

Evidence Brief: Drug checking services as a harm reduction intervention



Key Messages

- There is little evidence on the effectiveness of drug checking services on drug use behaviour or health outcomes.
- A long history of drug checking services in other countries may help to guide good practice
- Drug checking services have been useful for monitoring the drug supply for adulterants and new psychoactive substances, which can be used to issue public alerts

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Issue and Research Question

In the context of rising opioid overdose deaths in Canada, there is interest among service providers interacting with people who use drugs to increase the range and availability of harm reduction interventions. Harm reduction is “any program or policy designed to reduce drug-related harm without requiring the cessation of drug use.”¹

Drug checking is a harm reduction intervention that has received attention in Canada for its potential to reduce opioid-related harms in the population. Drug checking services have been used in some regions of Europe since 1992.²

These services typically allow individuals to anonymously submit samples of a drug they plan to consume for the purpose of drug analysis. Depending on the purposes and organization of the service, the testing may be used to confirm whether the sample contains

the psychoactive substance the individual intended to use, estimate the purity of the drug, detect novel psychoactive substances, identify contaminants, or monitor drug use patterns.

When drug checking is conducted for a harm reduction purpose, it may take place at an established drug checking site or at a location or event where drugs may be used. In this environment, the testing is often paired with counselling where individuals can discuss drug use, overdose prevention, and referral to other health services as needed, as well as access harm reduction supplies.

Testing methods vary in the level of technology and costs involved. Simple, low-cost testing includes liquid reagent tests and thin layer chromatography kits. More advanced laboratory techniques include gas chromatography/mass spectrometry, high performance liquid chromatography, and nuclear magnetic resonance techniques^{3,4}

A pilot drug checking program for fentanyl was established at Insite in Vancouver, British Columbia in July 2016. This program was created to inform clients of the presence of fentanyl in the drugs they intended to use, and provide education about overdose risks.⁵ Evaluation of this pilot program is underway. Because of its current exemption under the Controlled Drugs and Substances Act (CDSA), Insite was able to offer a drug checking service in which clients checked their own drugs for fentanyl. This exemption allows individuals to bring drugs on site, and clients could be instructed to use the fentanyl dipstick themselves.⁶ Other providers have offered drug checking services at large electronic music events in Canada without an exemption. They provided services in collaboration with community partners, with an understanding that drug checking could be provided as a harm reduction service where drugs were likely to be used, rather than using an enforcement approach.^{3,7}

The topic of drug checking was referenced in the [Interim Report and Recommendations on](#)

[the Opioid Crisis in Canada](#) released by the House of Commons Standing Committee on Health in November 2016. This report included a recommendation “that the Government of Canada grant exemptions under the CDSA for the purposes of drug testing at supervised consumption sites.”⁸

Further, the same report and the recent [Government of Canada Joint Statement of Action to Address the Opioid Crisis](#) also refer to increasing support and removing barriers to applications for exemptions under the CDSA to establish additional supervised consumption services across Canada.⁹

Given the public health importance of opioid-related harms in the population and interest in drug checking for the purpose of harm reduction, we sought to review the published literature and guidelines on this topic.

This Evidence Brief asks: *What is the effectiveness of drug checking services for adults who use drugs on drug use behaviours or serious adverse health outcomes related to drug use?*

It is beyond the scope of this evidence brief to review the technical specifications of the various drug testing methods. We will address the outcomes of drug use behaviour and health outcomes related to drug use, including engagement in other health services.

Methods

The evidence base for this review consists of review of the published literature, guidelines, grey literature, snowball literature searching, citations searches of relevant published articles, and contacting authors and experts in the field. Each of these strategies will be described in turn. The detailed search strategy is available from PHO on request.

PHO Library Services conducted a database search on November 21, 2016 in line with a peer-reviewed search strategy. Three databases were searched (Ovid MEDLINE, Embase, and PsycINFO) using relevant search criteria (subject

terms, key words, English language, from 2010 to 2016). Duplicate references were removed by the library staff.

In addition to the database search, PHO Library Services also conducted a grey literature search to identify all relevant reports or scientific guidelines for drug checking among adults who use drugs. We performed the search by running two keyword searches in a general search engine (Google). The key word search strings included [Pill-testing|"pill testing"|drug-checking|"drug checking"]. Further, we reviewed an unpublished report submitted by an external expert consulted on this evidence brief (reviewer initials ML), and citations within.¹⁰

Studies were eligible if they were written in the English language, represented primary data, research findings, or a systematic search and synthesis of the literature, and reported on adults who use drugs and access drug checking services. We included studies without a comparison group and qualitative studies. Outcomes of interest were the impacts on drug using risk behaviours and serious adverse health outcomes related to drug use. Additionally, guidelines were eligible if the guideline conducted a consensus process or literature review process to develop the guideline (not necessarily a systematic review). Title and abstracts were screened for eligibility by two reviewers using standardized criteria, and discrepancies were resolved by consensus. For articles potentially eligible on title and abstract screening, full text articles were retrieved and two reviewers assessed each article for eligibility using the same eligibility criteria and consensus process for discrepancies. The reviewers also screened citations in all full text articles for potentially relevant studies and selected articles using the full-text screening process above.

For included articles, relevant information was extracted from each article by one reviewer. A second reviewer independently extracted the data on 20% of the included articles and compared results with the other reviewer for reliability.

Two reviewers independently applied a quality appraisal tool to each included article based on the study design of the article. Quality appraisal tools for each study methodology have been previously reviewed, selected and approved for these purposes by PHO Library Services as part of the PHO Meta Quality Appraisal Tool (MetaQAT) and PHO's HPCDIP Knowledge Synthesis Services.¹¹

For the identified guidelines (n=2), the AACODS (Authority, Accuracy, Coverage, Objectivity, Date, Significance) evaluation and quality appraisal tool¹² was used to assess quality.^{3,4} The AACODS tool was also used to appraise the quality of included grey literature reports (n=3).^{5,13,14}

The remaining published primary studies (n=5), were assessed using the Newcastle-Ottawa Scale (NOS) for assessing the quality of non-randomized studies, including case-control and cohort studies.¹⁵ The Health Evidence Quality Assessment Tool for Review Articles,¹⁶ was selected to appraise one included systematic review article.¹⁷ Discrepancies in quality rating were resolved by consensus.

Main Findings

The search of the published literature identified 553 articles, from which 14 unique articles met inclusion criteria on title and abstract screening. Citation screening among these full text articles yielded 47 potential articles for inclusion. On full text review, a total of five articles were relevant to our evidence brief objectives (two articles from the original search and three articles from the citation search).

The grey literature search found 14 unique potential guidance documents or reports. Upon review, three articles met inclusion criteria for screening. On full text and citation review, a total of six articles were relevant to our evidence brief objectives (two articles and one guideline from the original search and two articles from the citation search). We also included one article that appeared in the

citation list of the document submitted by the external expert.

The quality ratings for the grey literature guideline and articles were appraised as two strong quality (Sage 2016, AACODS 5/6; Michelow 2015, AACODS 5/6),^{3,14} two moderate quality (NEWIP-TEDI 2012, AACODS 4/6; VCH 2016, AACODS 4/6),^{4,5} and one weak quality (Kreiner 2002, AACODS 3/6).¹³ Of the remaining six published articles: one was rated strong (Johnston 2006, NOS 8/10),¹⁸ three moderate quality (Hungerbuehler 2011, NOS 6/10; Ritter 2006, HE 7/10; Dundes 2003, NOS 6/10),^{17,19,20} and two were weak quality (Munn 2016, NOS 4/10; Spruit 2001, NOS 4/10).^{7,21}

Guidelines for drug checking

We found one set of practice standards that met our inclusion criteria, (i.e., use of a consensus process and review of select literature). The *Good Practice Standards* were developed by The Nightlife Empowerment & Well-being Implementation Project (NEWIP) which is funded by the European Union's Health Programme.²² These standards were developed by consensus of non-governmental organizations involved in safer nightlife initiatives across six countries in Europe. The document acknowledges that pill testing is not evidence-based, but suggests "gaps in science should not deter us from taking action," and "if harm reduction programs are developed, implemented and evaluated according to best practice principles, they can result in effective health promotion strategies."^{22(p.19)}

The standards address four cross-cutting considerations, including sustainability and funding, communication and stakeholder involvement, staff development, and ethical drug prevention. The standards also guide eight project stages, including needs assessment, resource assessment, program formulation, intervention design, management and mobilization of resources, delivery and monitoring, final evaluations, as well as dissemination and improvement. A notable aspect in the needs assessment standard

includes knowing the relevant drug-related policy and legislation. The aims of a drug checking program may include monitoring illegal drug markets, preventing use of especially dangerous materials, and promoting individual risk behaviour changes.

Within the standard on intervention design, the recommendations suggest drug checking should be part of a broader set of interventions, tailored to the target population. The design considerations also include whether the service will be a mobile service on site at events, or a regular facility service. Further, planners of drug checking services are referred to companion guidelines on methodology for analytical techniques to evaluate particular substances.⁴ The evaluation standards suggest several process indicators and a possible outcome indicator, the "number of persons who do not consume the substance after they are informed about dangerous ingredients."^{22 (p.69)} Finally, the standard suggest the monitoring and evaluation information should be used to inform whether the program should be sustained and future activities.

Drug use risk behaviours

We found ten studies or reports relevant to the effect of drug checking services on drug use risk behaviours.^{3,5,7,13,14,17-21} Overall, seven provided descriptive reports about whether individuals would use the drug after receiving the test result.^{3,5,7,13,14,17,18} The results ranged from 4-76% of clients choosing to discard the drug (two of these used self-reported discard intent as the outcome,^{13,18} including one that was a survey presenting hypothetical test results¹⁸). One report suggested drug warning campaigns generated from monitoring of drug checking samples may reduce the presence of dangerous compounds found in ecstasy pills tested following the campaign.²¹ Finally, we found two descriptive reports that described the potential influence of drug checking services on frequency of drug use. One used anonymous questionnaires among clients who tested their drugs, and the other surveyed students about their intended use of ecstasy at a party if drug

checking services were present.^{19,20} Detailed results are described below.

A systematic review on harm reduction strategies for alcohol, tobacco, and drugs briefly referenced pill-testing kits and suggested they “may reduce harm at both individual and population levels,” but did not comment on the data on effectiveness for this intervention.^{17(p.617)}

Results of a survey conducted by the AIDS Network Kootenay Outreach and Support Society (ANKORS) at a large seven-day electronic dance music event in British Columbia, Canada in 2013 found 77% of survey participants reported using the drug checking service. Respondents reported that when the test result was not as desired, 50% would discard the pill or powder tested.¹⁴

In 2014, the same festival had a cumulative attendance of 67,120 people, and ANKORS provided onsite harm reduction services, testing 2,786 pills using point-of-care reagent drug testing kits.⁷ Results were given to the attendee at the time the drugs were checked, and a chart describing tablets and their composition were displayed for the public. The program reported 30% of substances checked were negative for the expected drug and 7% of the substances checked were discarded after being checked; the program did not collect the reasons why the pills were discarded.

Canadian data reported by the same service that offered drug checking at the event in 2014, ANKORS, indicates that among 1900 samples tested in 2015, if the result detected a hazardous substance (such as *para*-methoxyamphetamine or *para*-Methoxy-N-methylamphetamine, PMA or PMMA respectively, 31% (numbers not provided) were discarded.³

Data from the fentanyl drug checking pilot at Insite in 2016 reported 173 drug checks performed between July 7 and August 3 2016.⁵ Most tests were for drugs reported to be heroin or other opioids, and the majority were positive for fentanyl (86%). Personal communication

with the program indicates that a minority of clients chose to discard their drugs following a positive drug check in this setting however research is underway to determine if use of the drug checking service results in adoption of other harm reduction behaviours or services.

A report on the ChEck iT! Service founded in 1997 in Vienna, Austria, reported that when clients receive an unexpected result when their drug is tested, two out of three report they will not consume the drug and will warn friends.¹³

A survey of 810 regular ecstasy users conducted in Australia in 2005 found 22% reported using a testing kit to establish content and purity of their drugs.¹⁸ Of the 178 reporting pill testing, 56% were aware of the limitations of testing. When asked about hypothetical test results and their intended actions, 2% said they would not take a pill if it contained MDMA, 15% would not take a pill if it contained an amphetamine, 57% would not take a pill if it contained ketamine, and 76% said they would not take a pill if there was no test reaction (benign or unknown substance).

A report on the Drug Information and Monitoring System (DIMS) in the Netherlands, a drug checking service established in 1992 with weekly testing of over 100 samples of ecstasy pills, included a description of “warning campaigns” based on information about dangerous pills tested by the service.²¹ The authors were not able to assess whether the campaigns were effective, but found that after a campaign the dangerous compounds were no longer found in drugs tested by the service.

The Drug Information Centre in the city of Zurich (DIZ) analyzed the results of a random sample of 1,376 anonymous questionnaires from the years 2001 and June 2010 submitted by individuals using the drug checking service.¹⁹ The authors found that the frequency of consumption varied by substance over the years analyzed (2004 vs. 2009) (increase in alcohol 37.2 vs. 43.0%, cannabis 11.5 vs. 16.8%, cocaine 10.1 vs 11.5%; decrease in ecstasy 19.5 vs 6.3% and amphetamines 19.4 vs 6.2%), with

no increase in polydrug use (2004: 91.5% vs. 2009: 78.5%) (no statistical testing). They concluded that the service did not appear to encourage drug consumption.

An anonymous survey of 719 college students in the United States in the year 2000 asked whether students will use or abstain from ecstasy at a rave when DanceSafe services were present (this service includes testing ecstasy for adulterants).²⁰ Among respondents, 25% had previously tried ecstasy and 8% reported regular use at parties. Among the 75% who had never used ecstasy, 19% might be more likely to try ecstasy if the service was present. These students were also more likely to use cigarettes, alcohol, and marijuana at parties.

Adverse health outcomes

We did not identify any reports or studies that described the impact of drug checking services on health outcomes.

Discussion and Conclusions

Our review found no comparative studies examining the effectiveness of drug checking services on drug use behaviours, although some reports describe the frequency of discarding drugs after the test. We found no reports on the effectiveness of drug checking services on health outcomes. We found one consensus guideline for the practice of drug checking. Most of the literature was based on individuals using ecstasy in dance settings; these findings may not be generalizable to drug checking programs involving different settings or populations.

Limitations for generating evidence in this area include the legal status of drug use and resources for research and evaluation. The authors of one included study discuss several factors that may decrease the availability of research on this topic: 1) fear of prosecution or event shutdown, 2) difficulty and resources needed for collecting prospective data, and 3) service provision and medical outcomes are not typically studied together.⁷ They suggest more research is needed on the use of the intervention

and health outcomes, as well as cost-benefit analysis.

However, practice in drug checking in Europe has been long-standing. An inventory and evaluation of onsite pill-testing interventions in the European Union concluded “pill testing interventions have to part of a global strategy for prevention and harm reduction in recreational settings.”^{23(p.60)}

Meanwhile, according to a legal opinion from 2015 included in the [How-To Guide](#) used by ANKORS in British Columbia, the legal status of drug checking in Canada remains ambiguous.³ The authors of this section on legal context indicate that when the [Respect for Communities Act](#),²⁴ became law in June 2015, it created barriers to obtaining exemptions under the CDSA. They proposed that a second option for drug checking services is to proceed without ministerial authorization; however this might risk prosecution under various aspects of the Criminal Code. To reduce this risk, the authors suggest certain measures such as ensuring volunteers do not handle the drugs themselves, emphasize the concept of health protection, and be clear there is no intent to encourage others to commit an offense.

We conclude that there is little evidence on the effectiveness of drug checking services on drug use behaviour or health outcomes. However, there is approximately a 25-year history of drug checking services internationally that provides experience to guide good practice. Drug checking services may be valuable for monitoring the drug supply for especially dangerous contents and issuing health alerts to people who use drugs. It may also be an important outreach approach for people who use drugs to access health information and services. There is a need for high quality research and evaluation to assess the impact of drug checking services on reducing harms for individuals and at the population level.

Implications for Practice

As a harm reduction intervention, the best available evidence on outcomes related to drug checking services provides descriptive reports that some individuals discard their drugs after receiving the results, and some report reducing the amount of drug they used afterward.

Drug checking may be a useful component of harm reduction services or contribute to a surveillance system on drug use. There are also potential legal barriers to wide-spread use of this approach in Ontario. Practice in this area with the development of future supervised consumption services paired with evaluation and research could advance the body of evidence on the use of drug checking.

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Specifications and Limitations of Evidence Brief

The purpose of this Evidence Brief is to investigate a research question in a timely manner to help inform decision making. The Evidence Brief presents key findings, based on a systematic search of the best available evidence near the time of publication, as well as systematic screening and extraction of the data from that evidence. It does not report the same level of detail as a full systematic review. Every attempt has been made to incorporate the highest level of evidence on the topic. There may be relevant individual studies that are not included; however, it is important to consider at the time of use of this brief whether individual studies would alter the conclusions drawn from the document.

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