BRITISH COLUMBIA CENTRE ON SUBSTANCE USE
Networking researchers, educators & care providers

Standard Operating Procedure

Drug Crushing for Drug Checking Services

BRITISH COLUMBIA CENTRE ON SUBSTANCE USE
Networking researchers, educators & care providers

Purpose and Scope

These procedures are intended to provide guidance to drug checking technicians on how to perform drug crushing for drug checking in any setting (e.g., fixed site, mobile, festival).

Drugs that are likely to contain more than one compound, are in crystal form, or have a hard coating need to be crushed into a powder prior to testing. Proper drug crushing facilitates effective testing and promotes uniform mixing of ingredients to avoid "hot spots" (i.e., areas of concentration). Proper drug crushing methods also protect against contamination, as drugs may unexpectedly shatter and spread when under pressure (i.e., being crushed). Specific drug crushing tools are designed to reduce the risk of contamination by increasing the crushing leverage power and using a vessel to contain the substance during crushing.

All technicians involved in drug crushing activities are required to review and be familiar with the BCCSU's *Reducing Exposure and Contamination Risk in Drug Checking Services* for information on Personal Protective Equipment (PPE), training, exposure reduction, and cleaning procedures.

Drug Crushing Equipment and Considerations

The following equipment is used during drug crushing activities:

- Drug crushing device: manual or electric pill crusher, or a mortar and pestle.
- Disposable vessels (i.e., plastic pill crushing pouches or paper medicine cups).
- Metal lab spatula or round aluminum rod.
- Reinforced surface (e.g., marble slab).
- Disinfecting agent (e.g., isopropyl alcohol swabs).
- Task wipes (e.g., KimWipes).
- Biohazard waste containers (i.e., a sharps container).
- PPE, in accordance with the BCCSU's *Reducing Exposure and Contamination Risk in Drug Checking Services*

For more details on drug crushing equipment, see Additional Information for Drug Crushing Equipment, and Appendix A – Summary of Drug Crushing Equipment.

2.1 Minimize Exposure and Spread

Drug crushing methods should minimize substance spread and exposure risk. Methods that use a disposable vessel are preferred as they contain the substance during crushing and prevent contamination of the drug crushing instrument.

2.2 Minimize Product Loss

Product loss is a valid concern when choosing a drug crushing method, particularly in contexts where samples are returned to service users. Aside from the minimal product loss that occurs naturally during drug crushing (i.e., adhering to disposable vessel surfaces), product loss can also occur when powder becomes trapped at the pill crushing pouch seal[1] or in the folds of a paper medicine cup, or when a disposable vessel breaks during crushing (e.g., when crushing a sharp substance inside an electric pill crusher).

2.3 Ease of Use

It is recommended that technicians working at high-volume events (e.g., festivals) choose a drug crushing method that is easy to use and promotes the reduction in risk of work-related musculoskeletal injury associated with repetitive movements (e.g., lever pill crushers[2]).

2.4 Portability

When involved in mobile services, technicians may prefer equipment that is easy to transport and use in various environmental conditions and settings. For example, some pill crushers are heavier or take up more physical space than others based on the nature of their design, which may prove challenging for some mobile services with limited space or frequent set-up and tear-down.

BRITISH COLUMBIA CENTRE ON SUBSTANCE USE
Networking researchers, educators & care providers

Applicable Substances

Most substances can be crushed for drug checking purposes. This includes:

- Any substance in tablet form (i.e., pressed pill), such as products sold as benzodiazepine tablets (i.e., Xanax) or MDMA.
    - Uncoated tablets, such as those sold as MDMA, are more brittle on the outside and easier to crush.
    - A hard film coating on some regulated drugs is used to hide an unpleasant taste or maintain drug stability.[3] Extended-release capsules also have a hard coating on internal granules to help slow drug absorption[3] (e.g., Kadian®). These coatings make the substance more challenging to crush. While regulated substances are likely to be those with a coating, and therefore less likely to be presented for drug checking, there may be situations where technicians encounter substances like coated opioids (e.g., extended-release oxycodone) that are also specifically designed to be harder to crush.
- Substances in crystal form, such as crystal meth, MDMA, or ketamine.
    - Substances in a crystal or chunk form can be crushed using the same procedures as tablets, with particular attention to the points on any crystals that may protrude through a disposable vessel, causing the vessel to break.

Some samples do not require crushing, such as those already in powder form or smaller than a half grain of rice in size. However, if there is concern that the sample may be a complex mixture of compounds or the sample is not well-mixed—which may be indicated by non-uniformity in drug sample colour—additional drug crushing is warranted before testing.

Drug Crushing Procedures

Before crushing a drug sample, prepare a space to use the drug crushing equipment. Use a dedicated, clean, flat drug crushing surface for all drug crushing activities. Remove any liquids or other samples in the area that could spill and contaminate the testing space.

To minimize the risk of contamination, always wash hands and don clean and appropriate PPE (e.g., eye protection, gloves, mask) before starting any drug crushing activity. Refer to the BCCSU's *Reducing Exposure and Contamination Risk in Drug Checking Services* for details.

1.1 Drug Crushing with a Mortar & Pestle

1.1.1 With a Pill Crushing Pouch

1. Ask the service user to place the substance to be crushed into a pill crushing pouch.
2. Remove as much air as possible from the pouch and seal (if applicable).
3. Place the sealed pouch containing the substance into the middle of the mortar.
4. Firmly grip the pestle with one hand and place it on top of the substance in the pouch and firmly hold the mortar in place with the other hand.
5. Gently pound or hammer the pouch to begin the crushing process, then press and twist the pestle against the substance, using a firm rolling motion.
6. Repeat the firm rolling motion in the opposite direction.[4]
7. Continue until there are no more chunks and the substance appears to be a finely ground, well-mixed powder.
    a. Refer to 2.2 Broken or Damaged Disposable Vessel if the pouch becomes damaged or breaks during drug crushing.
8. Using a metal lab spatula, transfer the substance from the pouch to the drug checking instrument for analysis.
9. If requested, return any remaining sample to the service user, or dispose of in Deterra pouch or kitty litter.
10. Clean the mortar, pestle, and spatula with individual disinfecting wipes, then dry with task wipes and dispose of in biohazard waste.
11. Replace PPE and wash hands as needed to prevent exposure and cross contamination.

1.1.2 With Paper Medicine Cups

1. Ask the service user to place the substance to be crushed into a paper medicine cup.
2. Place the paper medicine cup into the middle of the mortar and place a second paper cup on top of the first one, covering the substance.
3. Firmly grip the pestle with one hand and place it into the top paper cup, and firmly hold the mortar in place with the other hand.
4. Press and twist the pestle against the base of the top paper cup, using a firm rolling motion and gentle pounding or hammering to begin, if the substance is particularly hard.
5. Repeat the firm rolling motion in the opposite direction.[4]
6. Continue until there are no more chunks and it feels like the substance is a finely ground, well-mixed powder.
    a. Refer to 2.2 Broken or Damaged Disposable Vessel if the paper medicine cup becomes damaged or breaks during drug crushing.
7. Carefully separate the top paper medicine cup so that it is still contained within the bottom paper medicine cup and gently tap it with a metal lab spatula to release any powder that has adhered to the bottom or side surfaces.
    a. If the powder does not yet appear to be a suitable consistency or well mixed, place the top paper cup back onto the powder and resume crushing.
8. Dispose of the top paper medicine cup in biohazard waste.
9. Using a metal lab spatula, transfer the substance from the pouch to the drug checking instrument for analysis.
10. If requested, return any remaining sample to the service user, or dispose of in Deterra pouch or kitty litter.
11. Clean the mortar, pestle, and spatula with individual disinfecting wipes, then dry with task wipes and dispose of in the biohazard waste.
12. Replace PPE and wash hands as needed to prevent exposure and cross contamination.

1.2 Drug Crushing with a Manual Pill Crusher

1. Ask the service user to place the sample into the appropriate disposable vessel.[a]
    a. If using a pill crushing pouch, remove as much air as possible before sealing (if applicable).

[a] Depending on whether a pill crushing pouch or paper medicine cup is used with the pill crusher.

2. Follow the specific pill crusher instructions for placement of disposable vessel containing the sample.
3. Proceed with crushing according to the device (i.e., using lever, twisting, or rocking).
    a. Refer to 2.2 Broken or Damaged Disposable Vessel if the disposable vessel becomes damaged or breaks during drug crushing.
4. Stop crushing when the substance appears to be a finely ground, well-mixed powder.
5. If using paper medicine cups, carefully separate the top paper medicine cup so that it is still contained within the bottom paper medicine cup and gently tap it with a metal lab spatula to release any powder that has adhered to the bottom or side surfaces. Dispose of top paper medicine cup in biohazard waste.
6. Using a metal lab spatula, transfer the substance from the disposable vessel to the drug checking instrument for analysis.
7. If requested, return any remaining sample to the service user, or dispose of in Deterra pouch or kitty litter.
8. Follow specific pill crusher instructions for cleaning.
    a. If no cleaning instructions are specified, clean the pill crusher with a disinfecting wipe, then dry with a task wipe and dispose of both in the biohazard waste.
9. Clean the metal lab spatula with a disinfecting wipe, then dry with a task wipe and dispose of both in the biohazard waste.
10. Replace PPE and wash hands as needed to prevent exposure and cross contamination.

1.3 Drug Crushing with an Electric Pill Crusher

1. Ask the service user to place the sample into the designated pill crushing pouch[b] and remove as much air as possible before sealing (if applicable).
2. Follow the specific pill crusher instructions for placement of pill crushing pouch (e.g., into the crushing compartment) then push the crush button or wait for the sensor to detect the sample and begin crushing.
    a. If the pouch breaks during drug crushing, follow the specific pill crusher instructions for how to proceed and clean the device.
3. When crushing is complete, follow the specific pill crusher instructions to remove the pouch.
4. Using a metal lab spatula, transfer the substance from the pouch to the drug checking instrument for analysis.

[b] The pill crushing pouch that comes with the electric pill crusher.

5. If requested, return any remaining sample to the service user, or dispose of in Deterra pouch or kitty litter.
6. Follow the specific pill crusher instructions for cleaning between drug crushing events.
7. Replace PPE and wash hands as needed to prevent exposure and cross contamination.

1.4 Drug Crushing with Paper Medicine Cups and Round Rod or Metal Spatula

1. Place a reinforced surface (e.g., a marble slab) on table to protect the surface and provide resistance when crushing.
2. If needed, place a paper towel[c] on the reinforced surface to help prevent slippage.
3. Stack two paper medicine cups together (to reinforce in the event of paper medicine cup breakage), then place on the paper towel.
4. Place the sample into the top paper medicine cup, then place a third paper medicine cup on top of the sample.
5. Use a 1” round aluminum rod or the smooth end of a metal lab spatula as a pestle to gently pound or hammer the substance into smaller pieces through the paper medicine cup.
    a. If using a metal lab spatula, use the beveled side to further crush smaller pieces using a firm pressing motion.
    b. Refer to 2.2 Broken or Damaged Disposable Vessel if a paper medicine cup becomes damaged or breaks during drug crushing.
6. Stop crushing when there are no more chunks, and it feels like the substance is a finely ground powder.
7. Carefully separate the top paper medicine cup so that it is still contained within the bottom paper medicine cup and gently tap it with the metal lab spatula to release any powder that has adhered to the bottom or side surfaces.
    a. If the powder does not yet appear to be a suitable consistency or well mixed, place the top paper medicine cup back onto the powder and resume crushing.
8. Dispose of the top paper medicine cup in the biohazard waste.
9. Using a metal lab spatula, transfer the substance from the paper medicine cup to the drug checking instrument for analysis.
10. If requested, return any remaining sample to the service user, or dispose of in Deterra pouch or kitty litter.

[c] A task wipe may be used if a paper towel isn’t available.

11. Clean the round aluminum rod or metal lab spatula with a disinfecting wipe, then dry with a task wipe and dispose of in biohazard waste.
12. Dispose of the used paper towel in biohazard waste.
13. Clean the reinforced surface (e.g., marble slab) and table surface underneath with disinfecting wipes then dry with task wipes and dispose of in biohazard waste.
14. Replace PPE and wash hands as needed to prevent exposure and cross contamination.

Procedure Notes

2.1 Sample Size

If the service user has a whole tablet or large sample in excess of what's needed for crushing (i.e., the size of approximately half a grain of rice):

1. Ask if the service user would like the entire tablet or large sample to be crushed. Doing so will increase the likelihood of having a more representative reading.
    - If the service user would prefer only the minimum necessary sample size be used, request their permission to break off a smaller piece of the substance.
2. If the substance is not already in a plastic bag, transfer the substance into a drug crushing pouch (or plastic bag if no pouch is available) and seal it (if applicable).
    - If no plastic bag or pouch is available, use stacked paper medicine cups: place the substance into one paper medicine cup, then place a second paper medicine cup on top of the substance.
3. Break off a piece of the substance through the pouch using a metal lab spatula.
    - If using paper medicine cups, use a metal lab spatula to break off a smaller piece through the top paper medicine cup.
4. Open the pouch and pour the sample to be crushed into the applicable disposable vessel for drug crushing.[d]
    - If using paper medicine cups, carefully separate the top paper medicine cup so that it is still contained within the bottom paper medicine cup and gently tap it with the metal lab spatula to release any powder that has adhered to the bottom or side surfaces.
    - Pour the sample to be crushed from the bottom paper medicine cup into a new paper medicine cup for drug crushing.
5. If appropriate, return the remaining substance in the pouch, bag, or paper medicine cup to the service user.
    - If not returned to the service user, dispose of in Deterra pouch or kitty litter.
6. Dispose of any contaminated paper medicine cups in the biohazard waste.

[d] Applicable disposable vessel depends on the drug crushing device being used.

2.2 Broken or Damaged Disposable Vessel

If a paper medicine cup or pill crushing pouch breaks or becomes damaged when using a manual pill crusher or mortar and pestle:

1. Stop crushing.
2. Use a metal lab spatula to scoop as much of the escaped sample as possible into a new disposable vessel, then set this aside where it will not be disturbed during clean-up.
3. Clean the metal lab spatula or other equipment used to collect the spilled sample with disinfecting wipes, then dry with task wipes.
4. Dispose of the broken or damaged disposable vessel in biohazard waste.
5. If the bottom paper medicine cup broke and the substance contaminated the drug crushing equipment or table surface, clean all equipment and nearby surfaces with disinfecting wipes, then dry with task wipes and dispose of both in biohazard waste.
6. If using a mortar and pestle and access to a sink with warm water and soap is available, it is recommended that the mortar, pestle, and spatula be washed with warm water and soap after cleaning with disinfecting wipes to increase removal of drug residue.[5] Dry with task wipes and dispose of in biohazard waste.
7. Resume drug crushing according to the drug crushing device and methods.

Additional Information for Drug Crushing Equipment

3.1 Pill Crushers

Pill crushers are devices commonly used in pharmaceutical and healthcare settings to break down drugs into powder for compounding or administration (e.g., through a feeding tube). Pill crushers offer the following advantages:

- Reduced aerosolization (when crushed drug particles become airborne) as the substance is contained within the crushing chamber of the pill crusher.
- Many pill crushers are intended to be used with pill crushing pouches. These pouches prevent cross-contamination by eliminating the pill crusher's exposure to a substance, and are designed to be strong enough to withstand the pressure of crushing. As there is no routine contamination of the crushing equipment by the substance,[6] or cross-contamination with other substances, there is no standard requirement to wash the pill crushing equipment between drug crushing events.[6]
- Some manual pill crushers are ergonomically designed to help reduce the risk of work-related musculoskeletal disorders.[2]
- Pill crushers can facilitate technician efficiency at high-volume events (e.g., festivals).

There are two main types of pill crusher: manual and electric.

3.1.1 Manual Pill Crushers

Many manual pill crushers involve lifting a lever up and down to exert pressure on a crushing pad. Most of these come with specific disposable vessels (e.g., a paper medicine cup or a pill crushing pouch). Other manual pill crushers use a twisting action (i.e., rotating and grinding) to crush a drug within a crushing area,[1,2] or a rocking motion, where the top component of the device crushes the substance placed underneath.[1] Anecdotal reports suggest that the twisting and rocking crushers are more difficult to clean compared to lever crushers.

Manual pill crushing, such as with some lever-based devices, can result in high levels of static muscle loading—where the same posture or position is held throughout exertion—which increases the risk of musculoskeletal injury.[7] This is an important consideration for high-volume drug crushing sites or events such as music festivals. To reduce the risk of injury, manual pill crushing should be conducted with the crushing device at approximately hip height, with the length of the device extended forward from where the technician stands.[7]

3.1.2 Electric Pill Crushers

Electric pill crushers operate the same way as manual pill crushers, except they have a button-activated crush or a sensor instead of manual operation.[1,2] These are intended to minimize user fatigue,[1] or be used as an assistive device for people who may not have the strength or motor skill to operate a manual one.[2] Some devices are blade operated, like a blender, and some use a ball-and-socket mechanism like a mortar and pestle.[1] Electric crushers also come with or without designated disposable vessels. Anecdotal reports identify electric pill crushers as difficult to clean, although this varies by design.

3.2 Mortar and Pestle

Mortars and pestles are frequently used in pharmaceutical and healthcare settings. There are several different types based on size, shape, and material (e.g., porcelain, stainless steel). Some are designed to be used specifically with disposable paper medicine cups,[8] where the pestle is cone-shaped to fit into a paper medicine cup of the same shape to reduce the likelihood of damaging or breaking open the paper medicine cup during crushing.[8]

The pharmaceutical industry typically uses porcelain mortars,[9] although granite, marble, or grey agate may be more suited to drugs that are volatile, corrosive, or harder to crush.[10] Other considerations for the type of mortar and pestle used for drug crushing relate to the smoothness, fragility, and porousness of the material,[11] which can contribute to the amount of substance retained on the surface and potential for breakage. Size and weight are also important considerations for mobile drug checking services, as is cleaning, which anecdotal reports suggest is simpler for stainless steel devices.

Some mortars come with lids typically made of plastic, where the pestle fits into a hole in the middle of the lid. This may help minimize spill and spread, as well as the risk of inhalation of aerosolized particles when crushing a substance without a disposable vessel. This design requires

that the mortar, pestle, and lid be thoroughly cleaned between each drug crushing event to prevent cross-contamination and spread, which may be time consuming.

A mortar and pestle offer the following advantages:

- The ability to crush a sample to a very fine grind, which can be ideal for testing with benzodiazepine test strips.
    - Some anecdotal reports suggest that to be effective, benzodiazepine test strips require a well-dissolved sample. Crushing to a very fine grind can help dissolve the sample in water, especially when hot water is not available to facilitate dissolution.
- The ability to control the amount of force used when crushing particularly sharp crystals, which may break a pill crushing pouch when using a pill crusher.
- Cleaning is often easier and less time intensive than with other pill crushers.

3.3 Disposable Vessels

3.3.1 Pill Crushing Pouches

Dedicated disposable pouches are supplied with many pill crushing devices. These are latex-free and made of polyethylene.[1] Common thickness for these pouches is 6 or 7 mil (0.15-0.18mm).[1]

When a pill crushing pouch is not available, a sealable plastic bag (e.g., a “baggie”) may be used with caution: because the standard thickness of pill crushing pouches is intended to prevent pouches from breaking during crushing, alternative plastic bags need to be layered to achieve the same thickness. It is possible that the friction of multiple thin plastic layers moving on one other during crushing may break the bag during crushing; and recovering powder spilled between multiple bags may be challenging. It is recommended that this method only be used when there are no available disposable vessels, or those that are available are unsuitable (e.g., a paper medicine cup won’t work with the pill crusher).

3.3.2 Paper Medicine Cups

Paper medicine cups used for drug crushing are typically 1oz or 2oz in size. They are used by placing the substance to be crushed into one cup, then stacking a second cup on top of the first

cup—covering the substance with the bottom of the second cup—and using the second cup as a barrier between the substance and the drug crushing equipment, to prevent spread.

3.4 Spatulas and Round Rods

When substances are particularly challenging to crush (e.g., a hard coating or crystal form), or there are no available drug crushing devices, technicians may choose to use other devices to assist with crushing. A round aluminum rod with a 1” diameter that fits into a paper medicine cup can provide a suitable surface area to break up hard or pointed substances prior to being placed into a pill crusher or mortar. The smooth or beveled ends of a metal lab spatula may also be used, although anecdotal reports suggest the round aluminum rod is more effective due to its larger surface area.

A metal lab spatula or scoop is recommended to remove a substance that has spilled from a disposable vessel (e.g., if the vessel breaks), or when transferring a substance between a disposable vessel and a drug checking instrument.

Glossary of Terms

Deterra pouch: a pouch that contains activated carbon used to deactivate drugs.

Disinfect: removal of drug residue, dirt, microorganisms, or other potentially harmful contaminants from surfaces or objects by applying a disinfecting wipe.

Disinfecting wipe: a product that destroys microorganisms or other potentially harmful substances when applied to surfaces or other objects. In drug checking, these are typically alcohol swabs.

Disposable vessel: a one-time-use item intended to contain the substance being crushed, such as a paper medicine cup or pill crushing pouch.

Personal Protective Equipment (PPE): equipment and clothing worn to prevent bodily exposure to potentially harmful substances, such as gloves, face or eye protection, and medical masks.

Service user: any person accessing drug checking services.

Spill: any unintentional, uncontained dispersal of a substance (liquid or powder).

Technician: drug checking technician; any person who has received all applicable training required to perform drug checking services.

Task wipe: a lint-free, soft paper tissue used to dry equipment after washing or applying a disinfecting wipe. In drug checking, these are typically known as KimWipes.

Additional Resources

For information on spills, exposures, and waste disposal in the context of drug crushing, refer to the BCCSU's *Reducing Exposure and Contamination Risk in Drug Checking Services*.

For information on sample and other waste disposal, see the BCCSU's *Sample and Drug Checking Waste Disposal SOP*.

For additional drug checking services operational guidance, see the BCCSU's *Operational Technician Manual*.

Appendix A – Summary of Drug Crushing Equipment

Category	Image	Type	Description	Example
Pill crushers		Manual – lever	• Various designs available. • Lever is lifted up and down by the user to apply pressure and crush. • Designed to be used with disposable vessels. • May come with designated disposable vessels.	• Ocelco (uses paper medicine cups) • Silent Knight (uses pill crushing pouches)
		Manual - twisting	• Various designs available. • Top component (e.g., handle, lid) is twisted by user to create rotating or grinding movement to crush. • May be used with disposable vessels. • May come with designated disposable vessels.	• Ergo-Grip • Tri-Grip • Mini-Twist (uses pill crushing pouches)
		Manual - rocking	• Top component is rocked back and forth by the user to create pressure underneath and crush. • May be used with disposable vessels. • May come with designated disposable vessels.	• Roc N Crush

		Electric	• Various designs available. • Automated: may be button or sensor activated. • Designed to be used with pill crushing pouches. • Typically come with specific pill crushing pouches.	• VitaCarry (button operated, uses pill crushing pouches) • Powdercrush (button operated, uses pill crushing pouches)
Mortar and pestle			• Various sizes and material compositions available (e.g., porcelain, stainless steel) depending on purpose. • May come with lid that fits onto mortar (the base, or bowl), and pestle (hand-held object) fits through the hole. • May be used with disposable vessels.[e]	• Stainless steel • Ceramic (higher granular textures, susceptible to cracks[11]) • Stone (superior powdered consistency, susceptible to stone fragment breakage) • Porcelain • Glass
		Paper medicine cup	• Available in 0.5-5oz sizes. • Designed to hold and transport medication. • Used as a barrier between drug crushing device and sample to prevent spread. • Not provided with pill crushers. • Single use.	

[e] Disposable vessels are recommended when a mortar and pestle is used for drug checking purposes.

Disposable vessels				
		Pill crushing pouch	• Latex-free, typically made of polyethylene. • Typically 2” x 4.5” in size. • Common thickness is 6 or 7 mil (0.15-0.18mm).[2] • Designed specifically for pill crushing. • Contains sample during crushing to prevent spread. • Often supplied with pill crushers. • Single use.	
Spatulas and rods		Metal lab spatula	• Various sizes and styles available depending on purpose and user preference. • Typically made of stainless steel. • Used to transfer a substance or to assist with manual crushing.	
		Soft spatula	• Various sizes and styles available. • May be PTFE coated stainless steel or silicone. • Used to transfer a substance without damaging delicate or fragile surfaces (e.g., a mortar).	

		1” round rod	• Round rod, 1” in diameter. • Typically made of aluminum. • Used to assist with manual crushing.	
Reinforced surface		Marble slab	• Used when performing drug crushing without a drug crushing device to protect the underlying surface from damage.	

BRITISH COLUMBIA CENTRE ON SUBSTANCE USE
Networking researchers, educators & care providers

References

1. Thong MY, Manrique YJ, Steadman KJ. Drug loss while crushing tablets: comparison of 24 tablet crushing devices. *PLoS One*. 2018;13(3):e0193683. doi: 10.1371/journal.pone.0193683
2. Lee SU, Aplin T, Forough AS, Steadman KJ. Perceived usability of tablet crushers: comparison of devices by people with and without limited hand functions. *Pharmaceuticals*. 2023;15(2):517. doi: 10.3390/pharmaceutics15020517
3. Waitemapa. *Crushing Guidelines for Residential Settings.* Updated April 2021. Accessed July 10, 2023. https://www.saferx.co.nz/assets/Documents/9a2c1237a5/RAC_crushing_intro.pdf
4. Medisca. *Tip #4: Steps to Effectively Triturate a Powder.* 2023. Accessed July 10, 2023. https://www.medisca.net/compounding/tips
5. Bourdenet G, Sassereau E, Goullé JP, Guerbet M, Doucet J. Crushing drugs in geriatric units: are cleaning methods and devices appropriate? *European Journal of Clinical Pharmacology*. 2018;75:127-129. https://link.springer.com/article/10.1007/s00228-018-2547-9
6. Clauson H, Rull F, Thibault M, Oredekyan A, Tavernier J. Crushing oral solid drugs: assessment of nursing practices in health-care facilities in Auvergne, France. *International Journal of Nursing Practice*. 2016;22(4):384-390. https://doi.org/10.1111/ijn.12446
7. La Delfa NJ, Kunasegaram A, Whittaker R, Dickerson CR. Determining best practices for manual pill crushing through evaluation of upper extremity muscle exposures. *Applied Ergonomics*. 2021;90(103275). doi: 10.1016/j.apergo.2020.103275
8. Smith KR. *Pestle and Mortar for Crushing Pills in Pill Cups.* United States Patent. 1989. Accessed July 10, 2023. https://patents.google.com/patent/US4967971A/en
9. AntsLab. *Mortar and Pestle*. 2019. Accessed July 10, 2023. https://www.antslab.in/best-mortar-and-pestle/
10. ScienceEquip. *Mortar & Pestle: Uses and Benefits.* 2023. Accessed July 10, 2023. https://www.scienceequip.com.au/blogs/news/mortar-pestle-uses-and-its-benifts
11. GlobalSpec. *Mortars and Pestles Information*. 2023. Accessed July 10, 2023. https://www.globalspec.com/learnmore/labware_scientific_instruments/clinical_research_labware/mortars_pestles

Authors & Contributors

Authors

Keira St. George, RN, BN, MPH
Medical Writing Consultant, Changemark Research + Evaluation

Lizzy Matzinger, MPH
Project Manager, Changemark Research + Evaluation

Jennifer Matthews, BA, BSW, MSc (Health Promotion)
Drug Checking Implementation Lead, BCCSU

Reviewers

Jarred Aasen, RPh
Harm Reduction Pharmacist; DRED Project co-author, Lantern Services

Jana Baller
Drug Checking Lead, Fraser Health Authority

Matthew Bonn
Knowledge Translation Specialist, Changemark Research + Evaluation

David Byres
Drug Checking Training Coordinator, BCCSU

Marie Ferraro
Knowledge Translation Specialist, Changemark Research + Evaluation

Mona Kwong, BSc (Pharm), PharmaD, MSc
Director, Clinical Addiction Pharmacy Fellowship; Pharmacy Advisor, BCCSU; Clinical Instructor, UBC Faculty of Pharmaceutical Sciences

Antoine Marcheterre
Drug Checking Lead, Interior Health

Angus Quinton
Manager & Technician Supervisor, Get Your Drugs Tested

Suggested Citation

British Columbia Centre on Substance Use (BCCSU). *Drug Crushing for Drug Checking Standard Operating Procedures.* 2023.
https://drugcheckingbc.ca/wp-content/uploads/sites/2/2025/05/Drug-Crushing.pdf

Publisher

British Columbia Centre on Substance Use (BCCSU)
400-1045 Howe Street, Vancouver, BC, V6Z 2A9
inquiries@bccsu.ubc.ca

Publication Date

November, 2023