

City checking: Piloting the UK's first community-based drug safety testing (*drug checking*) service in 2 city centres

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Aims: To explore the feasibility of delivering community-based drug safety testing (*drug checking*), to trial service design characteristics and to compare with festival-based testing.

Methods: In total, 171 substances of concern were submitted on 5 dates at 3 venues in 2 UK cities and tested using up to 6 analytical techniques. Test results and harm reduction advice were distributed directly to over 200 service users through 144 tailored healthcare consultations, to stakeholders, and through early warning systems, media and social media alerts.

Results: The 171 samples were submitted and identified as MDMA (43.3%), cocaine (12.9%), ketamine (12.9%), various psychedelics submitted by students, and heroin and a synthetic cannabinoid submitted by rough sleeping communities, with 76% of samples' test results as expected. The 144 primary service users identified as 91.7% white, 68.1% male, with an average age of 26.7 years. Reported harm reduction intentions included alerting friends and acquaintances (37.5%), being more careful mixing that substance (35.4%), lowered dosage (27.8%), disposal of further substances (6.9%) and additionally 2.8% handed over further substances for verified destruction.

Conclusion: Community-based drug safety testing (*drug checking*) was piloted for the first time in the UK—within a drugs service, a community centre and a church—with consideration given to meso-level operational feasibility and micro-level behavioural outcomes. Service design characteristics such as venue, day of week, prior publicity, service provider, and direct and indirect dissemination of results all may impact on outcomes. Future studies should consider cost–benefit analyses of community and event-based testing and context-appropriate macro, meso and micro-level evaluations.

KEYWORDS

community-based, drug checking, drug safety testing, festivals, harm reduction, UK

1 | INTRODUCTION

Whilst Europe has not suffered a fentanyl crisis of the enormity of North America,¹⁻³ the UK has experienced a year-on-year increase in drug-related deaths (DRDs) to record highs,⁴ resulting in a perceived “public health crisis”,⁵ and leading to a range of experts calling for urgent government action.⁶ It is against this backdrop of record DRDs, predominantly for opioids but also for *recreational* drugs such as MDMA and cocaine, that publicly accessible *drug safety testing* (also known as *drug checking*) was introduced in the UK. Initially piloted at 2 outdoor music festivals in 2016, drug safety testing expanded to 3 festivals in 2017 and 7 festivals in 2018. These event-based mobile testing services provided forensic analysis of substances of concern with results fed back directly to the public, with permission from local stakeholders including police, public health, local authorities and festival management, and resultant growing support at regional and national level from police,⁷ public health⁸ and politicians.^{9,10} Building on the success of these UK festival pilots, drug safety testing expanded from event-based to community-based services in 2018, with 5 pilot dates at 3 venues in 2 cities, to explore the feasibility of delivering testing to a broader drug using demographic than festival-goers and including opioid users. Drawing on the work of Shearn and colleagues who suggest that “large, complex and messy interventions” can be evaluated through a conceptualisation of macro-, meso- and micro-level social structures,¹¹ this paper presents first findings at meso- and micro-level from the UK’s first community-based drug safety testing service, comparing the 5 city pilots with 7 festivals in 2018, and considers the challenges of delivering and evaluating community testing. The similarities and differences in outcomes for community and festival-based drug safety testing suggest merit in further piloting of both, with consideration given to context-appropriate evaluations at macro-, meso- and micro-level.

2 | DRUG SAFETY TESTING

Drug safety testing (drug checking) is a public health service whereby service users receive test results for a substance of concern submitted for forensic analysis as part of a harm reduction consultation.¹²⁻¹⁴ Testing of submitted samples may be conducted onsite in rapid *real-time* as part of an integrated testing service, or elsewhere by a partner laboratory. Whilst these services vary widely in terms of types of consultations, forensic analyses, staffing, funding, waiting times, whether community or event-based, static or mobile, permanent or temporary, and whether the testing service is integrated or split into individual components, their shared core aim is harm reduction and their shared core service characteristic is direct user engagement. The rationale for these services is that drug-related harm can arise from the consumption of illicit psychoactive substances of unknown content and strength. Therefore, if testing services share results and other relevant information directly with service users, and potentially also other interested parties such as wider drug using communities and support

What is already known about this subject

- Drug safety testing (*drug checking*) is a public health service whereby service users receive test results for a substance of concern submitted for forensic analysis as part of a tailored harm reduction consultation.
- Drug safety testing originated in mid 1960s California, spread across Europe from the late 1980s, and recently developed further in response to escalating drug-related deaths worldwide.
- Drug safety testing was introduced in the UK in 2016 at 2 outdoor music festivals.

What this study adds

- The UK’s first community-based drug safety testing service was piloted in 2018 on 5 dates at 3 venues in 2 cities.
- In total, 171 substances of concern were submitted by members of the public and analysed using up to 6 analytical techniques resulting in 144 tailored healthcare consultations being delivered to over 200 service users.
- A number of meso-level process and operational indicators and micro-level individual behavioural outcomes are proposed and first findings presented.

services, they can communicate the risks associated with consuming that substance and enhance users’ ability to make educated and informed decisions to reduce or avert future harm, protect their health and reduce the burden on health services. For stakeholders and support services, testing provides an opportunity to monitor trends in illegal drug markets and associated harms, and for alerts to be issued that are timely and accurately targeted to the appropriate drug using communities by utilising information that links composition of individual samples with what they were sold as, a distinct added value of drug safety testing.^{14,15} A global audit¹⁶ identified 31 such drug safety testing programmes operated by 29 organisations in 20 countries at that time, with the largest and longest standing being the Dutch Drugs Information Monitoring System,¹⁷⁻¹⁹ and more services have started operating since that audit.

Research and evaluation on drug safety testing have focused predominantly on process, trend monitoring, identification of new psychoactive substances (NPS), and the identification and removal of adulterants, contaminants and other substances of concern from circulation.²⁰⁻²³ At micro-level, disposal of unwanted substances has been utilised as a key indicator of impact on individual service users, in part due to the relative ease of measuring disposals by comparison with other outcomes, the potential for comparison between testing services, and the indisputable benefit (apparent even to critics) of taking substances of concern out of circulation. Testing services

worldwide report that a significant proportion of service users intend not to take further substances in their possession after service delivery, particularly if test results suggest that contents were adulterated, missold or otherwise other than expected.²⁴⁻³²

Drug safety testing disposal rates vary widely depending on composition profiles and adulteration rates identified by forensic analyses, with a review³³ suggesting that disposal rates for testing services ranged from 4–76% and subsequent studies suggesting that the range is even wider. Furthermore, distinctions have been made between intended disposals,^{34,35} actual disposals to a testing service,²⁹ and verified disposals to an external agency.²² For example, a Portuguese festival testing service found that almost all service users intended not to take a substance when contents were identified as other than expected (94.3%, $n = 86$), whereas almost all intended to take it when as expected (98%, $n = 370$).³⁵ A New Zealand festival testing service survey of 288 respondents found that 62% intended not to take the substance when it was other than expected.³⁶ The UK's first pilot in 2016 found that over 3/4 (77.8%) of service users whose sample was identified as other than expected intended not to take the substance, with 85.7% of these handing over further substances to the testing service for onwards police destruction.²²

Along with disposals, other micro-level harm reduction outcomes from drug safety testing include reported intentions to lower dosage, to take over an extended time period, to take more care in mixing substances, and to alert friends and acquaintances.^{22,30,34,37} Emergent findings also suggest that drug safety testing services may disproportionately attract younger, less experienced and female drug users and that they are more likely to engage positively in harm reduction behaviours afterwards. Conversely, engagement and outcomes may be lower for those with longer histories of drug use, higher scores on sensation seeking scales, previously having engaged with drug treatment services or having witnessed a fatal drugs overdose.^{22,23,30,38,39}

The temporal and geographical distinctiveness of outdoor music festivals combined with onsite paramedical, welfare and security services have led them to be characterised as *temporary autonomous zones*⁴⁰ and have facilitated innovative local policy initiatives in areas such as policing, health, welfare and the environment. In UK music festivals, this included a drug policy shift from *zero tolerance* to the 3Ps (prevent, pursue, protect) from 2016 onwards, in parallel with and supporting the introduction of onsite drug safety testing.⁴¹ Support services working in these semi-autonomous festival spaces collect data on their operations to report to festival management: this may include numbers of medical incidents within their borders and hospital admissions beyond their borders. This could facilitate trend monitoring in drug-related harm through both time series comparisons of the same event across several years before and after introducing onsite drug safety testing and also comparisons between similar concurrent events with and without testing. Meso-level comparative studies of festival healthcare, drug-related harm or testing have yet to be published, however, not least in part due to the partial, nonstandardised, commercially sensitive and often restricted nature of healthcare data collected by festival support services, combined with variations

in the scope, design and delivery of services within and between festivals year-on-year.²²

By comparison with festival testing, community testing presents additional challenges for meso-level evaluation. The porous geographical and temporal borders around a community testing service and the lack of partner agencies necessarily collecting data for the duration of the service in the specific location of the service results in additional resources being required to isolate and identify the influence of testing on changing trends in drug-related harm within the locality. Community testing evaluations might usefully draw on drug consumption room evaluations not only in terms of monitoring referrals to drugs services, ambulance callouts and DRDs, but also utilising broader indicators of positive impact on local communities.⁴²⁻⁴⁴

Leaving aside the potentially greater challenges and resource implications of evaluation, a key benefit of community-based drug safety testing is that if testing reaches beyond festival-goers, it provides an opportunity to engage with broader (including more disadvantaged or marginalised) drug using communities, thus becoming more inclusive and impactful.⁴¹ This is particularly salient given levels of opioid-related deaths around the world including in the UK, where over half of DRDs involve opiates.⁴ Demand for such community-based testing services is evident in footfall to Dutch services, with over 12,600 samples submitted in 2018,⁴⁵ amongst high risk drug-using communities in Slovenia,⁴⁶ and amongst festival-goers. For example, an online survey of 851 Australian festival goers found that 85% would use an external, fixed site service if available.⁴⁷

Research on Canadian community-based drug safety testing growing out of the North American fentanyl crisis and focussed on the structurally vulnerable suggests, however, that demand for testing and responses to unexpected results may be lower than for nightlife populations.⁴⁸ Valente and colleagues concluded that community-based testing with problem drug use, opioid using and lower socio-economic income groups has "more modest results" than testing in nightlife settings with higher socio-economic groups engaged in recreational drug use.³⁵ Sherman and colleagues found that older, homeless and nonwhite drug using groups reported being less likely to use testing services.²³ Community-based testing may also be more time sensitive to turnaround times: whilst a study of club and festival-goers found that 80% were willing to wait an hour for test results, this may be less attractive to opioid-using service users anticipating or experiencing withdrawal, for example.⁴⁷

3 | METHODS

This study aimed to explore the feasibility of expanding drug safety testing from festivals to community-based service provision in the UK, to trial several service design characteristics and to compare with festival-based testing. For community testing, as with festival testing, stakeholder agreement was obtained from local police, public health, local authorities and event management, and additionally licensing and the Central Business District *city safe* committees or similar. In 1 of the cities, funding came from a consortium of all of the above

stakeholders and additionally the local hospital; whilst in the other city it was funded by the Police and Crime Commission as part of a consortium that included the Police and Crime Commission, church, university and local constabulary. Ethical approval was obtained from Durham University.

Two contrasting cities were chosen, Bristol, a large city in south-west England and Durham, a small city in north-east England. Test dates were chosen to explore the potential additional benefit of proactive pre-event testing, similar to the Netherlands where drug safety testing is a permanent fixture within existing drugs services rather than sporadic and located at temporary leisure events.²⁴ Testing before rather than within a leisure event potentially facilitates earlier, more far reaching and effective alerts and notifications to early warning systems, with a ripple effect to wider drug using communities, stakeholders and support services, and the possibility of pre-empting a public health incident. Two dates were chosen in May ahead of the summer festival season including a local festival later that month. A further 3 dates were chosen to coincide with the December party season and ahead of student end-of-term parties.

The community drug safety testing pilots were delivered by the same service provider and operated along similar lines to the UK's first and only festival drug safety testing service from 2016 onwards.²² Both the festival and community testing services were free to service users, confidential, nondirective and nonjudgemental, combining forensic analyses of substances of concern by teams of postdoctoral chemists in a pop-up laboratory with tailored healthcare consultations delivered by multidisciplinary teams including medical doctors, nurses, pharmacists, psychiatrists and substance misuse practitioners. Face-to-face healthcare consultations provided an opportunity to discuss medical histories, prescription medications, current and previous drug and alcohol use, polydrug use and other risk factors, as well as the limitations of forensic analyses, batch variations and service user outcomes. All community service users were offered an opportunity to dispose of further substances of concern in their possession with the testing service for police collection and destruction, as well as signposting and onwards referral to a range of local health and social services, as happens with the festival service. All service users receive a liability disclaimer, and are told that all drug taking involves risk and that the safest way to take drugs is not to take them at all.

Three contrasting venues in 3 different locations were utilised: a church, a drugs service, and a youth and community centre. Each was chosen for its proximity to the city centre and public transport routes, and its capacity to contain a mobile laboratory, large teams of chemists and healthcare staff, and multiple individual booths for confidential consultations. All venues had additional benefits including a pre-existing rapport with local communities that used their facilities and a degree of public trust in being safe spaces for progressive initiatives. Additionally, drugs outreach workers known to local drug using communities were in attendance to provide assistance in engagement with the testing process, with a particular focus on practical support for rough sleeping communities. The church contained a café, shop and toilet facilities that were frequented by local shoppers and rough sleeping communities during the bitter winter weather of the pilot.

The first 2 test dates had minimal publicity beyond word-of-mouth through local drugs services in order to gauge initial interest in the scheme, assess feasibility in city centre delivery and facilitate steady growth. Subsequent pilots moved to different locations and received wider publicity including through festival and nightlife networks, media and social media coverage, and the service provider's social media channels with over 100,000 followers.

A total of 171 substances of concern were submitted by members of the public for forensic analyses during operating hours. Samples were deposited in locked metal boxes, service users received a unique sample ID number and were asked to return approximately an hour later. Samples were transported to a mobile lab, catalogued and up to 6 different analyses were conducted to assess the composition and strength of samples as accurately as possible within the specified time period. These included Fourier-transform infrared spectroscopy, colorimetric tests, fentanyl strips, ultra violet spectroscopy, mass loss analysis and, additionally, the last 2 dates trialled atmospheric solid analysis probe-mass spectrometry in partnership with a university chemistry department.⁴⁹ Developments in mass spectrometry—including miniaturisation, mobilisation and ruggedisation of equipment—allow for easier transportation, reduced costs, and simplified maintenance and use, which all increase its potential application to drug safety testing. All results were triangulated and tests repeated if necessary, with quantification provided by UV spectroscopy and mass loss analysis.²²

Returning service users were matched with their sample through their ID number and healthcare consultations were delivered to 144 friendship groups comprised of over 200 service users across the 5 pilot dates. First findings are presented for a number of suggested meso-level process and operational indicators (including demographics, footfall, venue, return rates, adulteration rates, and the composition and source of samples) and micro-level individual behavioural outcomes (disposal rates, dosage modification, care in mixing substances, alerting friends and signposting to onwards support services) for the community testing, with comparisons with festival testing by the same service provider that same year.

4 | RESULTS

1. Meso-level indicators

Demographics: Primary service users at the 2018 community testing services (one person nominated from each friendship group attending their healthcare consultation, $n = 144$) were composed of 91.7% identifying as white, 68.1% identifying as male, with an average age of 26.7 years (ranging from 16–60 with a standard deviation of 7.94). This compares with primary service users at the 2018 festival testing services ($n = 2091$) being composed of 92.4% identifying as white, 66.2% male, with an average age of 22.3 years (ranging from 16–58, standard deviation 5.75).

Demographic diversity was evident within as well as between test sites. Whilst weekends were generally more popular than weekdays, in Durham there was a differential appeal of the midweek test date

for students compared with the weekend test date for local residents. Durham primary service users were composed of 65% students, 12% employed, 7.7% unemployed, 3.8% homeless and 12% did not specify. The Wednesday pilot attracted primarily students with Wednesday being the main student night out in the UK and additionally it being the last Wednesday of term before the Christmas holidays, with end of term electronic dance music parties held that evening, resulting in 56% of primary service users being female and a variety of psychedelics being submitted by students along with the more usual recreational drugs. By contrast, the Saturday pilot after term finished attracted predominantly local residents, all primary service users were male, and there were 2 groups from local rough sleeping communities who submitted samples of heroin and a synthetic cannabinoid.

Return rates: The rate of service users returning for their test results and healthcare consultations was slightly higher for community testing compared with festival testing in the UK in 2018 (84.2 and 78.1%, respectively). There was some benefit to the service being delivered by a dedicated drug safety testing service provider with a pre-existing reputation amongst at least some drug using communities, evident in 8.5% of community service users having used the service provider's testing service previously, mostly at festivals.

Footfall: The maximum number of community-based consultations reached 68 per day compared with 430 per day on the busiest day of festival testing that year, as well as smaller friendship groups attending each community healthcare consultation compared with each festival consultation (an average of 1.4 and 2.2 service users respectively). The lower volume of service users per day receiving consultations in these community pilots (approximately 1/10 of the numbers receiving festival consultations) therefore raises questions regarding service aims, design, impact and resourcing. However, given the growth in demand across the 3 Bristol dates linked to increased publicity and a move to a different venue, it is anticipated that regular test dates and associated increased confidence in the confidentiality of the service, along with an appropriate venue, publicity and stakeholder support, could significantly increase footfall beyond these pilot numbers.

Composition of samples: The composition of over 3/4 (76%, $n = 130$) of submitted samples across the 5 pilot dates was found to be as bought or expected. The remainder were identified as other than expected or without expectations regarding identity, for example if found on the ground. Four broad categories of samples were identified (see Table 1):

- i. The 3 core recreational drugs—MDMA, ketamine and cocaine (at 43.3%, 12.9% and 12.6% respectively)—collectively made up nearly 7 in 10 (69%) of all submitted samples;
- ii. A wide range of expected and unexpected psychedelics and NPS were identified including LSD, 2C-B, DMT, mescaline, 5-MeO-MiPT, n-ethylpentylone missold as MDMA, 25C-NBOH and 25D-NBOMe missold as LSD, and the ketamine analogue 2-FDCK missold as ketamine;
- iii. A small number of submitted samples were associated with problem drug use including heroin containing paracetamol and

TABLE 1 Test results for total submitted samples ($n = 171$) and for healthcare consultation subsample ($n = 144$), and whether these test results were as expected by service users, for 5 UK community-based drug safety testing pilots, 2018

	All submitted samples		Consultation subsample	
	Test results	As expected	Test results	As expected
MDMA	74	70	64	61
Ketamine	22	20	17	17
Cocaine	17	15	15	13
Other psychedelics ^a	9	6	6	3
LSD	6	6	5	5
Cocaine mixture	5	0	5	0
2C-B	5	4	5	4
DMT	5	5	4	4
Amphetamine	3	3	3	3
2-FDCK	4	0	2	0
N-ethylpentylone	1	0	1	0
Heroin	1	1	1	1
Heroin mixture	1	0	1	0
Synthetic cannabinoid	1	0	1	0
Adulterants ^b	10	0	8	0
No active component	4	0	2	0
Unknown	3	0	3	0
Total samples (n)	171	130	144	111
	100%	76%	100%	77.1%

^a'As expected' excludes all samples whose test result was other than as bought or expected, including samples whose identity was unknown at testing such as *ground finds*.

^a'Other psychedelics' includes mescaline, 4-HO-MET, 5-MeO-MiPT, 25C-NBOH and 25D-NBOMe.

^b'Adulterants' includes nonpsychoactive and adulterated contents and cutting agents including benzocaine, caffeine, cellulose, chloroquine, creatine, lactose, monosodium glutamate, paracetamol, sodium bicarbonate and sugar.

caffeine, and the synthetic cannabinoid 5f-MDMB-PICA. Opioids tested negative for fentanyl;

- iv. A miscellaneous group containing adulterants, unidentified and inactive substances (sometimes with traces of psychoactive ingredients) including chloroquine missold as MDMA and creatine, sodium bicarbonate and a caffeine/lactose mixture missold as cocaine.

Adulteration rates: The proportion of submitted samples that were identified as having been missold, adulterated or otherwise other than expected was similar for community and festival testing services in 2018. Over 3/4 (77.1%) of the samples submitted by returning service users to community testing services were as expected, compared with 73.6% of samples from festival returning service users (see Table 2).

TABLE 2 Summary of results for subsample receiving healthcare consultations, for 5 UK community-based drug safety testing pilots, 2018 (*n* = 144)

	Bristol			Durham		Total
Date of service	12/5	25/5	1/12	12/12	15/12	
Venue	Drugs service	Drugs service	Community centre	Church	Church	
Substance as expected ^a	76.2%	82.4%	85.3%	68%	46.2%	77.1%
Self disposal ^b	4.8%	5.9%	5.9%	12%	7.7%	6.9%
Verified destruction	0%	0%	2.9%	4%	7.7%	2.8%
Never previously accessed drug or alcohol services	95.2%	100%	80.9%	88%	76.9%	86.1%
Onwards signposting to drugs services	9.5%	0%	7.4%	0%	7.7%	5.6%
Total healthcare interventions (<i>n</i>)	21	17	68	25	13	144 100%

^aSubstances not as expected includes mislabeled substances, adulterants and unknown substances e.g. found on ground.

^bReported future intentions.

Over half (54.9%) of community-based primary service users had already tried the substance that the submitted sample came from and nearly half of these (*n* = 36, 25% of the whole sample) had already experienced negative effects from consuming that substance, suggesting that there is demand for retrospective information. Over 4 in 10 (43.3%) samples identified as other than expected were reported to have caused negative effects before submission.

Sources of samples: Regarding where, how and from whom samples were obtained, over 3/4 (77.8%) reported having obtained their sample from their local town or city, with another 15.3% obtaining the sample from the dark web (predominantly students' psychedelics). Almost all service users (83.3%) reported having bought their sample, 11.8% were given it and 4.2% found it (e.g. on the ground). In terms of who provided the drugs, over half (58.3%) bought their drugs from a dealer (composed of 25.7% from a regular dealer, 17.4% from an occasional dealer and 15.3% from a dealer who was a stranger), 27.8% from a friend who was not a dealer, and 13.2% not from a person (such as bought online or found).

Venue: Regarding choice of venue, there were relative merits to the 3 locations: a church, drugs service, and youth and community centre. Whilst the first 2 pilots at the drugs service benefited from having staff who were employed at that drugs service and also volunteered with the testing service, local recreational drug users expressed a reluctance to enter and use the testing service whilst

located within the drugs service in case family or work colleagues saw them enter and the perceived stigma attached to that. Numbers increased when the service moved to the youth and community centre for the third and final Bristol pilot.

Although perhaps an unlikely setting for a mobile laboratory, the church received favourable feedback as a testing venue from diverse drug-using communities. It was seen as a trusted neutral space and characterised as sanctuary from the authorities, at least by some, with a pre-existing positive relationship with local rough sleeping communities through its open door policy for its café and toilet facilities, which also provided a cover story for service users concerned about being seen entering the premises by family or work colleagues. Also, the church's location in the central market place and shopping district enabled service users to visit those amenities whilst awaiting results, and its size made it large enough to accommodate the mobile laboratory, individual consultation booths and waiting area with ease.

2. Micro-level behavioural outcomes

Disposals: There were nearly 1 in 10 (9.7%) combined intended and verified disposals at the community testing services, compared with 13.9% combined intended and verified disposals at the festival testing services that same year. Whereas most festival disposals were directly to the testing service, community disposals were made up of 2.8%

TABLE 3 Summary of reported behavioural and harm reduction intentions by primary service users, for 5 UK community-based drug safety testing pilots, 2018

	Bristol			Durham		Total
Date of service	12/5	25/5	1/12	12/12	15/12	
Take intended amount	66.7%	64.7%	48.5%	40%	23.1%	49.3%
Take smaller amount	4.8%	29.4%	27.9%	36%	46.2%	27.8%
Alert friends and acquaintances	23.8%	47.1%	45.6%	32%	15.4%	37.5%
More careful mixing this	23.8%	11.8%	42.6%	48%	23.1	35.4%
Take over longer time period	0%	0%	19.1%	24%	7.7%	13.9%
Total brief interventions (<i>n</i>)	21	17	68	25	13	144 100%

verified disposals and 6.9% reporting intending to dispose of further substances themselves later (see Table 3). Another 1 in 10 (9.7%) did not have any more of that substance left to dispose of, again suggesting demand for retrospective information on substances of concern already consumed, not simply regarding anticipated future consumption.

Dosage modification:

- i. Nearly half of service users (49.3%) reported intending to take the same dose of the submitted substance in future as they had intended to before the consultation, usually in cases where the test result, strength and accompanying advice on purity trends and dosage were all as expected. Whilst the mean MDMA content for all submitted pills was 185.2 mg, pills submitted by this group contained 142.2 mg MDMA on average.
- ii. Another 27.8% of service users intended to take a smaller dose of the substance in future after receiving their healthcare consultation, having heard the strength of their sample and wider advice on purity trends and dosage, suggesting a higher strength than they had expected and/or a greater appreciation of the risk from their usual dose than they had previously understood to be the case. Pills submitted by this group contained 226.2 mg MDMA on average.
- iii. One in 7 intended to take future substances over a longer time period than previously planned.
- iv. Over a third (35.4%) said that they intended to be more careful about mixing that substance with others in future.
- v. No service users reported intending to take a larger dose of that substance in future.

Signposting to onward support services: Similar proportions of service users at the community and festival testing requested signposting to drugs services for further advice and counselling (5.6 and 5.5%, respectively). This may reflect the similar compositions of the community and festival healthcare teams who, whilst volunteers to the testing service, had paid employment in a range of health, welfare and drugs services and therefore specialist knowledge of local support services of relevance.

Alerts: Over 1/3 (37.5%) of service users reported intending to alert friends and acquaintances to substances of concern identified by the testing service and 9.3% reported intending to alert their dealer after their test result. Thus, testing may provide a useful feedback loop not only to wider drug using communities but also to suppliers, who themselves may be unaware of the substances that they are selling and possible adulteration or misrepresentation higher up the supply chain.

Tailored harm reduction advice was delivered directly to service users and students cascaded the advice they received about the ketamine analogue 2-FDCK—reported by users to last longer and have more intense effects—to friends who had been sold ketamine from the same supplier, ahead of an end-of-term student party that evening. The students subsequently reported to the author that no serious adverse drug-related incidents occurred at the party. Social media

alerts were issued regarding the increased risks from 2-FDCK missold as ketamine and 25C-NBOH and 25D-NBOMe missold as LSD. A notification on 2-FDCK was sent to the UK and EMCDDA Early Warning Systems as it was the first time that it was identified in the UK (it was first identified in the EU in 2016) and within 24 hours reference standards were sent to other drug safety testing NGOs including in Canada, the Netherlands and New Zealand.

5 | DISCUSSION

Drug safety testing is an emergent public health service operating in a number of countries whose evidence base is developing, which holds promise in reducing drug-related harm and addressing record levels of DRDs, yet remains politically, legally, operationally and financially challenging. This study piloted the extension of drug safety testing from festivals to community settings for the first time in the UK and explored the feasibility of delivering a community-based testing service in several different venues. The community pilots were delivered by the same service provider and in many cases the same staff as the festival testing in 2018, allowing comparisons between them. Overall, there were only minor differences between the community and festival testing services on indicators such as service user demographics, adulteration rates, return rates and signposting to support services, although footfall per day was approximately 1/10 of the busiest festival testing services. The prevalence and proportions of MDMA, ketamine and cocaine in the community testing echoed the findings from both festival testing²² and testing of police seizures in the UK.⁵⁰

These pilots suggest that community-based drug safety testing can provide, first, engagement with more diverse drug-using communities than event-based testing—in terms of demographics, drugs of choice and risk taking behaviours—and therefore *potentially* can be more inclusive and impactful across drug-using communities including with marginalised groups. Second, there is the potential benefit of issuing proactive alerts for substances of concern in local drug markets ahead of specific leisure events, as happened with a missold ketamine analogue identified in this study. Third, community testing can benefit from accessing fixed site laboratory facilities (in this case, a university chemistry department) to complement the speed and convenience of mobile laboratories with potentially greater analytical capabilities and trialling of new technological developments.

These benefits cannot be presumed, however. The community pilots highlighted that service design characteristics and operational variations such as venue, day of week, prior publicity and outreach activities all can influence outcomes. Moving to a neutral central building attracted larger numbers and a greater diversity of service users as well as building trust with new service user groups, with drugs outreach staff further enhancing engagement with more marginalised drug using communities.

This study supports the work of Valente and colleagues in Europe³⁵ and Sherman and colleagues in Canada,²³ suggesting that more modest aspirations may be appropriate for community-based

testing compared with event-based testing, and concludes with a call to take into account different geographical, criminal justice and socio-cultural contexts in service design, delivery and evaluation. For example, lower disposals at a community testing service could relate to different service user demographics and disparities in the perceived risk of having controlled drugs on one's person in urban and festival settings; retaining little or none of a substance of concern after a negative experience; the *just in time* purchase and consumption of single doses by lower income and marginalised drug users; or differential intention to consume a substance regardless of test result, particularly if anticipating or experiencing withdrawal.

The costs and benefits of community-based and event-based testing therefore need careful consideration and comparison, along with an understanding of the socio-cultural context to drug use and supply. As drug safety testing remains an emergent and contested health service, further trials are necessary to evaluate different models and design features including by whom, where and how testing services are delivered. The similarities and differences in outcomes for community and festival testing identified in these pilots suggest that future studies should give consideration to context-appropriate evaluations at macro-, meso- and micro-level, on a range of health and social indicators and including between communities with and without testing. Finally, given that urban centres are not the bounded, semi autonomous and drug-prolific leisure spaces that characterise some festivals, it may require more comprehensive multiagency partnerships if effective and sustained programmes of community drug safety testing are to be resourced, designed, delivered and evaluated.

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COMPETING INTERESTS

The author is unpaid co-director of The Loop, the nonprofit social enterprise that delivered these pilot drug safety testing services: www.wearetheloop.org. She did not analyse samples or deliver healthcare consultations.

DATA AVAILABILITY STATEMENT

Data subject to third party restrictions.

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