

Confirmatory Testing

Description

Confirmatory testing has been shown to be a vital element in the implementation of a drug checking service. Confirmatory testing with laboratory-based, gold-standard technologies allows for a more refined analysis of samples collected at point-of-care drug checking and to gain more insight into the drug supply. The highly sensitive technologies in confirmatory laboratories can detect trace amounts of substances as well as provide quantification information that is not possible with FTIR and test strip technologies.

The BCCSU has an agreement with Health Canada's Drug Analysis Service (DAS) to provide confirmatory testing for a limited number of drug samples sent from approved sites in BC. Under this agreement, approved sites may collect samples as per the storage, tracking, and transport procedures outlined below to send to DAS for further analyses.

Decisions regarding what samples to send to the confirmatory testing laboratory are at the discretion of the BCCSU Drug Checking Project based on its agreement with DAS. Because multiple sites participate in this program, the number of samples must be tracked by BCCSU to ensure efficient use of laboratory resources and time. Samples will be sent on an as-needed basis, with a focus on samples that provide useful information to partners and drug checking as a whole. Not all samples can be sent to DAS and a list of recommended samples is included below.

All efforts will be made to send in samples that have been identified as potentially harmful and to return results to the service user in the timeliest manner possible. However, turn-around time for results is dependent on the capacity of DAS, and may be delayed based on other priorities.

Results from confirmatory testing will be shared via email with sites once they are received by the BCCSU. As per the agreement between Health Canada and the BCCSU, results from confirmatory testing may be shared with individual service users to support safer use and with public health to develop harm reduction responses to changes in the drug supply.

Confirmatory testing methods

DAS may use one or more of the following methods to analyze submitted samples:

- **Quantitative nuclear magnetic resonance (qNMR)** can identify known and unknown samples using magnetic resonance frequencies unique to particular components of a

drug sample.¹ This means samples can be characterized irrespective of reference to other substances (i.e., absolute concentration), thus allowing for quantification of novel substances while also acting as a tool for impurity/adulterant profiling. Quantitative (percentage) information provided by DAS is derived from qNMR only. Samples submitted to DAS for analysis should be at least 10 mg in size or qNMR may not be possible.

- **Gas chromatography/mass spectrometry (GC/MS)** separates a sample into components based on their affinity to the gas chromatography column. It then provides a rapid, semi-automated analysis of molecular structures to determine compounds in complex mixtures using a reference library.² GC/MS can be used to identify components that are present in trace amounts, or those not suited to qNMR, because of the chromatographic separation.
- **Liquid chromatography/mass spectrometry (LC/MS)** is similar to GC/MS, except the chromatographic column for separation of components is a liquid medium. DAS uses a **ultra-high performance liquid chromatography/quadrupole time of flight mass spectrometer (UPLC/QTOF)** which offers the ability to identify substances at the nanogram scale, making it useful for identifying drugs or adulterants present at extremely low concentrations.
- **Fourier-transform infrared spectroscopy (FTIR)** and **Gas chromatography/Fourier-transform infrared spectroscopy (GC/FTIR)** are available when their use is required.

Samples recommended for confirmatory testing

Although any psychoactive or scheduled drug sample may be submitted for confirmatory testing, certain sample types provide the most useful and utilizable confirmatory results. Determination of specific samples to be sent for confirmation is at the discretion of the BCCSU Drug Checking Project.

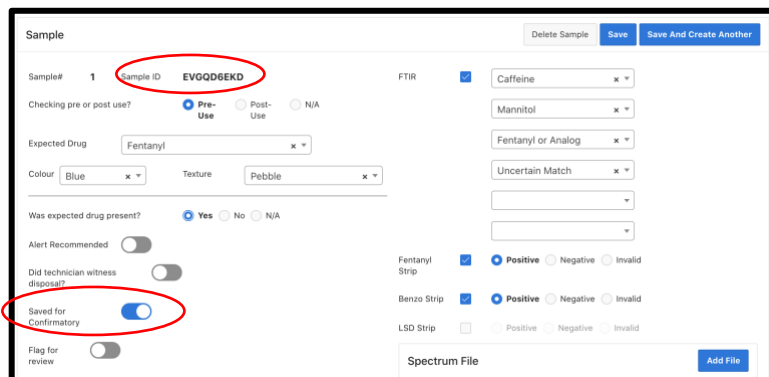
Samples currently recommended for confirmatory testing are:

- Samples with suspected fentanyl analogues (to be identified and quantified)
- Samples containing benzodiazepines (particularly etizolam)
- Samples with no FTIR library match (to create a new library entry)
- Samples with complex mixtures (as FTIR can provide little information)
- Samples containing new psychoactive substances
- Any 'typical' samples for ongoing evaluation and general surveillance

Procedures

1. Collection of samples for confirmatory testing

- 1.1. If the participant consents to confirmatory testing, transfer the remainder of the sample into a glass vial. Consent is implied if the sample is to be disposed. Samples saved for confirmatory testing should be at least 10 mg, or the size of a match head. Note that the amount of sample needed for point-of-care FTIR analysis can be less than this.
- 1.2. Note in the comments section of the drug checking database (DCBC) any relevant information (e.g., adverse effects, suspected components).
- 1.3. Ensure the “Saved for Confirmatory” switch is “turned on” in DCBC for that sample. If the switch is not turned on, the sample may not be submitted in a timely fashion.



*Screenshot of DCBC sample entry page.
The “Sample ID” and “Saved for Confirmatory” switch are circled.*

- 1.4. Affix the vial with a lid, and label the side of the vial with the first six digits of the DCBC Sample ID using a fine-tipped permanent marker. If available, place the vial into an evidence bag and seal.
- 1.5. If the sample cannot be immediately placed into the safe (see **2. Storage of samples**), use a sample lockbox or other secure container to ensure all samples are stored together and safely. Transfer the samples from the lockbox to the safe as soon as possible.

2. Storage of samples

- 2.1. All samples collected must be stored in the drug checking designated safe. Only designated technicians will have access to the code to the safe to ensure security of the samples and protect the chain of custody.

2.2. At the end of the drug checking shift, log all samples collected for confirmatory testing on the log sheet (“Confirmatory Testing Log”) inside the storage safe. Each sample is logged separately to ensure it can be tracked independently.

2.3. Information collected and logged:

- a) Date sample was placed in the safe
- b) Site sample was collected
- c) Unique identifier (6-digit alphanumeric code)
- d) Technician initials
- e) Running total of samples stored in the safe

2.4. Close and lock the safe when finished logging samples.

3. Courier

3.1. When 20–25 have been collected, the BCCSU will notify the technicians on site to prepare samples for shipping. The BCCSU Research Data Coordinator (via DCBC) will keep track of the samples stored at sites to know when enough samples have been saved for a full shipment.

3.2. The BCCSU Research Data Coordinator will deliver the envelope, labels and courier waybill to the technicians on site prior to the shipment time. Some packing materials may be stored on site for use when needed. The BCCSU Research Data Coordinator will ensure sufficient time for packing of samples before the scheduled pick-up time.

4. Packaging of samples for courier

30 minutes prior to start of designated shift (to allow time for packaging)

4.1. Place vials individually into tamper-proof exhibit bags (if not already). Label each sealed bag with the associated unique label. Crosscheck the sample number on the vial against the printed label before moving onto packaging the next sample.



Photo of exhibit bag with sample vial. Note that the IDs on the vial and the label match and are clearly visible.

- 4.2. Check the sample off on the “Confirmatory Testing Log” under “Sent to Lab” to track it leaving the safe.
- 4.3. Take a photo of each bagged sample (photo must include the label “File number,” and written vial code). See below for an example photo. The photos for each shipment will be emailed to the BCCSU Research Data Coordinator for logging purposes
- 4.4. Place exhibit bags in a labelled (courier waybill) envelope for courier pickup. When the envelope is packed, lock it in the safe to await pick-up.
- 4.5. Ensure relevant staff are aware that you are expecting a courier pick-up because when the courier arrives, they will inform reception that they are to pick up a package. When the courier does arrive, go retrieve prepared package from the safe.
- 4.6. Hand over the package to the courier.

Appendices

Confirmatory Testing Log – kept in safe at Insite to record and reconcile samples sent from Insite to DAS.

References

1. Kerr T, Tupper K. Drug Checking as a Harm Reduction Intervention: Evidence Review Report. Published online 2017. <https://www.bccsu.ca/wp-content/uploads/2017/12/Drug-Checking-Evidence-Review-Report.pdf>
2. Holzgrabe U, Deubner R, Schollmayer C, Waibel B. Quantitative NMR spectroscopy—Applications in drug analysis. *J Pharm Biomed Anal.* 2005;38(5):806-812. doi:10.1016/j.jpba.2005.01.050

