally corroborated indicator of positive engagement with the service, as well as removing substances of concern from circulation and eliminating the risk of disposals becoming 'ground finds' that could harm other adults, children or animals onsite. Upon hearing the test result, over one in five service users (21.3%) chose to use the disposal service (see Table 2 for further details on disposals). Two thirds of those whose test result revealed their sample to be at variance with what it was sold as then handed over further substances in their possession compared with under one in ten whose sample was confirmed to be as sold (66.7% v 9.1%, $p < .01$). Those who obtained their sample within the festival grounds were nearly twice as likely to use the disposal service as those who obtained their sample offsite (27% v 14.8%, $p < .05$), with a quarter of women compared with one in five men utilising the disposal service (24.7% v 19.6%).

Twenty two MAST service users (8%) said that they would take the substance over a longer time period or after leaving the festival and another seven said that they intended to take a smaller quantity of the drug (see Table 3 for further breakdown of individual outcomes). For most of these their test result confirmed the substance to be as sold but of a higher strength than anticipated, with the consultation session providing an opportunity for healthcare staff to discuss estimated strength and appropriate dosage. Six respondents reported their intention to throw away further substances in their possession after hearing

Table 2
Comparison of using the disposal service for onward police destruction by whether the sample matched what it was identified as when sold or given to the service user, 2016.

| | Police destruction | Other outcomes | Total n % |
|-----------------------------|--------------------|----------------|-----------------|
| Matched sold as | 15 | 149 | 164 |
| | 6.5% | 64.8% | 71.3% |
| Didn't match sold as | 9.1% | 90.9% | 100% |
| | 30 | 15 | 45 |
| Don't know eg. ground finds | 13% | 6.5% | 19.6% |
| | 66.7% | 33.3% | 100% |
| Total | 4 | 17 | 21 |
| | 1.7% | 7.4% | 9.1% |
| Total | 19% | 81% | 100% |
| | 49 | 181 | 230 |
| | 21.3% | 78.7% | 100% |

NB 'Matched sold as' is distinguished here from service user expectations after having bought and possibly tried the substance.

Table 3
Individual behavioural outcomes of 230 MAST brief interventions, 2016 – answers over 1%.

| | Matched sold/acquired as | Did not match sold/acquired as | Other eg. ground find | Total |
|--|--------------------------------|--------------------------------------|--------------------------|-------------|
| I will take my usual amount | 111 67.7% | 4 8.9% | 6 28.6% | 121 52% |
| Further substances handed for police destruction | 15 9.1% | 30 66.7% | 4 19% | 49 21.3% |
| I may take it later/ over longer time period | 20 12.2% | 1 2.2% | 1 4.8% | 22 8% |
| I will take smaller amount | 7 4.3% | 0 0% | 0 0% | 7 3% |
| I will throw it away myself | 1 0.6% | 4 8.9% | 1 4.8% | 6 2.6% |
| I will return it to my dealer | 1 0.6% | 1 2.2% | 0 0% | 2 0.9% |
| I will be more careful about mixing with other drugs | 1 0.6% | 0 0% | 0 0% | 1 0% |
| None left | 2 1.2% | 1 2.2% | 0 0% | 3 1.3% |
| No answer given | 6 3.7% | 4 8.9% | 9 42.9% | 19 8.3% |
| Total | 164 100% | 45 100% | 21 100% | 230 100% |
| | 71.3% | 19.6% | 9.1% | 100% |

NB This was an open ended question, coded subsequently.

the test result. It is reasonable to presume that some festival-goers will enter a testing service with just one dose to test and keep the rest of their supplies in their tent for fear of arrest and whilst some might return to utilise the NGO disposal service, others will discard unwanted substances in any convenient nearby refuse bin.

Two service users requested signposting to local drugs services when offered, neither of whom had previously been in touch with drugs services. A further two service users reported planning to return their drugs to their dealer to inform them about unwanted contents and/or to ask for a refund. Drug safety testing therefore could stimulate an interesting accountability feedback 'loop' between drug dealers and their regular customers.

Meso level impact: alerts, drug-related deaths and hospital admissions

All onsite agencies at the festival – including police, welfare, security and paramedical services – were provided with updates on MAST test results at daily security advisory group meetings. Testing revealed significant misselling onsite, prompting the circulation of targeted alerts with the support of festival management and police, including for chloroquine and ketamine missold as cocaine, and for high MDMA content pills.

Given use of the disposal service and other reported positive harm reduction intentions (such as lower dosage, taking over a longer time period, see Table 3), one might anticipate a reduction in drug-related medical incidents onsite. A reduction in drug-related deaths could be considered a clear measure of positive behavioural outcomes and indeed mortality rates have been used as a key measure of drug-related harm for example, in Nutt, King, and Phillips, (2010) multi criteria decision analysis modelling. There were six drug-related deaths at UK festivals in 2016, the highest on record, but none at the pilot festival that year. However, drug-related deaths are both relatively rare at festivals and often multi factorial. Therefore a more useful measure of efficacy is hospital admissions for drug-related medical incidents that require major critical care, data that are usually recorded by the festival paramedical service and at this festival were collated by the multi agency harm reduction lead (Ward, 2016).

This festival reported a 95% reduction in drug-related hospital admissions in 2016 (the year that MAST was introduced) compared with the previous year. There were 19 drug-related hospital admissions of 59 in total in 2015 (similar to previous years), by comparison with only one drug related hospital admission of 50 in total in 2016 (Ward, 2015, 2016). Festival and partner agencies suggested a number of possible explanations for this fall: MAST raised awareness of contaminants in circulation and misselling onsite, with alerts circulating via social media and word of mouth from medical, welfare and general staff, and festival-goers. If each service user (approximately one in 25) who received a harm reduction consultation then spoke with five friends, not unreasonable given the excitement surrounding participating in the UK's first drug safety testing pilot, and if, according to UKFA (2017), an estimated one in five festival-goers take illegal drugs at UK festivals, then blanket saturation could have been reached for localised alerts and associated harm reduction advice at this festival. This reach - festival paramedics, management, welfare and police concurred - led to early presentation for drug-related problems combined with a greater confidence amongst paramedics in treating drug-related presentations onsite rather than sending them to hospital.

Discussion

This paper describes the UK's first drug safety testing service direct to the public, conducted to assess the feasibility, practicality and efficacy of delivering festival testing. The pilot established that positive engagement was possible from all key stakeholders including police, public health, local authorities and event management, as well as providing an opportunity to access and engage directly with harder to reach and first time drug using groups. Festival-goers were willing to submit substances of concern for analysis and to engage productively in healthcare consultations when offered the opportunity. Harm reduction messages informed by test results, medical and drugs histories were delivered directly to approximately one in five drug using festival-goers, with a word-of-mouth ripple effect resulting in potential blanket saturation of messaging to that population. MAST service users reported their intention to take smaller quantities of substances, over a longer time period and to be more careful about polydrug combinations, with a small number also requesting signposting to drugs services to continue a dialogue with healthcare professionals after the festival.

Nearly one fifth of submitted substances was misfold and two thirds of these service users handed over further substances of concern in their possession to the MAST disposal service for onward safe police destruction, thereby reducing the risk of harm to others from discarded substances, as well as providing an externally corroborated measure of impact. A larger proportion of female than male service users were first time consumers of the submitted substance, had not previously spoken with healthcare professionals and then went on to utilise the disposal service, contrasting with women's lower representation in traditional drugs services (Simpson & McNulty, 2008). Whilst this pilot cannot ascertain any contribution of MAST towards reduced drug-related hospital admissions as there was no opportunity to control for other important variables associated with hospitalisations, nevertheless, there was only one drug-related hospital admission from this festival in 2016, a 95% reduction on previous years.

Brief interventions to service users and alerts to festival-goers informed them of localised misselling onsite, potentially reducing demand for those substances and facilitating a feedback loop to dealers. Other researchers have noted the potential for drug safety testing to impact positively on illegal drug markets with red alerts reducing demand to the point where a drug leaves the market (eg. Spruit, 2001). Testing services in Berlin and Switzerland, for example, have reported that tested pills have increasingly corresponded to expectations over time, suggesting that drug safety testing could have a positive impact on these illegal drug markets (Kriener et al., 2001). Ritter and Cameron (2005) warn, however, that a trend in improved "quality" cannot

necessarily be attributed directly to drug safety testing. The significant increase in purity of most illegal drugs in the UK, for example, happened around 2010 onwards, six years before drug safety testing was introduced (UK Focal Point on Drugs, 2017: 176).

Not only did this pilot illustrate drug safety testing's potential value as a public health intervention but also to understand the operation of local drug markets and to inform the policing of festivals. In the MAST pilot, half of service users chose to buy drugs within the festival grounds. This may have been because of less easy access to drug dealers before entry, perhaps related to being a couple of years younger. However recent studies (Grigg, Barratt, & Lenton, 2018; Hughes, Moxham-Hall, Ritter, Weatherburn, & MacCoun, 2017) suggest that high visibility policing and drug detection dogs at entry can drive some people to buy drugs within festival grounds rather than before entry. This drug safety testing pilot highlights the negative consequences of this drive to buy onsite in that substances bought onsite were more than twice as likely to be misfold as those bought offsite and were nearly twice as likely to be disposed of at the MAST disposal service, suggesting that entry security procedures combined with onsite dealing practices could significantly increase drug-related harm. Future research on drug safety testing could usefully explore not only its efficacy in terms of harm reduction, therefore, but also its potential value in increasing our understanding of perceptions of risk, festival drug supply and use, and the policing of festivals.

Pilot limitations and future directions

Firstly, brief interventions were delivered in non ideal conditions, despite every effort being made to strive for productive engagement at point of care. For example, the service operated from 12-8 pm in order to minimise intoxication levels of service users, closing before evening festivities got underway. Any service user assessed by healthcare staff to be intoxicated, unable to fully engage in the intervention and potentially unable to give informed consent was asked to return after a suitable time period. Nevertheless 62.9% of service users reported having already had an alcoholic drink (on average 4.3 UK units of alcohol) and 43% had already consumed drugs other than alcohol before using the service that day, reflecting levels of afternoon consumption at UK festivals.

Secondly, the pilot revealed challenges in attempting to assess the efficacy of a drug safety testing service particularly at meso level. In order to assess the impact on hospital admissions, welfare and medical incidents, this requires data sharing with onsite and offsite partner agencies. However, data vary in quality, with year-on-year variations in agencies employed and indicators used, including some data failing to distinguish between 'drug-related' and 'non drug-related' indicators or between alcohol and drug-related intoxication. High quality stakeholder data collection is integral to high quality drug safety testing service evaluation.

Thirdly, relatedly, future studies should monitor potential unintended consequences for both the legal and illegal drug markets from delivering a drug safety testing service, including displacement to other drugs including alcohol, the latter discussed anecdotally by some service users after hearing their test results. However, given that all service users had acquired and either intended to consume or already had consumed the substance they submitted for testing, it is unlikely that prevalence of illegal drug use would increase significantly as a result of the service. Furthermore, given that over four in ten MAST service users had general or specific concerns about the sample or their own condition, one fifth of samples had been misfold and over a quarter of the substances acquired onsite were misfold, testing is more likely to have a deterrent than stimulant effect on drug supply and use within the festival grounds.

Acknowledgements

This paper was written on research leave funded by Durham University, UK. Ethical approval was obtained from the Department of Sociology at Durham University. The author is co-founder and co-director of the Loop, the non profit social enterprise that delivered the pilot. The cost of the trial was covered by festival and other donations, including staff volunteering their time. A huge thank you to all volunteers and stakeholders who made this pilot happen.

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