BRITISH COLUMBIA CENTRE ON **SUBSTANCE USE**

*Networking researchers, educators & care providers*

*Drug Checking*

# Operational Technician Manual

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# 1.0 Glossary of Acronyms and Other Frequently Used Terms

**Amnesty bin:** a disposal bin where visitors can dispose of unwanted drugs

**ANKORS:** AIDS Network Kootenay Outreach and Support Society

**ATR:** attenuated total reflectance

**BCCSU:** British Columbia Centre on Substance Use

**EDC:** electronic data capture

**FTIR:** Fourier transform infrared (spectroscopy)

**Fentanyl immunoassay strips:** also referred to as fentanyl test strip

**GC-MS:** gas chromatography-mass spectrometry

**LSD:** lysergic acid diethylamide, also known as “acid”

**MDMA:** 3,4-methylenedioxymethamphetamine

**OPS:** overdose prevention site

**OQ:** operational qualification

**PQ:** performance qualification

**PWUD**: people who use drugs

**qNMR:** quantitative nuclear magnetic resonance

**RSC:** reference single channel

**SCS:** supervised consumption site

**SSC:** sample single channel

**SWGDRUG:** Scientific Working Group for the Analysis of Seized Drugs

# 2.0 Introduction

## 2.1 About the BCCSU

The British Columbia Centre on Substance Use (BCCSU) is a provincially networked organization with a mandate to develop, implement, and evaluate evidence-based approaches to substance use and addiction. The BCCSU's vision is to transform substance use policies and care in British Columbia by translating research into education and evidence-based care guidance. By supporting the collaborative development of policies, guidelines and standards, the BCCSU seeks to improve the integration of best practices and care across the continuum of substance use, thereby serving all British Columbians.

The BCCSU seeks to achieve these goals through the integrated activities of its three core functions:

**Research** —Leading an innovative multidisciplinary program of research, monitoring, evaluation and quality improvement activities to guide health system improvements in the area of substance use.

**Education and Training**—Strengthening addiction medicine education activities across disciplines, academic institutions and health authorities, and training the next generation of interdisciplinary leaders in addiction medicine.

**Clinical Care Guidance**—Developing and helping implement evidence-based clinical practice guidelines, treatment pathways and other practice support documents.

## 2.2 About Drug Checking

British Columbia (BC) is in the midst of the most serious drug overdose crisis in its history. In 2017 alone, 1,487 individuals died of an illicit drug overdose (nearly as many as the previous two years combined).[1] The overdose crisis is largely attributable to the emergence of highly potent, illegally manufactured synthetic opioids, which has created a toxic illegal drug supply.[2] In 2017, fentanyl was detected in 84% of all illicit drug overdose deaths, up from 4% five years earlier, in 2012.[1] This influx of highly toxic substances into the illegal drug supply necessitates the incorporation of all possible harm reduction measures into a comprehensive, multi-sectoral strategy to prevent overdose deaths.[2]

Drug checking is a harm reduction service that allows individuals to anonymously submit drug samples for analysis and to receive individualized and fact-based consultation regarding their samples. Drug checking can be conducted using a range of technologies and in a variety of settings. While it was first piloted in community-based settings in California in the 1960s and early 1970s,[3] it was not until the early 1990s that it became established as a strategy to reduce harm associated with novel psychoactive substances in party settings in Europe.[3] Drug checking services have now been established across Western Europe[3,4] and at sites in Australia,[5] the United States,[6] and Canada.[8–12] the unanticipated presence of powerful opioids, such as fentanyl, in street drugs is a contributing factor.

The overarching goal of drug checking is to provide information to people who use drugs (PWUD) about the contents of the drugs they intend to consume and to empower individuals to make better-informed decisions regarding substance use. Drug checking services offer one of the only means of providing consumer safety in the context of an illegal and unregulated street drug supply.

## 2.3 History of Drug Checking in British Columbia

Drug checking first emerged in BC in the late 1990s as an informal, peer-based service in the electronic dance music scene. Although the informal colorimetric reagent testing of "ecstasy" pills was initially met with staunch opposition from local law enforcement, the BC Ministry of Health released a policy document in 2005 that recognized drug checking as an integral harm reduction strategy for PWUD.[13]

The longest running drug checking service in the province has been provided by the AIDS Network Kootenay Outreach and Support Society (ANKORS), which has offered on-site drug checking at the large, multi-day music festival Shambhala every August since 2003. Other drug checking pilots have also emerged in recent years, including a project focused on the use of fentanyl immunoassay strips at Insite supervised consumption site in 2016.[23] The STS Pain Pharmacy in Victoria also began offering immunoassay strip testing in the same year.[14]

Prior to 2016, a federal exemption under the *Controlled Drugs and Substances Act* was required to allow harm reduction staff to provide drug checking services for PWUD. However, as per the authority of the provincial *Emergency Health Act* (Ministerial Order No.M488), drug checking is now considered an overdose prevention service. As a result, in order to set up a drug checking service, the Health Service Delivery Area Medical Health Office must provide written designation

of the site as an overdose prevention site. This has greatly expanded opportunities to provide drug checking in BC.

In October 2017, the BCCSU partnered with regional health authorities, local community agencies, and various levels of government to expand the availability of drug checking services in BC. This program was initially implemented in partnership with the Vancouver Coastal Health Authority at Insite supervised consumption site and has since been expanded to sites in Fraser Health, Interior Health, and Island Health. This program pairs the use of Fourier transform infrared (FTIR) spectrometers with fentanyl immunoassay strips to rapidly and accurately analyze substances at point-of-care. The program is designed to be a low-barrier, consumer safety-oriented service for PWUD.

## 2.4 About this Manual

This manual offers basic instruction on the drug checking procedures, protocols, and methods used by the BCCSU drug checking program and is intended to supplement (not substitute) in-person training.

# 3.0 Primary Drug Checking Technologies

## 3.1 Fourier Transform Infrared Spectroscopy

Fourier transform infrared (FTIR) spectroscopy is an established chemical analytical technique commonly used in forensic chemistry as well as the food and pharmaceutical industries. FTIR spectroscopy works by shining a wide spectrum of light, in the Infrared wavelength range, onto a sample and measuring the amount of infrared radiation absorbed. Since each compound has a unique absorption behaviour, the data collected can be used to mathematically model the sample's unique spectrum and match it to absorption profiles found within reference library databases.[13,15] Spectra are defined as characteristic measures of absorption as a function of electromagnetic wavelength.

The BCCSU uses a Bruker ALPHA-II or ALPHA FTIR spectrometer equipped with the platinum attenuated total reflectance (ATR) module (which has a diamond ATR crystal), operated with OPUS software. OPUS is a computer program used for measuring an unknown substance's absorbance spectrum and matching it to spectra stored in a reference library. Reference libraries are a collection of spectra collected from pure, laboratory-tested substances. The BCCSU drug checking program utilizes three primary reference libraries that contain common drugs and adulterants on a day-to-day basis: the Scientific Working Drug for Analysis of Seized Drugs (SWGDRUG), TICTAC ATR-FTIR, and the BCCSU ATR-FTIR Library.

- **SWGDRUG**: consists of 561 spectra
- **TICTAC ATR-FTIR**: consists of 369 spectra
- **BCCSU ATR-FTIR**: consists of 32 spectra

**Alternative libraries are also used as needed:**

- **ATR-LIB-PHARMA+:** consists of 4 sub-libraries of 10,105 total spectra
- **Demolib**: consists of 350 spectra

Note that although the Bruker ALPHA FTIR spectrometer can rapidly and accurately identify a wide range of compounds present in a sample, it can only detect substances that are present in proportions above approximately 3-4%.[7] It should be noted that some substances, such as fentanyl, can produce serious toxicity below this level.

# 3.2 Fentanyl Test Strips

Fentanyl test strips are a one-step immunoassay that utilize an antibody that is selective for a drug or drug group.[16] The BCCSU drug checking program uses BTNX Rapid Response™ Fentanyl immunoassay strips, originally designed for detection of fentanyl in urine samples.

Immunoassay strips are able to detect trace amounts of fentanyl and some analogues with a detection limit of 0.13 micrograms/mL[17] (Table 1). They provide binary results (presence/absence) and do not provide information about other compounds that may be present in a drug sample.

***Fentanyl Analogue Cross Reactivity List***

| | |
|---|---|
| Carfentanil | Butryl Fentanyl |
| P-Fluoro Fentanyl | Acetyl Fentanyl |
| Fentanyl | Furanyl Fentanyl |
| Valeryl Fentanyl | Ocfentanil |
| 3-Methyl Fentanil | Remifentanil |
| Sufentanil | Norfentanyl |

***Table 1.*** *Fentanyl analogue cross-reactivity list for BTNX strips[17]*

**The BCCSU always pairs FTIR testing with a fentanyl strip test, unless the client refuses the test.** In this case, the fentanyl test strip result will be recorded as 'declined' in the electronic data capture (EDC) system* or in the Data Reporting Sheet (see Appendix 7.7). Fentanyl immunoassay strips are available at overdose prevention sites (OPS) and supervised consumption sites (SCS) across BC.

* For a copy of the EDC Manual, please contact the BCCSU

| | ***Fourier Transform Infrared Spectroscopy***  | ***Fentanyl Immunoassay Strip***   |
|---|---|---|
| ***Size and Portability*** | Compact and portable<br><br>Mobile and stationary use | Compact and portable<br><br>Mobile and stationary use |
| ***Processing Time*** | Fast processing time (usually under 5 minutes, up to 10 minutes for complex mixtures)<br><br>Suitable for high traffic situations | Fast processing time (under 2 minutes)<br><br>Suitable for high traffic situations |
| ***Scope of Detection*** | Detects a wide range of compounds, including cutting and buffing agents<br><br>Does not identify compounds that have not been entered into the reference library<br><br>May not distinguish between drugs with similar chemical structures (e.g., fentanyl analogues) at low concentrations | Detects the presence or absence of fentanyl and some fentanyl analogues only (see Table 1.)<br><br>Does not provide any information on quantity or relative proportion of drug or drug class present in a sample<br><br>False positives or false negatives are possible, depending on the substance and method used |
| ***Training Required*** | Results are relatively easy to interpret using OPUS software<br><br>Staff must be trained to use instrument, software, and reference libraries | Results are easy to interpret |
| ***Sample Preparation*** | Minimal-to-no sample preparation required<br><br>Requires approximately 5 mg of sample<br><br>Non-destructive - sample can be returned to client or used for further testing | Minimal-to-no sample preparation required<br><br>Requires approximately 1-2mg of sample<br><br>Destructive - sample cannot be returned to client in original form or used for further point-of-care testing |
| ***Reliability of Result*** | Provides percentage estimates of the components within a substance (including buffing and cutting agents)<br><br>Provides rough proportions but requires testing with more advanced technologies to confirm | Provides a binary result (positive or negative for fentanyl), but limited ability to detect all fentanyl analogues |
| ***Limit of Detection*** | Limitations in detection of substances present in low concentrations (less than 3-4%[7]) | Highly sensitive (detection limit of 0.13 micrograms/ml[17]) |

***Table 2.*** *Comparison between fentanyl test strips and FTIR spectroscopy.*[13]

# 4.0 Drug Checking Protocol

Drug checking takes place in various settings and locations across the province, including SCS/OPS and music festivals and events.

## 4.1 General Site Setup

Drug checking takes place at community partner sites with regional health authority approval. When setting up the drug checking equipment, it is critical to work respectfully and collaboratively with site staff to ensure minimal disruption to ongoing site activities.

If possible, the drug checking services should be set up in an easily accessible location that provides some degree of confidentiality and privacy to service users. Where possible, information about the drug checking service should be displayed at the site to ensure community members are aware of the services offered and the hours of operation should be prominently displayed. A laminated copy of the BCCSU's disclaimer (see Appendix 7.1) must be displayed at all times and key points must be reviewed with the client prior to drug checks. This disclaimer provides relevant information on the limitations of FTIR and fentanyl test strips as well as basic harm reduction guidance and information.

# 4.2 Drug Checking at Supervised Consumption and Overdose Prevention Sites

## 4.2.1 Supplies and Equipment Checklist

Drug checking technicians are responsible for communicating when site-specific supplies are low.

**Drug checking technicians should be prepared with the following materials for each shift:**

- ❑ FTIR spectrometer and case
- ❑ Notepad and pen
- ❑ Reporting slips
- ❑ Stainless steel chemistry spatula
- ❑ Paper medicine cups
- ❑ Drug information binder
- ❑ Kimwipes™ or Kleenex™
- ❑ Water bottle
- ❑ BTNX benzodiazepine test strips
- ❑ BTNX LSD test strips
- ❑ Laminated disclaimer sheet
- ❑ TRIPSIT drug combination chart

**If applicable:**

- ❑ Power bar
- ❑ Portable Internet connection (recommended 5 GB/month)
- ❑ Ehrlich reagent test kit
- ❑ Extension cord
- ❑ Desk lamp

**Sites are responsible for providing the following supplies:**

- ❑ Table/workspace & chair
- ❑ Fentanyl test strips
- ❑ Nitrile or polyurethane gloves
- ❑ Internet connection (if possible)
- ❑ Stable power source
- ❑ Deterra™ medication disposal system pouch (or other safe disposal plan/ amnesty bin)
- ❑ Alcohol wipes

Note that supplies provided by sites should **not** be removed.

### 4.2.2 Drug Checking Procedure

Upon the client approaching the drug checking service area:

1. Explain the point-of-care drug checking procedures (FTIR spectrometer and fentanyl test strips) using the example script below. **Remember, unless the client refuses one test, both will be used in every situation.**

> ***Hi, I'm [name], the drug checking technician.*** *I am going to use two different technologies to check your drugs today. The FTIR will tell me up to 4 different components within your drug. The FTIR has a limit of detection of about 3-4% and cannot detect substances not present in our reference libraries. I will also use the fentanyl test strip to tell me if there is any fentanyl present. You will get most of your sample back, but I will need a few grains for the fentanyl test. The two tests should take about 5 minutes per sample to complete.*
>
> ***Do you have any questions?***
>
> ***How many drugs are you wanting to check today?***
>
> ***What did you purchase this sample as?***
>
> ***Have you tried this sample yet?***
>
> ***(If they have tried the sample already): What do you expect this sample to be now?***

**Capturing Data**

Drug checking provides timely information about local street drug markets in BC and it is essential to track data in a consistent way in order to analyze and aggregate results and trends. Information is collected in the electronic data capture system or the Data Reporting Sheet (see Appendix 7.7). Information tracked for every sample includes:

- *Pre- or post-consumption*: has the drug checking client consumed any of this particular product yet?
- *Expected Drug:* what did the client purchase their substance as? If the substance is being checked post-consumption, the *expected drug* should reflect the current expectation. Note what the drug was purchased as in the notes.
- *Colour and texture:* what does the sample look like? Descriptions of appearance should follow the *BCCSU's Guidelines for Identifying Colours and Textures*
- *Influence:* did the client dispose of the sample onsite?
- *Results:* what were the results of the drug check? Be sure to include immunoassay strip results.
- *Comments*: is there anything notable about the sample that could be important to capture? Some examples can include:
    1. If and why the sample spectrum required secondary review by a Senior Drug Checking Technician
    2. If and why a certain testing method was declined
    3. If and why multiple testing iterations were completed on the same sample
    4. Any adverse or abnormal side effects experienced by the client
    5. If a public health alert was issued
    6. If the sample was tested post-consumption, what the drug was originally bought as
    7. Any other notable observations regarding the sample

**Expected Drug**

There are often many different names or slang terms used to refer to a particular drug. In some cases, the same name is always used to refer to the same drug (e.g., in BC, side/jib refers to methamphetamine, up/powder refers to cocaine), and in other cases, different drugs can be referred to by the same name (e.g., in BC, speed can refer to multiple stimulants, including methamphetamine, amphetamine, and methylphenidate). In particular, the slang term *down* can refer to heroin, fentanyl, a mix of heroin and fentanyl, or an unspecified opioid.

**To accurately assess the client's expectation of their sample prior to drug checking, it is important to always ask for clarification whenever any slang terms are used.**

**Example:**
*Technician: what did you purchase this as?*
*Client: down*
*Technician: do you know if it's supposed to be heroin or fentanyl?*
*Client: it should be fentanyl*

When recording the expected drug, it is important to capture that the client originally expected the substance to be down, but, after being prompted, specified fentanyl. In the EDC system, this should be recorded as "Down-Fentanyl". If the client is unable to be more specific, it should be recorded as "Down (unknown opioid)".

**Determining if the expected drug is present**

If signal from the expected substance is found by the technician during FTIR analysis, the sample contains the client's expected substance. A positive immunoassay strip result (fentanyl, benzodiazepine, or LSD) can also indicate if the expected drug is present.

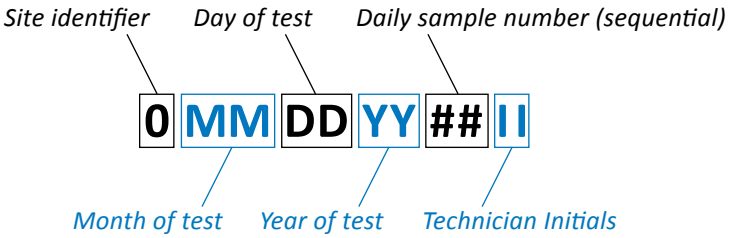
The sample is considered to *not* contain the client's expected substance if the drug checking technician determines that it is *not* present in any amount by either drug checking technology.

It cannot be determined whether the sample contains the expected substance or not when:

1. The expected substance would be present below the detection limit of the FTIR (i.e., drugs with very low dosage)
2. The drug checking technician cannot interpret the spectrum (e.g., difficult reading)
3. The drug check was incomplete (e.g., client declined one method of analysis which made determining expected substance not possible)

**Note:** The client may want to test multiple substances. Ask the client to only take out one substance at a time to ensure that sample IDs are not confused. This will also assist in reducing clutter at your workstation and will reduce the possibility of contamination.

2. Generate a unique sample ID for each sample using the following format:




Example: The drug checking ID 109101801JD indicates that the test was performed at Insite (1) on September (09) 10th (10), 2018 (18), was the first test of the day (01) and was performed by John Doe (JD).

3. Record the appearance of the drug sample in the EDC system.

4. Conduct the FTIR and fentanyl strip tests (see below for further details).

5. Document results in the EDC system or on the Data Reporting Sheet (see Appendix 7.7) and if applicable, on a drug checking slip used to provide results to the client (see Appendix 7.5).

6. In SCS/OPS settings, advise clients to provide this slip to consumption room staff if they plan on using the substance onsite.

7. At a festival or event, advise clients to provide the slip to harm reduction staff for information and/or guidance around safer consumption practices.

8. Ensure that basic information and guidance around harm reduction practices are provided to the client (see Harm Reduction Messaging in Section 6.0). If the client asks questions that you are unable to answer, refer them to more experienced harm reduction and/or clinical onsite staff.

9. When you find substances that may have wider public health implications (e.g., substances that could result in unusual or high numbers of overdoses), and upon consultation with the Senior Drug Checking Technician, alert the community site and the relevant health authority (see Issuing Alerts in Section 6.0).

10. Whenever possible, substances that are difficult to discern at point-of-care or that result in public health alerts should be sent for confirmatory testing with advanced laboratory technologies (see Confirmatory Testing in Section 5.5).

# 4.3 Drug Checking at Festivals and Events

Festivals and events differ somewhat from SCS/OPS settings in the set-up, roles and responsibilities of service providers. Depending on the setting, there may be supplementary services available (e.g., safer spaces, sanctuaries, harm reduction supplies, medical care); drug checking staff should collaborate closely with service providers to the utmost extent possible.

The BCCSU recommends that staff be chosen to fit the roles and responsibilities outlined below, although these roles may vary based on the event and staff availability. All staff are required to complete mandatory pre-festival training, provided by the BCCSU with the support of contracted harm reduction and medical service organizations.

| *Role* | *Description* | *Requirements for Role* |
|---|---|---|
| ***Navigator(s)*** | • Assist in directing crowds and managing lines to ensure order and privacy is maintained to the extent possible<br>• Review drug checking procedures and what clients should expect before they enter the drug checking tent and answer questions | • Must be comfortable speaking in front of groups<br>• Must be able to describe the procedures of both the fentanyl test strips and FTIR testing in lay language |
| ***Sample Prepper(s)*** | • Explain and perform fentanyl strip tests<br>• As needed, assist clients in placing 5-10mg samples in paper medicine cups for later FTIR testing | • Must be trained according to health authority guidelines in using fentanyl test strips and documenting results |
| ***Drug Checking Technician(s)*** | • Perform FTIR drug checks<br>• Complete the data collection form<br>• Direct healthcare staff to issue any alerts as needed | • Must complete the multi-day training hosted by the BCCSU, in addition to 30 hours of shadowing with a trained FTIR Operational Technician. |
| ***Healthcare Harm Reduction Staff*** | • Review the results of the drug checks and provide individualized harm reduction information and education to clients<br>• Provides referrals to other on-site services as needed<br>• At the direction of the drug checking technician, issues alerts and update the Alert Board with:<br>1) where the drug was purchased (onsite/offsite),<br>2) appearance of the drug,<br>3) expected substance, and<br>4) drug check results. | • Must be extremely knowledgeable about safer drug use practices and be trained in delivering harm reduction messaging |

The drug checking technician is responsible for setting up the drug checking space at festivals and providing an onsite orientation to volunteers. Below is a possible layout for the drug checking station. Note that siding is recommended to control for weather variations.

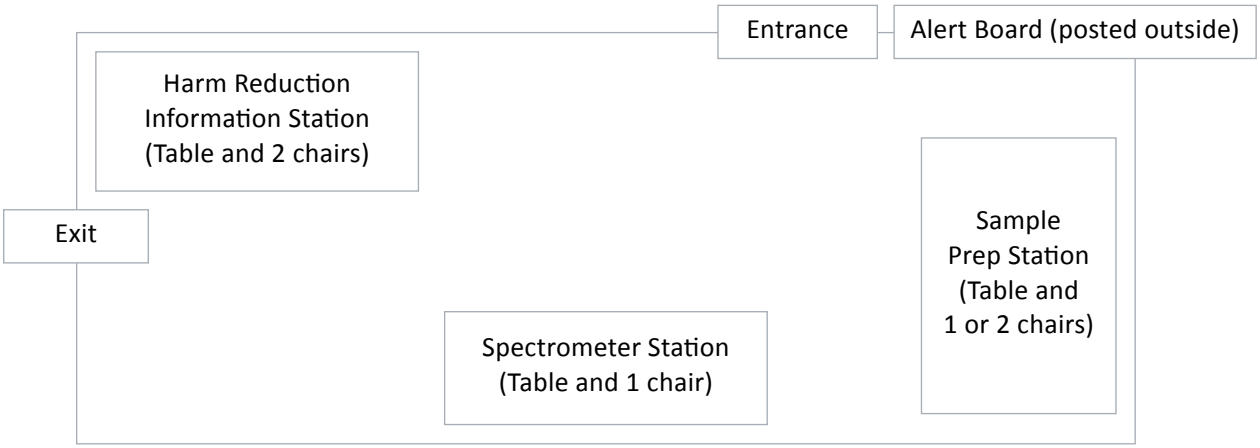



***Figure 1.*** *Potential Festival Drug Checking Tent Layout*

Below is the suggested procedure for completing drug checks in a festival or event setting:

1. The **navigator** will welcome the client, review the disclaimer (see Appendix 7.1) and the drug checking procedure with the client, and answer any questions

2. Once a **sample prepper** is available, the navigator will direct a client to their station. The **sample prepper** will provide the client a drug checking slip for each drug sample. No personal identifying information will be recorded at any time. The **sample prepper** will label the results slip with the expected drug, explain and offer a fentanyl strip test, and record the results of the fentanyl strip test on the results slip. A sample script is below

   > *Hi, I'm [name]. How many drugs do you want to test today**?** I am going to do a fentanyl strip test to see whether fentanyl or fentanyl analogues are present in your sample. I will need a few grains of your drug to complete the test. Do you have any questions?*

   After the test is complete, the **sample prepper** should explain the following:

   > *Your result is [positive/negative] for fentanyl. As a reminder, drug checking does not guarantee your drug is safe to use. There are some fentanyl analogues and other potentially dangerous substances that we may not detect. I have written your results on this slip – please keep it with you as you travel through the tent. Your next stop will be with the spectrometer.*

The sample prepper will then ask the client to scrape a small amount of pill or place a small amount of powder (about the size of half of a match head) into a paper medicine cup for the **drug checking technician**.

3. The **drug checking technician** will explain and offer the FTIR spectrometer test by saying the following:

   *Hi, I'm [name], the drug checking technician. I'm going to test your sample using the FTIR spectrometer, which will tell me up to 4 different components within your drug. The FTIR has a limit of detection of about 3-4% and cannot detect substances that are not in our reference libraries. For this test, you will be able to get your sample back. Do you have any questions about what I'm going to do?*

4. The **drug checking technician** will generate a unique sample code to connect spectra and all analyses on that sample (for a suggested sample ID numbering system, refer to explanation in Section 4.2.2).

5. The **drug checking technician** will write the FTIR components on the results slip and will remind the client that drug checking has limitations and does not guarantee their drug is safe to use, using the disclaimer (see Appendix 7.1).

6. Basic information on harm reduction can be provided by the **drug checking technician** before sending them to the **harm reduction volunteer** for more detailed information. Suggest to the client that they bring the results slip to talk to the **harm reduction volunteer**, so that the volunteer is aware of the test results. Basic information and guidance around harm reduction practices can be found in Harm Reduction Messaging (Section 6.0).

# 4.4 Procedures Following Drug Checks

1. Ensure all results are recorded in the EDC system or in a Data Reporting Sheet (Appendix 7.7)

2. Provide the client with the results along with harm reduction information described in Harm Reduction Messaging (Section 6.0)

3. Ask the person if they have any questions or would like more information or resources for staying safe.

# 4.5 Safe Substance Handling and Disposal

When conducting drug checks, drug checking technicians must wear gloves (nitrile or polyurethane) and hands should be washed before and after administering services. Gloves should be changed on regular basis (every 30 to 60 minutes), whenever they come into contact with a substance, or if they tear. Always remove gloves and wash hands before touching your face, touching door knobs, using the washroom, eating, drinking, or leaving the drug checking area.[18]

The FTIR spectrometer and spatula should be cleaned using a minimum of three alcohol swabs and dry Kimwipes™ following each drug check, even if conducting multiple drug checks on the same "batch" or for the same person.

Items contaminated with drug residue (e.g., baggies, paper flaps) can be disposed of in the garbage. If the amount is more than residue (i.e., collectable or usable), it should be disposed of in an amnesty bin or tamper-proof sharps container at the site. Any amount larger than a single dose of the particular drug should be given to site staff to be disposed of in accordance with site policy (e.g. disposal safe for police pick-up).

In community sites with no disposal protocols in place, substances can be disposed of in a Deterra™ pouch (see Appendix 7.3), or, if no Deterra™ pouch is available, the sample can be mixed with water and dumped into kitty litter.

- If the client wishes the drug checking technician to dispose of their sample, the drug checking technician should do so immediately and in front of the client. If the client wishes to dispose of their substance, they should be directed in how to do so.
- In festival settings, clients should be informed that if they want to discard substances later, they should bring their sample back to be properly disposed of, rather than discarding in a waste bin, down the toilet, or by giving it away.
- **Do not** dispose of drugs in the garbage, in a sink, or by flushing down the toilet. This increases the risk of theft and diversion and may be environmentally harmful.
- Test strips, stir sticks, alcohol swabs, and any other drug checking materials can be disposed of in a standard garbage bin. At SCS/OPS settings, garbage is disposed of in biohazards bins at the end of the day

# 5.1 Fourier Transform Infrared (FTIR) Spectrometer

## 5.1.1 FTIR Spectrometer Setup and Storage

The Bruker ALPHA FTIR spectrometer has two components: the "sampling module" (smaller component) and the "spectrometer module" (larger component). Each component comes packaged separately in a plastic bag in the FTIR carrying case (Figure 2).

***Note**: The two modules should be positioned so that the most weight sits at the bottom of the case.*


***Figure 2**. The "sampling module" (left) and "spectrometer module" (right) packaged in the Bruker hard-case for transport.*

Procedures:

1. Remove the spectrometer module from its bag and place it on the table. Use care to not touch any of the interior components of the device.

2. Remove the sampling module from its bag. Using the side rails on the spectrometer module, slide the sampling module into place. Open the latch by firmly pressing the silver rectangular button located on top of the spectrometer module.

3. When the sampling module is in the proper position, you will hear a click as the rectangular button becomes level with the spectrometer module (Figure 3, left). If the rectangular button is not level with the spectrometer module (i.e., the rectangular button does not fully raise), press firmly down on the rectangular button and try again (Figure 3, right).

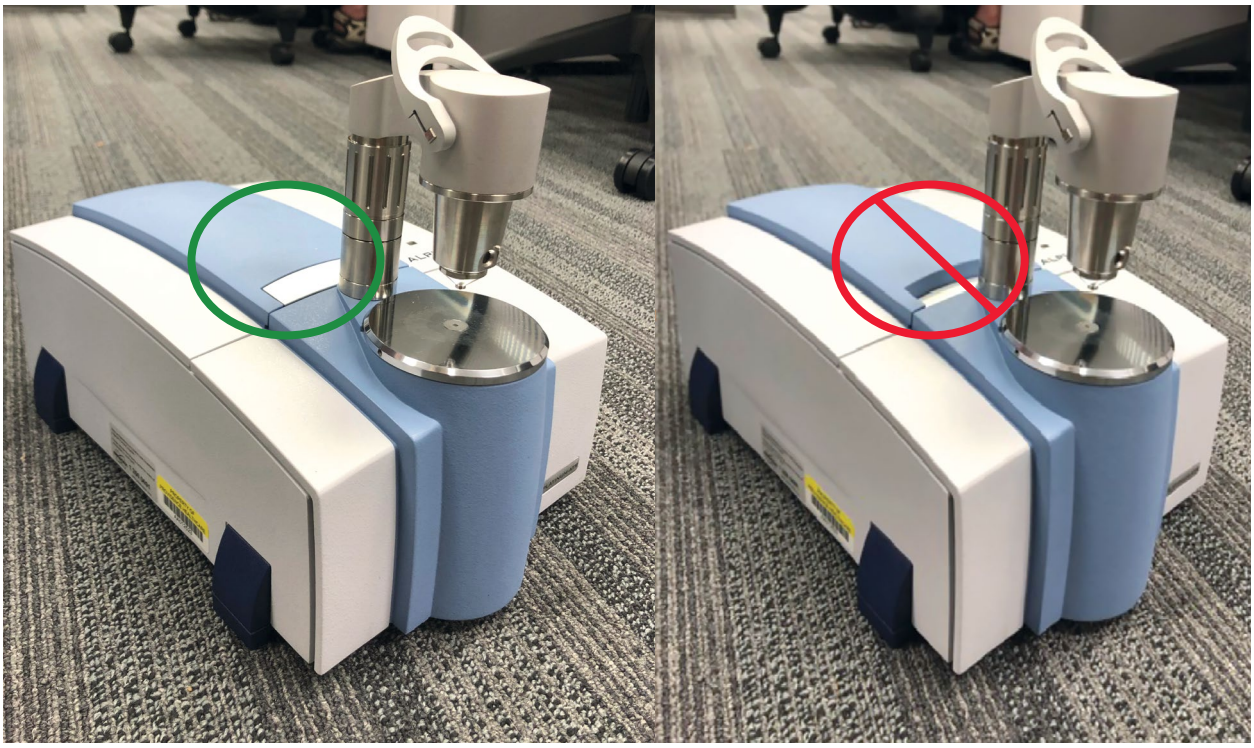


***Figure 3**. When the sampling module is properly secure, the rectangular button will be level with the spectrometer module (left).*

1. Insert the power supply cable to the power port on the back of the spectrometer module (Figure 4). Be sure to connect the device to a reliable power source. **Any disruption in the power supply will cause the spectrometer to restart.**

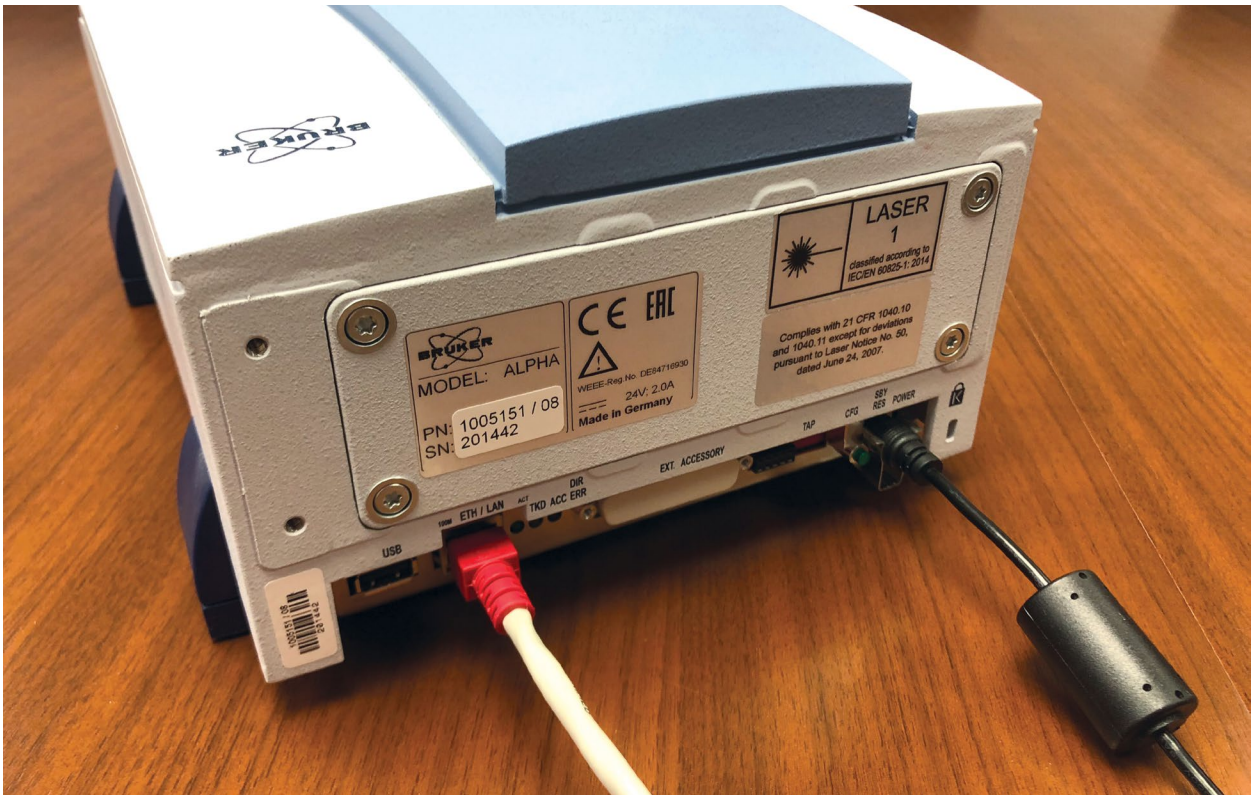



***Figure 4****. FTIR ethernet port (left) and power port (right).*

2. Once the FTIR is plugged in, a warm-up phase, lasting approximately 10 minutes, will begin. If the spectrometer is unplugged in the middle of testing a sample, the spectrometer will automatically restart and the warm-up phase will repeat. If this happens, inform the client of the delay and ask if they would like to come back later. Record this interruption in the notes section of the EDC system or the data collection form (see Appendix 7.7).

3. Connect the laptop to the spectrometer by inserting the network cable into the back of the spectrometer module, and the ethernet port on the laptop. Open the OPUS program (DrugID Wizard) on the laptop desktop by clicking this icon:


***Figure 5.*** *OPUS Drug ID Wizard*

A small window will pop up. The default username and password are the same for all spectrometers and are set up when the spectrometer is delivered and installed by Bruker.

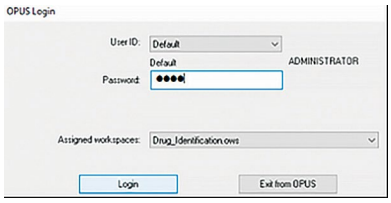



***Figure 6.*** *Username and Password Window*

A second window will then open. Click OK to close it.

4. Once logged into the system, a countdown will be visible in the task bar (the bottommost border of the OPUS window). When a task is running, the bar will be green.


***Figure 7.*** *The green taskbar can be seen in the bottom of the window*

5. After the warm-up phase is complete, the spectrometer will run a 'performance test.' **Do not touch the diamond ATR crystal during the performance test.** If the diamond ATR crystal is touched, the performance test will fail and a Performance Qualification (PQ) test will have to be performed. The PQ test takes an additional ten minutes to evaluate the performance and function of the spectrometer and is intended to be performed once a week or when the spectrometer is moved between sites.

   **Note**: The Operational Qualification (OQ) test is used to check the current state of the instrument performance. OQ tests are intended to be performed after major repairs, exchange of optical components that influence instrument performance, and annual maintenance. Bruker staff will complete this test when performing these tasks.

6. When the warm up and validation is complete, the status light in the bottom right corner of the OPUS window will turn green, as will the light on the top of the spectrometer module. The FTIR is now ready to begin a drug check.

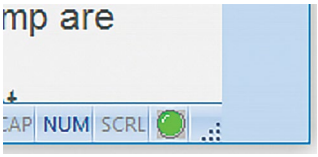



***Figure 8.*** *OPUS Button Green Light*

***Storage***

FTIR spectrometers are stored in the Bruker hard case when not in use and for transport to and from the site**. FTIRs must be monitored at all times at testing sites**. When offsite, drug checking technicians are responsible for storing the FTIR in a secure location.

### 5.1.2 FTIR Spectrometer Drug Checking Procedure

1. Instruct the client to deposit a small amount of substance (approximately 5mg, roughly corresponding to the size of half a match head) onto the FTIR sample plate, on or near the diamond ATR crystal. Ensure the sample is optimally positioned on the diamond ATR crystal using a stainless-steel chemistry spatula or similar tool. Apply appropriate pressure to the sample with the pressure anvil.

2. Initiate the infrared scan using the OPUS software (see Measuring Spectra with the OPUS Software below – Section 5.1.3). This scan will measure the infrared absorption by the sample, thus indicating composition. The entire process will typically take 5 minutes, but complex mixtures, unusual substances, or other analytically challenging samples may require extra time. If a clear result cannot be obtained within the timeframe available to the client, provide the client with the sample code and instruct them to return as soon as possible for their results.

3. Once the result is obtained, verbally report these results to the client. You **MUST** be sure of the result and explain the practical significance (such as risk of toxicity) of any contaminants and/or adulterants detected. **Do not verbalize the analysis process, as this is unnecessary and has the potential to confuse and worry clients**. Following the explanation, the client will have the opportunity to ask the drug checking technician questions about the results of the test.

4. Record the FTIR results on the Drug Checking Results Slips (Appendix 7.5) and the Data Reporting Sheet (Appendix 7.7)

5. If not already complete, use a portion of the sample for fentanyl strip testing (see Fentanyl Test Strip Procedure in Section 5.2). Inquire whether the client would like the remainder of their sample and either return it to them or dispose of it.

6. If you have difficulty determining the components of a sample, if the client reports unusual side effects, or if the client requests, the sample may be sent for confirmatory testing (see Confirmatory Testing in Section 5.5).

7. Thoroughly clean the FTIR sample surfaces, particularly the diamond ATR crystal and pressure anvil, by wiping both with alcohol swabs and drying them with a clean tissue. After a minimum of 3 alcohol swabs are used, use a clean Kimwipe™ or tissue to dry the sample tray. This procedure ensures no carry-over of trace amounts of substances tested.

### 5.1.3 Measuring Spectra with the OPUS Software

1. Before each sample is tested, a background scan must be conducted. Ensure that the diamond ATR crystal is clean and click the large “Measure Background” button on the left-hand side of the window.

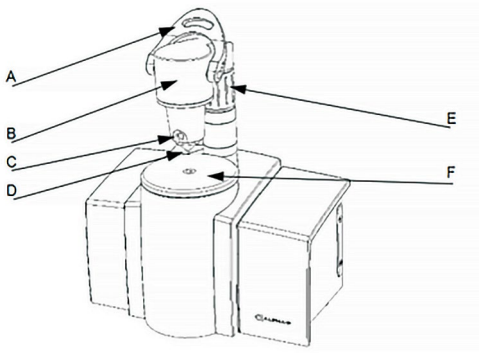

***Figure 9.*** *Measure Background Button*

The task bar will turn green and display the progress of the background scan.


***Figure 10.*** *Progress Bar for Background Scan*

A background scan consists of 24 measurements of the empty diamond ATR crystal and is used as a comparison when the sample is loaded onto the ATR crystal (Figure 11, Point F). This scan will take approximately 30 seconds. Once this procedure is complete, the large button on the left will change to “Measure Sample”.

**Note:** In SCS/OPS settings where fentanyl is prevalent in drug checking samples and often present at amounts near the detection limit of the spectrometer, 24 scans is recommended to improve the signal-to-noise ratio of measured spectra. In settings where recreational drugs are being checked, 8 scans is considered sufficient to determine major components of drug checking samples.




A. Handle to raise and lower anvil
B. Pressure arm
C. Red spot displays anvil pressure
D. Anvil
E. Pressure control knob
F. Sample plate with diamond ATR crystal in the centre (sensor) in the centre

***Figure 11**. FTIR spectrometer sampling module*

**Important: DO NOT** put the sample onto the ATR crystal while the background is running. If this happens, the task bar will reject the background scan. To stop a background scan from running, right click on the green task bar and click “Stop Task”. Clean the sample surfaces (diamond ATR crystal and anvil) and re-run the background measurement.

2. Click “Measure Sample”. You will be prompted to enter information about the sample you are running. You will notice on this screen that field will appear that is auto-populated with information about the last measured sample.

3. Enter the sample information. This will determine the name the spectrum file will be saved under and attach metadata that will be included with the file.

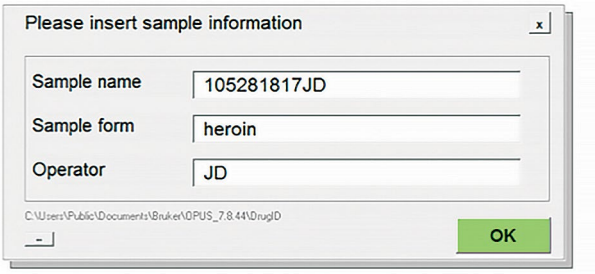



***Figure 12.*** *Sample Information Box*

4. Click OK.

5. The new window displays a live reading of the sample. You can now load the sample onto the diamond ATR crystal using a stainless-steel spatula. To maximize the signal and get a stronger result, it is best to fully cover the sensor (ATR crystal) with the sample. Depending on how much sample was provided to you by the client, you may have excess – this is OK.

6. Bring down the anvil to apply pressure to the sample (onto the diamond ATR crystal) (Figure 11, Point D and Figure 13), which will increase the signal. Take note of where the red dot sits in the viewing window. The optimal location of the red dot is in the centre of the viewing window when the anvil makes first contact with the diamond crystal – the dot should remain in, or very near, that position.

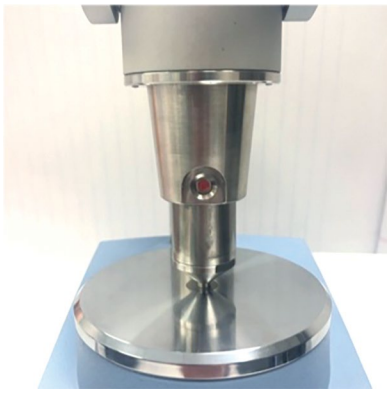


***Figure 13****. Red dot on FTIR pressure head*

**Note**: With powders, especially fine-textured powders, it may be difficult to get a signal. If you cannot get an acceptable signal, ask the client for more powder. If you need to ask for

more powder, remind the client that they will get their sample back.

If the sample is very chunky and hard, crush the chunk to smaller particles or powder so that the anvil will not have any trouble applying pressure to the sample and the sample will not slip away from the pressure anvil. A sudden slip of a chunk while under pressure can cause a collision of the pressure anvil with the diamond crystal.

7. Take note of the peak heights by looking at the scale on the left. Try to get the signal as high as possible, ideally over 0.300. If it is under 0.200, readjust the sample on the sensor and try again.

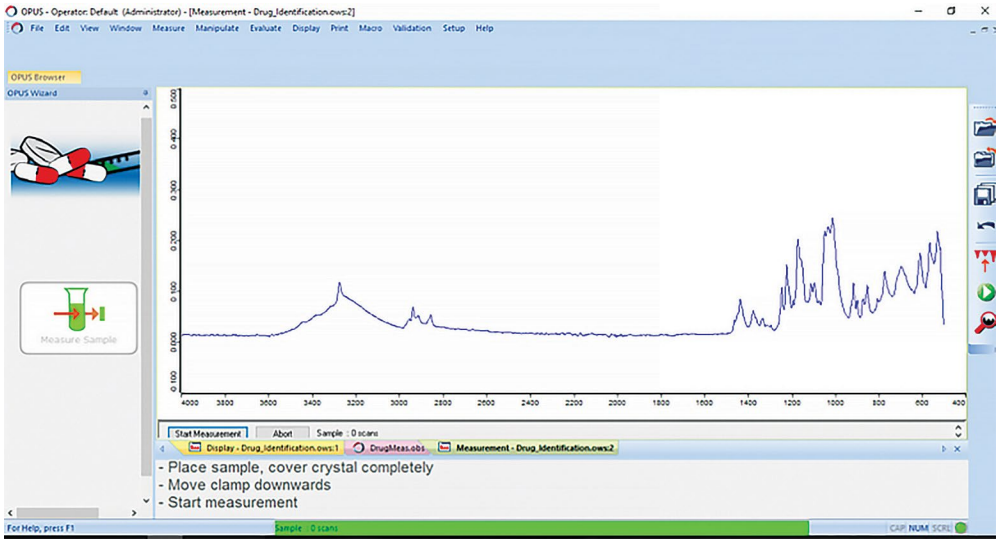



***Figure 14**. Example of Peak Heights*

8. When you have maximized the signal for the sample, click “Start Measurement”. The signal will disappear off the screen but the task bar will turn green — this shows the progress of the scan. The reading will take the same amount of time as the background scan, about 30 seconds. When the reading is finished, OPUS will automatically open the spectrum into the window and run a spectrum search with the last-used parameters.

### 5.1.4 Performing a Spectrum Search

A spectrum search is the function in OPUS that detects the components of an unknown spectrum. OPUS will match the unknown spectrum you generated to reference spectra in selected libraries. Libraries are made up of hundreds of spectra of pharmaceuticals, street drugs, common adulterants, and other substances.

1. After a spectrum is generated, OPUS will usually run a Spectrum Search automatically. If this does not occur, this can be done manually: click “Evaluate” > “Spectrum Search”. You can also use the shortcut button in the toolbox on the right-hand side. The icon is a magnifying glass.

***Figure 15.***
*Magnifying Glass Icon*

2. Once this search is performed, a window will open with three tabs:

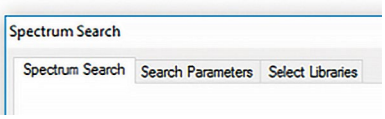



***Figure 16.*** *Window for Spectrum Search, Parameters, and Library*

- **Spectrum Search**: In this tab, you can select which sections of the spectrum to use for the search. To start, ensure that “Use file limits” is selected. This setting uses the entire measured spectrum.
- **Search Parameters**: In this tab, you can select the search algorithm to use. When performing basic analysis, use Spectrum Correlation, Vector Normalization, 1st Derivative.
- **Select Libraries**: In this tab, you can select the reference libraries for the spectrum search**. If it is your first time running a drug sample, ensure that the SWGDRUG, TICTAC ATR-FTIR, and BCCSU libraries are selected at a minimum.**

3. After selecting the relevant options, select “Search Library”.

- The spectral matches will be listed by descending Hit Quality (1000 represents a perfect fit. “Hit Quality” refers to OPUS’ prediction of what the substance is based on in comparison to reference spectra found within selected libraries.
- Samples that contain more than one component are referred to as **mixtures**. Mixtures must be analyzed by subtracting the individual spectral components until there are no residual peaks present (i.e., it has returned to the baseline measurement from the background scan).
- To subtract components, right-click and select “Auto-Subtract” > “New Search”. This subtracts the selected reference spectrum from the measured spectrum, thereby revealing the peaks in the measured spectrum not accounted for by the first reference hit. Note that it may be necessary to perform more than one subtraction (with different reference spectra) to best identify all of the components in a mixture.

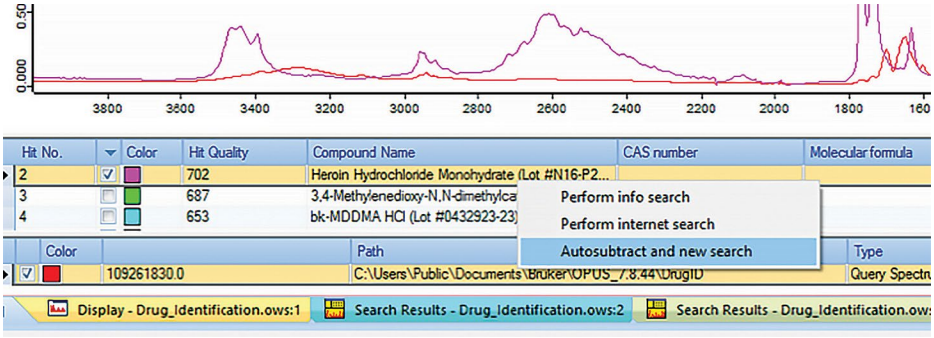



***Figure 17.*** *Instructions for how to Auto-Subtract*

- If there is a section of the subtracted spectrum with a large dip or other subtraction issue, you can use the “Spectrum Search” tab of the “Spectrum Search” function window to restrict the search area, excluding that region. Right click to add or remove new regions and drag the width to fit accordingly.

**Note**: If there are peaks remaining that you think could be more than noise (i.e. they could be a signal from an unknown compound), yet do not match any existing hits, try using different libraries. The PHARMA libraries are very large and therefore slow to run but do contain substances that are not accounted for in the smaller libraries.

- Control which window you are viewing using the tabs at the bottom. Use the 'x' button on the right side to close the present window.

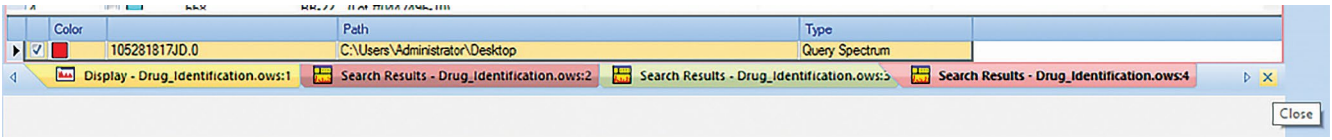



***Figure 18.*** *Instructions for how to close present windows*

4. When the interpretation is complete, unload the spectrum from OPUS by clicking "File" > "Unload All Files", or use the shortcut on the toolbox to the right.

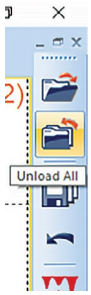



***Figure 19.*** *Shortcut to unload all files*

- You can view which files are loaded into OPUS by viewing the OPUS Browser. Hover your cursor over OPUS Browser in the top left of the OPUS window, below the taskbar.

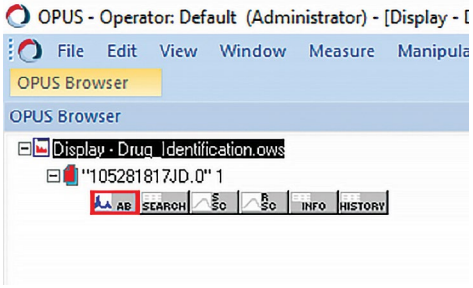



***Figure 20.*** *Instructions for how to view uploaded files*

- When you perform subtractions and spectrum searches, the new subtracted spectrum will be loaded into the OPUS browser. To perform a spectrum search on a specific spectrum, ensure the correct one is highlighted in the OPUS Browser (i.e. the AB block). This is important if you have multiple spectra open in the same window.

5. After unloading the spectra from OPUS, the software is ready to measure a new sample. Click the large button on the left-hand side of the screen that reads "Next Sample".

### 5.1.5 Troubleshooting: How to Recover a Spectrum After Saving a Subtraction

When performing a subtraction analysis in OPUS, it is important to discard changes when closing windows or unloading files to ensure that the original measurement is saved rather than an edited spectrum. See below for an example spectrum saved after a subtraction.

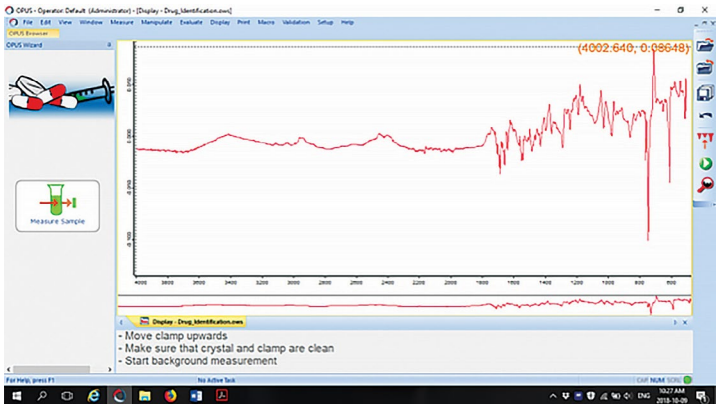



***Figure 21.*** *A subtraction result saved instead of the original spectrum measurement*

In the above figure, the AB Block of the file was replaced by the subtraction result. To recover the original, the AB Block must be regenerated. It is possible to regenerate the AB Block from the “Reference (RSC)” and “Sample Single Channel (SSC)” blocks, using the following steps.

1. With the file loaded into OPUS, open the “Spectrum Calculator” from the “Manipulate” menu in the toolbar.

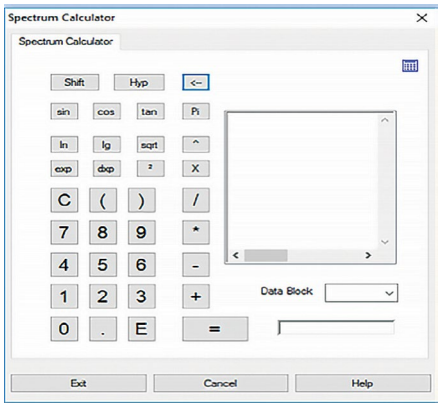



***Figure 22.*** *Spectrum Calculator*

2. Clear the input window by clicking the “←” button.

3. Drag the SSC block from the OPUS browser into the input window. Select “divide” ( / ), then drag the RSC block from the OPUS browser into the input window.

4. Click “equals” ( = ).

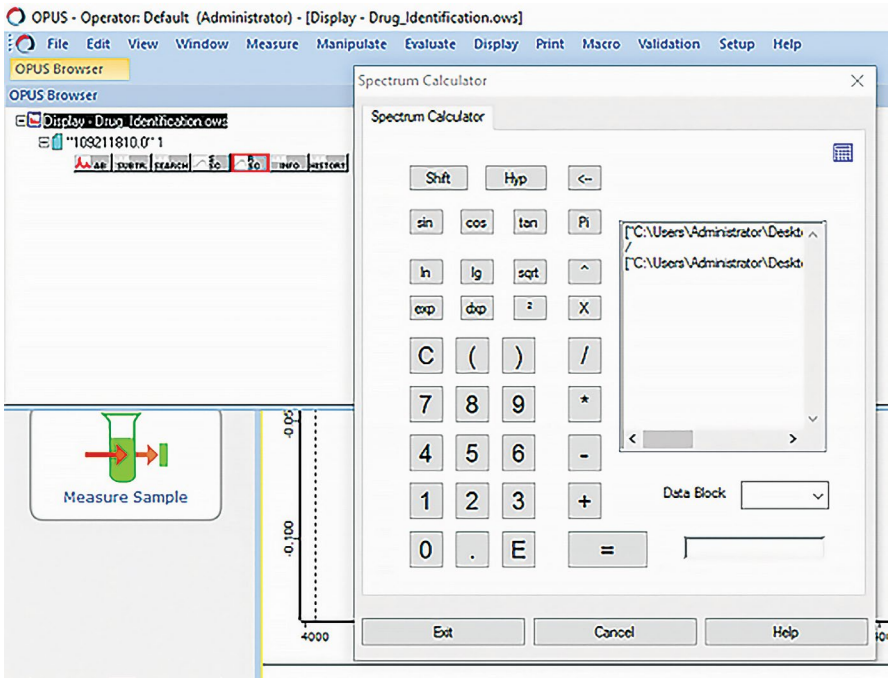



***Figure 23**. Spectrum calculator with relevant buttons highlighted*

This calculation generates a transmission spectrum block. For drug checking, we deal with absorbance spectra, which is the inverse of transmission. To convert from transmission to absorbance:

5. Select the TR Block in the OPUS browser.

6. In the “Manipulate” menu in the toolbar, open “AB <-> TR Conversion”.

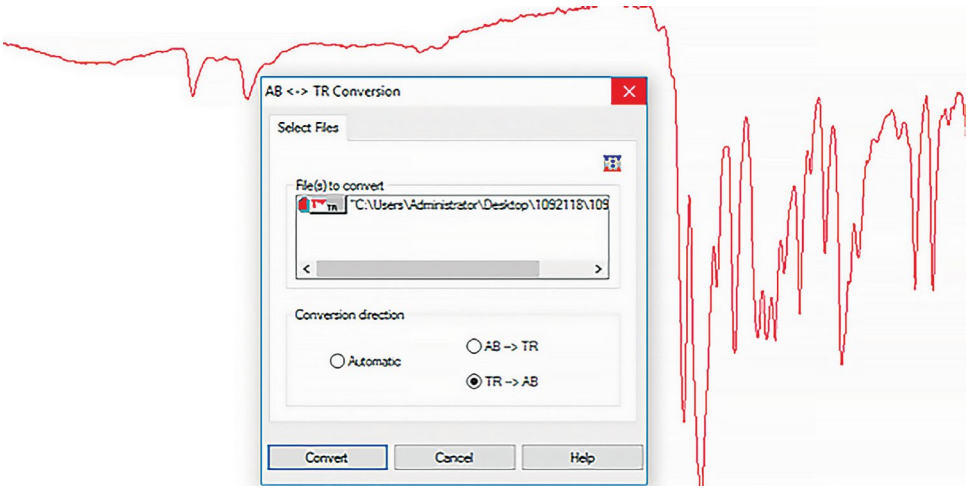



***Figure 24.** AB <-> TR Conversion window*

7. Select “Automatic”.

8. Click “Convert”.

   You can now save the corrected file under the original file name. Select “Save” in OPUS. Remember that to perform analysis, the AB Block in OPUS Browser must be selected.

### 5.1.6 How to export the spectrum files for sharing and safe data storage

It is important to back-up the saved OPUS spectrum files to ensure there is a second copy in case of computer failure, damage, or theft, and to allow for quality checking procedures.

When a sample is measured in OPUS, the spectrum file is automatically saved in a computer folder called *DrugID* located within the OPUS file directory (**C:\Users\Public\Documents\Bruker\OPUS_#.#.##\DrugID**)**.** To open this folder, follow the procedures below:

1. Click the “Windows” (Start) button

2. Type the name of the folder you are searching for, i.e., “DrugID”

3. In the result search window, select the option called, “Find results in folders”

4. Click “DrugID” to open the folder.

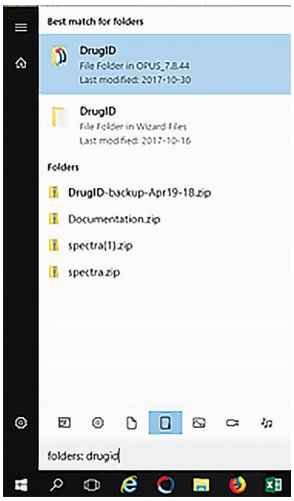



***Figure 25.*** *Instruction for how to open DrugID Folder*

To share the contents of the DrugID folder, select all the files you would like to share and copy them to a new folder. Compress (zip) the new folder into a single file. To do this, right-click on the file folder you wish to share and select “Send to” > “Compressed (zipped)” folder. Save the zipped folder in a secure location for long-term data storage.

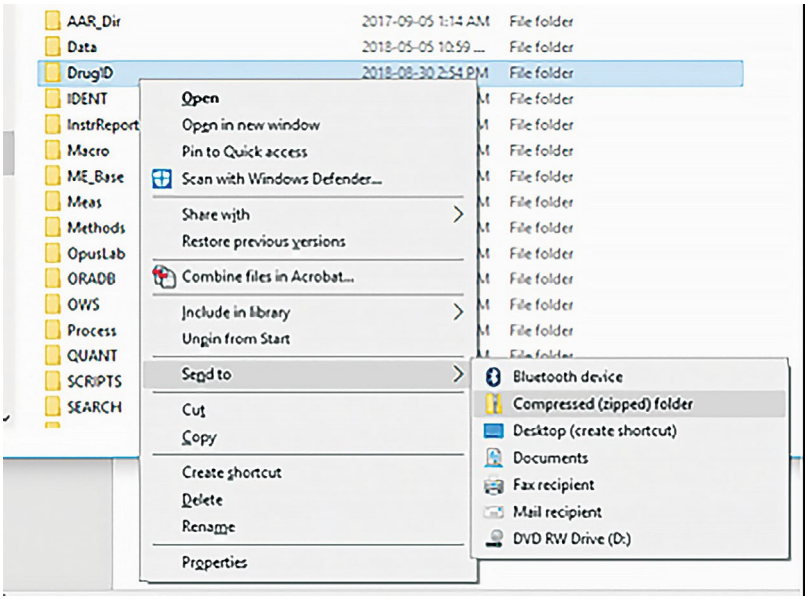



***Figure 26.*** *Instructions for how to share DrugID Folder*

### 5.1.7 FTIR support information

1. Whenever possible, the first point of contact should be another drug checking technician or the BCCSU Senior Drug Checking Technician.
2. If a technician is unable to assist, email Bruker Support at service.bopt.ca@bruker.com. For more urgent service, call the Bruker Service Engineer.
3. If you are unable to connect with Bruker Support via email, contact your Regional Sales Manager.
4. If you are unable to connect with the Bruker support line, call the Bruker Optics North America Service Hotline at 1-987-439-9899 ext. 2.

# 5.2 Fentanyl Test Strips Procedure

1. Add approximately 30 mL (1 ounce) of tap water to a paper cup containing approximately 1 mg of sample and swirl until dissolved. **It is important that no more than 1 mg of sample is used for the fentanyl test. Larger amounts may cause false positive results, especially with crystal meth and MDMA.**
2. Remove the BTNX Rapid Response™ Fentanyl immunoassay strip from the pouch and visually check for any obvious defects. If the package is ripped or torn, discard the test strip.
3. Holding the strip from the solid blue end, dip the white end of the strip into the liquid in the sample cup, taking care not to dip beyond the blue line as this may interfere with the results. When the liquid wicks up the strip to the top of the white portion, (typically about 10-15 seconds), remove the strip from the sample cup and place on a non-absorbent surface or across the top of the cup.
4. Visually examine the strip under bright, direct lighting in order to avoid missing fainter bands. The result can normally be read off the strip immediately, but if colour is slow to develop, you may need to wait up to two minutes for well-defined bands to appear.
    - The upper band (control line) must **always** appear, or else the test is invalid and must be repeated (Figure 27).
    - Do not read/record/interpret results more than 10 minutes after the test has been performed, as a second band may appear even in a positive sample. The result is **no longer valid** after 10 minutes.

- The second (lower) band will often be lighter in colour than the upper (control) band. This is expected and **does not indicate a positive test**. Any second band, even if faint, results in a negative test. If there is any doubt in interpretation, repeat the test. It is safer to repeat the test than to be unsure.

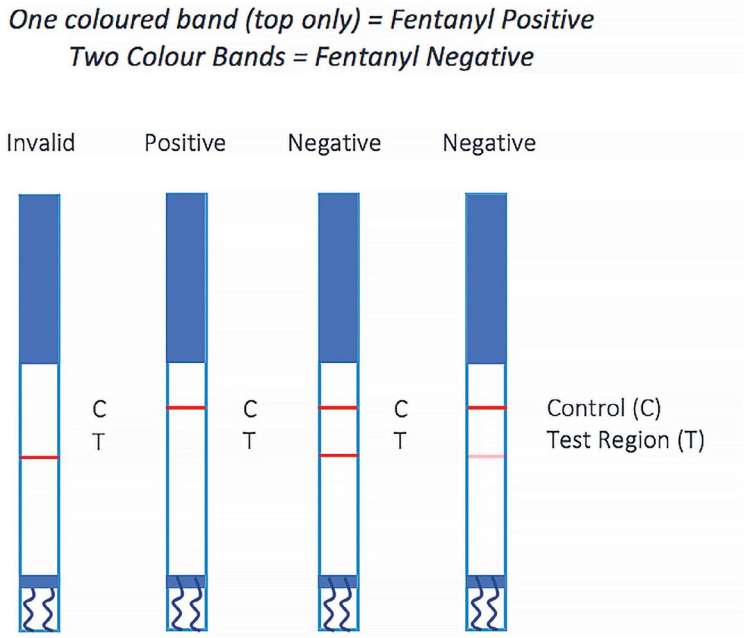



***Figure 27.*** *Invalid, positive, and negative fentanyl test strips.*

5. The sample cup and all discarded substances should be handled and disposed of in accordance with existing site disposal procedures (see Safe Handling and Storage in Section 4.5).

6. Regardless of test results, all clients are able to securely dispose of their substance before leaving the testing area in the site-provided amnesty bin or Deterra™ pouch. Record all witnessed substance disposals.

7. **Note**: Fentanyl test strips must be in a dry location at room temperature (2-30$^0$C; 36-86$^0$F). Test strips are sensitive to humidity and must be used immediately after being opened.[17]

# 5.3 Benzodiazepine Test Strip Procedure

Because of the high potency of benzodiazepines, these drugs are dosed in the sub- to single-milligram range. This means that it is very unlikely that a benzodiazepine would be present in a sample at a level high enough to be above the detection limit of the FTIR spectrometer. **Therefore, in order to test a substance for the presence of benzodiazepines, a BTNX benzo test strip must be used.**

To test a substance with a benzo test strip, the procedure is the same as the fentanyl test strip procedure (see Section 5.2). The same 30 mL sample can be used for multiple test strips. Alprazolam (Xanax), clonazepam, diazepam (Valium), and lorazepam (Ativan) are all examples of benzodiazepines that will react with the BTNX benzodiazepine test strip. **Note that the research chemical etizolam will not react with the benzodiazepine test strip.**

# 5.4 LSD Immunoassay and Ehrlich Reagent Test Procedure

To perform an LSD immunoassay strip test, use clean, fine scissors to cut off a small portion of blotter paper and place it in a paper medicine cup. Add 30mL of water and follow the test strip procedure in Section 6.6. LSD immunoassay strips are selective and require no additional special equipment to perform. The BCCSU uses immunoassay strip testing for all LSD drug checking.

If LSD immunoassay strips are not available, Ehrlich reagent, a colorimetric test, can also be used to detect LSD, DMT, 5-MeO-DMT, 5-MeO-DIPT, psilocybin, psilocin, AMT, and other indoles. Use this test when testing LSD blotter paper. Ehrlich reagent can be purchased from www.testkitplus.com. Ehrlich reagent contains an indicator (DMAB) dissolved in ethanol (sometimes 1-propanol), mixed with a strong acid (hydrochloric). As hydrochloric acid is very corrosive, take care to use proper PPE (nitrile or polyurethane gloves).

The following instructions are adapted from the Test Kit Plus website:

1. Put a small sample into the testing vial or onto a white-coloured, non-porous surface (a ceramic plate is commonly used). If testing blotter paper, cut off a corner with fine scissors.
2. Place 1-2 drops of the reagent from the dropper bottle onto the sample. Make sure to tightly close the dropper bottle. Do not let the sample touch the bottle nozzle or the reagent will be contaminated.

3. Watch the colour change from 30 seconds to 3 minutes. Purer samples (e.g., crystals) may yield more vivid colours than blotters. The colour change will ONLY occur if indole is present in the sample.

4. Compare the sample colour with the colour chart provided in the kit, if necessary.

5. Thoroughly wash the testing vial or non-porous surface after each use. Use an alcohol wipe to clean the scissors or any implement that was used.

6. It is important to note that colourimetric testing, including Ehrlich reagent tests, have limitations. Unlike drug checking with FTIR, colourimetric testing cannot determine impurities. The result is simply a positive or negative for the presence of specific (and some closely-related) drugs. Psychedelic amphetamines like DOB, DOI, or 25I-NBOMe are commonly found on blotter papers; they can have harmful side effects and **do not** react with Ehrlich reagent.

## 5.5 Confirmatory Testing Procedure

The BCCSU is currently able to send a limited number of samples from Insite, a supervised consumption site in Vancouver Coastal Health, and SafePoint, a supervised consumption site in Fraser Health, to partnering laboratories for additional testing. Known, unknown, and new psychoactive substances that are difficult to analyze at point-of-care may be selected for confirmatory testing with more sensitive and selective technologies. Clients may also request that their samples be sent for additional testing.

Partnering laboratories at present test samples using the following methods:

- **Quantitative nuclear magnetic resonance** (qNMR) enables known and unknown samples to be identified using magnetic resonance frequencies unique to particular physical, chemical, electronic, and structural components of a drug sample.[19] This allows for samples to be characterized irrespective of reference to other substances, thus allowing for quantification of novel substances while also acting as a tool for impurity/adulterant profiling.
- **Gas chromatography-mass spectrometry** (GC-MS) separates the sample into components based on their affinity to the chromatography column. GC-MS provides a rapid, semi-automated analysis of molecular structure to determine unknown compounds in complex mixtures using a reference library. While GC-MS is established for impurity profiling of illegal drugs, the process is time consuming as it depends on the volatility of the compound, which is why it is more suitable for laboratory-based testing than point-of-care drug checking.[13]

Clients can obtain their results after 1-2 weeks in one of the two following ways:

- **Results binder**: Confirmatory testing results are printed and stored in a binder onsite. Results can be retrieved by sample ID.
- **Email**: Clients can email drugchecking@bccsu.ubc.ca with their sample ID and will be sent their results within 1-2 weeks. Note that drug checking technicians are not allowed to obtain a client's email address in order to maintain confidentiality.

If the drug checking technician would like to send a sample for confirmatory testing, the following script should be used:

> *I would like to send your sample for additional confirmatory testing.*
>
> *If you agree, the sample that you have already provided will be sent to a laboratory for identification. We will not be collecting any personal identifiers and participation is voluntary.*
>
> *If you consent to participate, I will give you a code that will be matched to your sample. If you are interested in the results, you can return to this site in 1-2 weeks' time and a drug checking technician will provide you with your results. If you prefer, you can email us at drugchecking@bccsu.ubc.ca and we will reply to your email with your results.*
>
> *Do you have any questions?*
>
> *Do we have your consent to send your sample for confirmatory testing?*

### 5.5.1 Sample Confirmatory Testing Protocol

1. If the client consents to confirmatory testing, transfer the sample used for FTIR testing into a glass vial and record that the sample was saved.

2. Seal the vial and label it with the sample code using a marker. Temporarily place the vial into the lockbox at the drug checking table until the end of shift.

3. At the end of the shift, bring the lockbox to the storage safe in the key card protected “Staff Only” room.

4. Transfer the sample vials from the lockbox into the confirmatory testing safe. Note that only drug checking technicians will be able to open and lock this safe using the assigned numeric code but will need to request swipe access to the Staff Only area from Insite staff.

5. The following information must be entered in the ‘Confirmatory Testing Sample IN/OUT Log’ that is kept within the safe:

   IN: (recorded by the drug checking technician at the time of sample addition)
   Number of samples added
   Date and time
   Drug checking technician name

   OUT: (recorded by drug checking technician at the time of courier pickup)
   Date and time
   Name of drug checking technician

6. Prepare labels. Include sample ID and a unique barcode. Package vials into independent exhibit bags and seal.

7. Affix each label to the outside of the corresponding exhibit bag, crosschecking each sample number on the vial against that on the barcode label. Take a photograph of each bagged sample, ensuring the full barcode label and sample number is captured.

8. Package the samples for courier pick-up by placing sealed evidence bags in a padded envelope and affix the DAS Lab address label.

9. Return the envelope to the Confirmatory Testing Safe, to be stored securely until the courier picks up the samples.

10. When the courier arrives on site, retrieve the package from the safe and provide the fully packaged and labelled enveloped to the courier (ensuring to record this in the IN/OUT log and ensuring that the FTIR and laptop are monitored by a staff person).

# 6.0 Harm Reduction Messaging

The BCCSU drug checking program provides a key opportunity to connect with people who use drugs and provide them with valuable and potentially life-saving harm reduction information. These conversations can occur during the few minutes while substances are being checked or while providing drug checking results back to clients.

It is critical for the drug checking technician to be familiar with some of the more common drug interactions and be able to provide detailed information on the results of the drug check and potential harms. Drug checking technicians will be provided with drug information binders, harm reduction information, and a TripSit drug combination chart, which may be valuable reference materials for these conversations.

The disclaimer (see Appendix 7.1) provides some harm reduction messaging, including:

1. Don't use alone
2. Know the signs of overdose and call 911 if you think someone needs help
3. Start with a small amount
4. Carry and know how to use naloxone
5. Avoid mixing substances (especially alcohol with opioids and other depressants), which increases your risk of overdose
6. Use where help is available, if possible, like an overdose prevention site

Additional harm reduction tips may include:

1. Eat a meal before you start using
2. Drink lots of water and stay hydrated (but don't drink too much!)
3. Use slowly
4. Locate medical services (and the sanctuary, at festivals) before using
5. Visit an overdose prevention site to obtain safer consumption materials (e.g., sterile syringes, needles, straws)

When discussing harm reduction, it is important to choose your language carefully to ensure

that you are not coming across as paternal, shaming, or denigrating. For example, avoid using language like, “You should…”, “You need to…”, “I need you to listen…”. If you do not know the answer to a question, harm reduction questions should be forwarded to SCS/OPS staff. Please see Appendix 7.2 for additional harm reduction resources.

**Issuing Alerts for Harmful Substances**

When drug checking technicians encounter samples that are suspected to be unusually dangerous and that might have wider public health implications (e.g., substances that could result in unusual or high numbers of overdoses), alerts should be issued to the community site and to the relevant health authority. This protocol should be established by your team ahead of time.

Some examples of scenarios in which the BCCSU issued a public health alert include:

| Date | Location | Expected Substance | Result |
|---|---|---|---|
| 31-Dec-18 | SCS #1 | Cocaine | Fentanyl |
| 14-Feb-19 | SCS #2 | “Down” | AMB-FUBINACA and Fentanyl |
| 15-Mar-19 | SCS #1 | Xanax | Fentanyl (negative for benzos) |

**Sample Email**

Dear all,

This morning at _____Supervised Consumption Site in _____, AMB-FUBINACA was found to be in a sample of heroin by spectrometer drug checking.

Medical staff on site reported the sample caused an overdose with an irregular presentation, with the participant experiencing seizure-like symptoms and an irregular pulse. For more information on the overdose, please contact the client care coordinator of the site.

The substance was light brown in colour with a granular appearance. A picture is attached to this email. The client had expected this substance to contain heroin and was sold it by a dealer who apparently found it on the ground in the Downtown Eastside. The FTIR spectrometer finding was caffeine and AMB-FUBINACA. Fentanyl test strip result was negative.

The sample tested has been saved for confirmatory analysis.

If you have any questions or require more information, please contact me or site staff.

[Drug checking technician email signature]

# 7.0 Appendices

## 7.1 Drug Checking Disclaimer

### DRUG CHECKING
### FTIR SPECTROMETER + FENTANYL TEST STRIPS

**Drugs may not be what you think!**

Even if you know your source, your drugs may contain unexpected and dangerous substances

Drug checking can help **reduce risk** by providing information about what is actually in a substance, allowing you to make **better-informed decisions**

**What we <u>can</u> tell you about your sample:**

*With the FTIR:*

- Up to 3-4 different components in a mixture and approximate proportions
- Other drugs and cutting agents that may be mixed in or used as filler

*With the strips:*

- Whether your sample contains fentanyl and some fentanyl analogues
- **Note**: strips only test for fentanyl within the sample provided. Fentanyl may still be present in the remainder of the drug batch. Strips may occasionally report a negative result when fentanyl or an analogue is present

**What we <u>cannot</u> tell you about your sample:**

- The FTIR cannot detect substances present in small amounts (less than about 5%)
- Specific quantities or the exact percentage in a mixture
- New or rare substances we don't have in our reference database
- We cannot reliably distinguish between specific substances with similar chemical make-up (e.g., 2C-family, fentanyl analogues)

**Checking your drugs cannot guarantee that a drug is safe to use**
**The FTIR and the strips may occasionally miss fentanyl, fentanyl analogues, or other dangerous substances**

**Even after checking your drugs, we recommend you**:

Never use alone

- Know the signs of overdose and call medical aid if you think someone needs help
- Start with a small amount
- Carry and know how to use naloxone
- Avoid mixing substances (especially alcohol with depressants) which increases your risk of overdose
- Use where help is available whenever possible, like at an overdose prevention site

# 7.2 Harm Reduction, Drug Information, and Other Resources

| | |
|---|---|
| EROWID | Erowid is a non-profit educational resource that provides information about psychoactive plants, chemicals, and related issues.<br>https://www.erowid.org |
| TRIPSIT | TripSit is a non-profit organization that provides harm reduction techniques/tools and support for people who use drugs.<br>https://tripsit.me |
| bc211 A United Way Partnership | bc211 is a non-profit organization that specializes in providing free information and referral regarding community, government, and social services in BC.<br>http://www.bc211.ca/ |
| ANKORS | AIDS Network Kootenay Outreach and Support Society (ANKORS) is a non-profit organization that provides a variety of harm reduction services, including drug checking, in the interior of British Columbia<br>www.ankorsvolunteer.com |
| | Drug Identification Chart—A reference tool developed by the RCMP, Sûreté du Québec, Canadian Association of Chiefs of Police and Health Canada for identifying illicit drugs and their harmful effects.<br>www.rcmp-grc.gc.ca/drugs-drogues/poster-affiche/index-eng.htm |

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**British Columbia Centre on Substance Use.** *Drug Checking as a Harm Reduction Intervention: Evidence Review Report*. **Vancouver, BC; 2017. https://www.bccsu.ca/wp-content/uploads/2017/12/Drug-Checking-Evidence-Review-Report.pdf. Accessed August 27, 2018.**

**Public Health Ontario.** *Evidence Brief: Drug Checking Services as a Harm Reduction Intervention*. **Ontario; 2017. https://www.publichealthontario.ca/en/eRepository/Evidence_Brief_Drug_Checking_2017.pdf. Accessed August 28, 2018.**

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**Ventura M, Noijen J, Bücheli A, et al.** *Drug Checking Service: Good Practice Standards*.**; 2013. www.safernightlife.org. http://newip.safernightlife.org/pdfs/standards/NEWIP_D_standards-final_20.12-A4.pdf Accessed August 27, 2018.**

# 7.3 Deterra Pouch Technology

DETERRA
drug deactivation system

Safe. Convenient. Effective.

## Deterra® is the solution

Closing the loop on the pharmaceutical lifecycle


### *Vetted, Endorsed, and Recommended*

- The manufacturers of Deterra have testified before a Joint Congressional Committee about at-home drug deactivation.
- The manufacturers of Deterra have testified before the FDA to amend recommendation to expand to the use of at-home drug deactivation and disposal technology.
- Deterra is endorsed by the DEA Educational Foundation. The White House Office of National Drug Control Policy cited at-home deactivation technology in their Drug Control Policy 2.0
- The President's Commission on Combating Drug Addiction and the Opioid Crisis supported the use of drug deactivation pouches for disposal of unused prescription opioids.

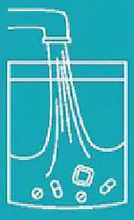
### *Put Into Use*

- Deterra was developed under a Small Business Innovation Research (SBIR) contract with the National Institute on Drug Abuse (NIDA).
- Attorneys General in Pennsylvania and Kentucky are currently distributing Deterra pouches throughout their states.
- Pending legislation has been put forth in multiple states to provide for at-home drug deactivation and disposal technology.
- Deterra enjoys many marquee clients in six market verticals.

## The Deterra® drug deactivation system neutralizes drugs effectively, safely and quickly.

Each patented Deterra pouch contains a water-soluble inner pod containing $MAT_{12}$® activated carbon. Once the pharmaceuticals are placed in the pouch, warm water is then added, which dissolves the inner pod releasing the activated carbon. The warm water will also help dissolve pills and draw the drugs out of patches.


1 Tear open pouch and place unused medications inside



2 Fill pouch halfway with warm water and wait 30 seconds

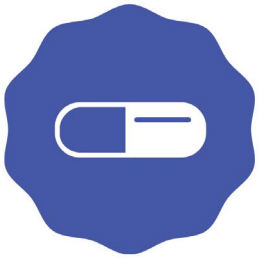
3 Seal pouch tightly, gently shake and dispose of in normal trash

www.DeterraSystem.com

verde Technologies

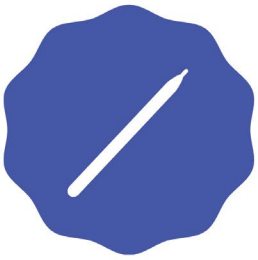
# 7.4 Drug Checking Procedural Posters

## WHAT'S IN YOUR DRUG?
## FENTANYL TEST STRIPS



### 1. PROVIDE A DRUG SAMPLE

Technician mixes your drug sample (about the size of one grain of salt) with ~30mL of tap water in a paper cup.



### 2. DIP THE STICK

Technician removes the test strip from pouch and puts it into the solution (up to blue line) for >10 secs. The wet strip is placed on a non-absorbent surface for 2 min.

### 3. READ THE RESULT

One red band = positive for fentanyl
Two red bands = negative for fentanyl

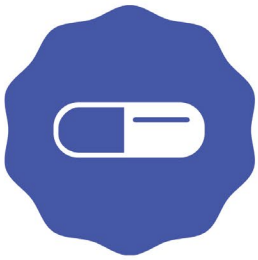
### 4. CLEAN UP

The cup and tap water are disposed of using on-site disposal procedures.

DISCLAIMER: Strips only test for fentanyl within the sample provided. Fentanyl may still be present in the remainder of the drug batch. **Strips may occasionally report a negative result when fentanyl or an analogue is present.**

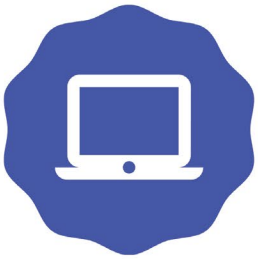
BRITISH COLUMBIA CENTRE ON SUBSTANCE USE

# WHAT'S IN YOUR DRUG?
# FT–IR SPECTROMETER



## 1. PROVIDE A DRUG SAMPLE

Place a small sample of your drug – equivalent of a few grains of salt – onto the sample tray.



## 2. COMPLETE THE TEST

Technician scans the drug sample using the FT-IR spectrometer (this typically takes a few minutes). Possible hits are matched to a drug library and are reviewed by the technician.

## 3. GET YOUR RESULTS

Technician reports results to you, advising of drug check limitations.

## 4. FENTANYL TEST STRIP

Tray is cleaned. The sample can be re-used for the fentanyl strip test, given back to you, or disposed of.

**DISCLAIMER**: Our technicians will not be able to tell you specific quantities or percentages of components in a mixture. The FT-IR cannot detect new or rare substances that are not in our database. The FT-IR cannot distinguish between some substances that have a similar chemical structure (e.g., substances within the 2C-Family or fentanyl analogues). The FT-IR cannot detect substances in small amounts (less than about 5%). **A fentanyl test strip is always recommended to check for fentanyl and fentanyl analogues.**

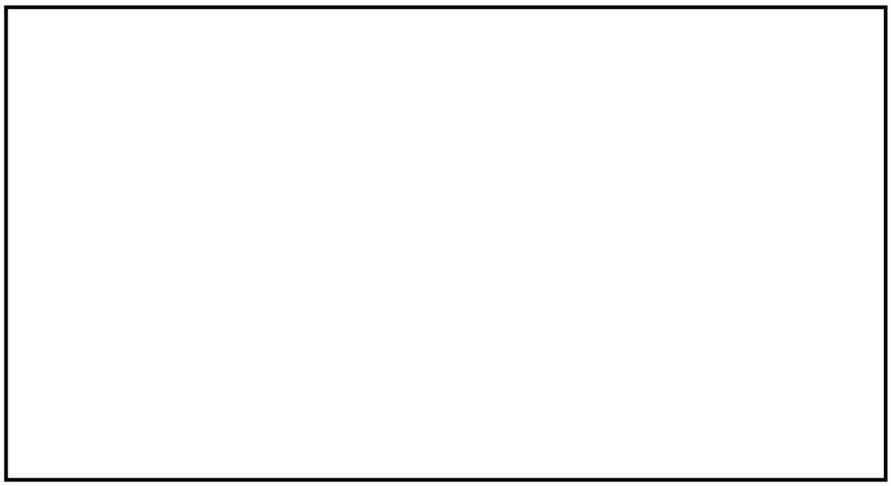
BRITISH COLUMBIA CENTRE ON SUBSTANCE USE

# 7.5 Drug Checking Results Slips

Drug checking results for this substance:

Fentanyl: + ☐ – ☐ o ☐

Appearance



To help improve your clinical care, please hand this result to consumption room staff if you plan on using the room

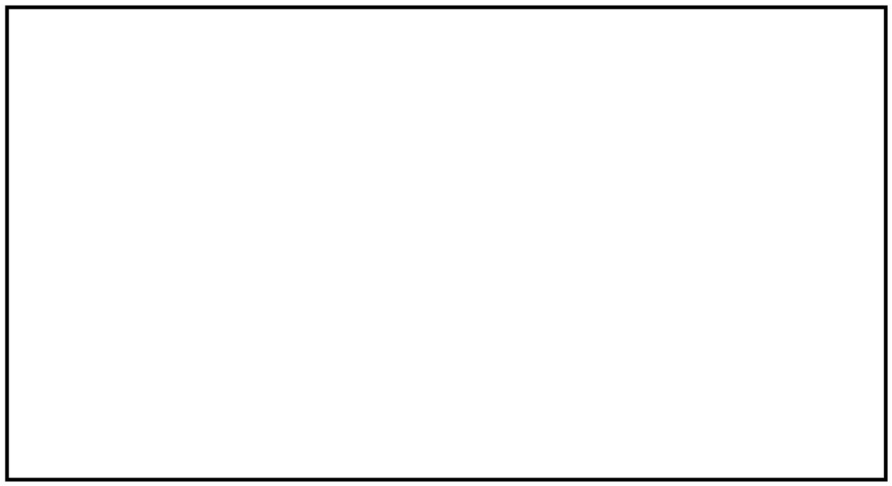
*Know what you're using before you use*

BRITISH COLUMBIA CENTRE ON SUBSTANCE USE

Drug checking results for this substance:

Fentanyl: positive ☐ negative ☐

Appearance



To help improve your clinical care, please hand this result to consumption room staff if you plan on using the room

*Know what you're using before you use*

BRITISH COLUMBIA CENTRE ON SUBSTANCE USE

# 7.6 Sample Logging Template

| Confirmatory Testing IN Log | | | | | |
|---|---|---|---|---|---|
| DATE IN DD/MM/YYYY | TIME IN 24:00 | SAMPLE ID | TECHNICIAN NAME | RUNNING TOTAL OF SAMPLES | SAMPLE SENT FOR TESTING |
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| Confirmatory Testing OUT Log | | | |
|---|---|---|---|
| DATE OF COURIER PICK UP DD/MM/YYYY | NUMBER OF SAMPLES SENT FOR TESTING | NUMBER OF SAMPLES REMAINING | TECHNICIAN NAME |
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# 7.7 Data Reporting Sheet

**Drug Checking Results**

BRITISH COLUMBIA CENTRE ON SUBSTANCE USE

| SAMPLE ID | EXPECTED DRUG | COLOUR & TEXTURE | PRE- OR- POST-CONSUMPTION | FTIR COMPONENT 1 | FTIR COMPONENT 2 | FTIR COMPONENT 3/ FTIR COMPONENT 4 | FENT (-/+/o) | NOTES (Include mixture analysis and additional test types) | Witnessed disposal? Check if yes |
|---|---|---|---|---|---|---|---|---|---|
| | | | PRE-<br>POST- | | | | | | |
| | | | PRE-<br>POST- | | | | | | |
| | | | PRE-<br>POST- | | | | | | |
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| | | | PRE-<br>POST- | | | | | | |
| | | | PRE-<br>POST- | | | | | | |

Date: _____ Technician Name: _____ Location: _____

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**www.bccsu.ca**