

SAFER TABLET INJECTION

A Resource for Clinicians Providing Care to Patients Who May Inject Oral Formulations

September 2020; updated January 2021
Available online: www.bccsu.ca/opioid-use-disorder

In this resource:

- 1.0 BACKGROUND
- 2.0 SAFER INJECTION PRACTICES
- 3.0 SAFER INJECTION PRACTICES FOR INJECTING DISSOLVED ORAL OPIOID FORMULATIONS
- 4.0 COVID-19-SPECIFIC GUIDANCE
- 5.0 MEDICATION TABLE
- 6.0 RESOURCES

1.0 BACKGROUND

British Columbia is in the midst of dual public health emergencies—the ongoing opioid overdose crisis and the COVID-19 pandemic. Between 2016 and 2019 over 4,045 British Columbians died from an opioid overdose.¹ Record numbers of opioid overdose deaths have been reported since the COVID-19 pandemic was declared—171 deaths in May 2020, 177 deaths in June 2020, and 175 deaths in July—with the deaths in July 2020 representing a 136% increase over July 2019.²

Injection of oral formulations, whether obtained illicitly or prescribed as a harm reduction measure, is a common method of consuming drugs.³ To inject oral formulations, tablets are crushed and dissolved in water to produce an injectable solution. In addition to the risks associated with frequent non-medical injection (such as sepsis, osteomyelitis, endocarditis, cellulitis, and abscesses), there are specific concerns associated with injection of oral formulations, whether prescribed or obtained illicitly. Oral formulations contain excipients including binders, lubricants, coatings, colourings, and emulsifiers that can cause medical complications when injected.³ Potential harms associated with injecting oral formulations include local and systemic infections, skin and soft tissue injuries, and pulmonary, cardiac, and vascular conditions.⁴⁻⁷

Although still relatively common, injection is not the most common mode of consumption associated with overdose deaths in BC. In 2019, inhalation or smoking accounted for 40% of overdose deaths, while injection accounted for 25%.⁸ These figures underscore the importance of discussing route of administration with all patients who use drugs, and providing harm reduction education and supplies specific to their needs and circumstances. This resource provides guidance on safer injection practices. For guidance on safer inhalation practices, please see [VCH's Safer Smoking brochure](#).

^a Although there are known harms associated with injecting oral formulations, the known composition of prescribed opioids paired with safer injection practices is likely much safer than using illicit opioids contaminated with unknown concentrations of fentanyl, carfentanil, and other highly potent synthetic opioids.

2.0 SAFER INJECTION PRACTICES

In addition to discussing treatment and recovery options where appropriate, clinicians should have respectful, non-judgmental conversations with their patients about their drug use patterns, including route of administration, and harm reduction practices. Patients who are abstinent from substance use (e.g., in long-term, abstinence-based recovery) should be offered the opportunity to receive harm reduction information. When discussing sensitive topics, asking permission and normalizing questions may help reduce patient experiences of stigmatization, for example, “*Would it be alright to talk about harm reduction and safer injection practices? I talk to all of my patients about substance use and harm reduction.*”

Clinicians should provide harm reduction information on safer injecting practices for all patients who inject drugs, and should discuss the risks of injecting oral formulations with those patients who are prescribed oral formulations that may be injected as well as patients who inject illicit street drugs.

ASK THE PATIENT HOW THEY CONSUME DRUGS, INCLUDING ROUTE OF ADMINISTRATION AND IF THEY SELF-INJECT OR IF SOMEONE ELSE INJECTS FOR THEM

- Ingestion, inhalation,^b insufflation, and injection (including intravenous, intramuscular, and subcutaneous) require different harm reduction strategies.
- If prescribing opioids as a harm reduction measure, consider route of administration when prescribing (e.g., prescribe an immediate-release tablet with fewer excipients for patients planning to inject oral formulations).
- If the patient is being injected by a friend or partner, sterile injection equipment should be used for each injection.
- Discuss the increased risk of overdose when using multiple CNS depressants (e.g., opioids and alcohol or benzodiazepines).

ADVISE PATIENT NOT TO USE ALONE

- Using opioids alone increases the risk of opioid overdose death.⁹
- Discuss the risks of using alone and work with each patient to determine ways to reduce risk. These could include:
 - Having a friend or acquaintance with them (i.e., buddying up). If someone else can not be physically present while they are using, recommend they:
 - Have a friend or support person on the phone who can call 911 if they become unresponsive.
 - Request staff (e.g., in supportive recovery, front desk staff) or a neighbor check in, if the patient feels safe to do so.
 - Staggering drug use (i.e., one person uses at a time) if using with a friend to ensure one person is always able to respond to an overdose.
 - Visiting an overdose prevention or supervised consumption service^c; using drug checking services for illicitly obtained substances, where available.
 - Using an overdose prevention app, such as [Lifeguard](#), which is activated by the patient before injecting drugs and alerts 911 of a potential overdose if the patient does not respond to an alarm after 75 seconds.
- Overdose prevention and supervised consumption service locations and locations that provide harm reduction services and supplies, including filters, can be found at [Toward the Heart](#).

^b Guidance on safer inhalation practices can be found on [Toward the Heart](#).

^c Staff at overdose prevention and supervised consumption sites may be able to provide assistance and education on safer injection techniques.

PROVIDE EDUCATION ON SAFER INJECTION TECHNIQUES

- Safer injection techniques help to ensure patients avoid missing the vein, which can lead to soft tissue infection and arterial damage, and reduce multiple injection attempts. More information on safer injection techniques can be found here.
 - Advise patients to clean their injection site with an alcohol swab before injecting.
 - Tie a tourniquette using a quick release.
 - Insert the needle with the bevel up at a 30 degree angle to their head.
 - Flag the needle (i.e., push needle in and pull back on plunger until they can see blood on the needle).
 - Loosen the tie on the tourniquette.
 - Inject drugs slowly.
 - Pull the needle out, clean hands, and apply pressure to the injection site.
 - Safely dispose of injection equipment.

PROVIDE EDUCATION ON THE SAFEST PARTS OF THE BODY FOR INJECTION

- The safest areas of the body to inject are the lower arms. If the patient prefers to inject elsewhere, the lower legs and hands are also lower risk.
- Some people who use drugs may want to ensure that injection marks are not visible (e.g., work in a building that requires abstinence from drug use or need discretion at work).
- Injecting into the head and neck, wrist, and groin and genital areas carries severe risks of harm (e.g., injecting into an artery, sepsis, endocarditis).^{10,11} Injecting into these areas should be done with extreme caution.¹⁰
- Subcutaneous and intramuscular injection reduce the risk of vein damage compared to intravenous injection, but increase the risk of soft-tissue infection.¹² Subcutaneous and intramuscular injection will also result in slower absorption of drugs and different drug effects as compared to intravenous injection.^d

ADVISE PATIENT TO USE NEW, STERILE EQUIPMENT WITH EACH INJECTION

- The use of non-sterile equipment has been associated with an increase in the risk of bloodborne infections such as HIV and hepatitis C¹⁰ and bacterial infections that lead to skin abscesses, cellulitis, and endocarditis among people who inject drugs.¹³
 - In particular, reuse of the residue left over in a cooker may increase the risk of infective endocarditis.¹⁴
 - Residue that is left over in a cooker should be heated with a lighter for approximately 10 seconds or until the residue bubbles (i.e., “cook your wash”) to reduce the amount of HIV present in the residue.¹⁵
 - Sharing or exchanging “washes” can counter the effects of using sterile supplies to prepare drugs for injection and increase the risk of spread of blood-borne pathogens.¹⁶
- Any equipment that is not sterile or is being reused (e.g., lighter, pill crusher) should be washed or disinfected (e.g., with an alcohol swab, letting it dry completely) and a clean surface should be used to prepare drugs, when possible.
 - Pathogens such as HIV and hepatitis C can survive outside the human body on equipment and surfaces for days to weeks.¹⁷⁻¹⁹ Washing or disinfecting surfaces and equipment that is being reused reduces the risk of transmission of these pathogens.

PROVIDE EDUCATION ON THE IMPORTANCE OF HAND HYGIENE

- Hand hygiene practices should be followed to reduce the risk of transmitting viruses, bacteria, or other microorganisms that may cause infection if they enter the body.
- Patients should wash their hands and disinfect the area of their body they will use for injection to help prevent microorganisms present on the skin from entering the body via the needle puncture and causing infection.²⁰

^b This guidance is specifically relevant for opioid injection. Subcutaneous and intramuscular injection of stimulants should be avoided, due to a higher risk of necrosis and abscesses due to vasoconstriction.

3.0 SAFER INJECTION PRACTICES FOR INJECTING DISSOLVED ORAL OPIOID FORMULATIONS

Clinicians should discuss the specific harms associated with injection of dissolved oral formulations, whether prescribed or obtained illicitly. Oral formulations contain excipients including binders, lubricants, coatings, colourings, and emulsifiers that can cause medical complications.³⁻⁷

Harms associated with injecting oral formulations can include:

- Local and systemic infection
- Skin and soft tissue injury
- Pulmonary, cardiac, and vascular conditions

Clinicians should discuss with their patients how harm reduction strategies specific to injecting oral formulations, such as cooking techniques and filtering, can be used in conjunction with other harm reduction practices (e.g., sterile needle and syringe, sterile water, alcohol swabs) to reduce the risks associated with injecting oral formulations.

PROVIDE INFORMATION ON COMMONLY USED TECHNIQUES TO PREPARE ORAL FORMULATIONS

- Two commonly used techniques, hot and cold cooking, have different safety profiles and risks for the patient:

Technique	Benefits	Risks
Hot Cooking	Kills some bacteria and viruses	Causes some excipients in oral formulations to melt (e.g., wax), which can be more difficult to inject and can cause harm if injected
Cold Cooking	Does not melt excipients in oral formulations, reducing the risk of injecting	Does not kill bacteria or viruses that may be present

- While neither hot nor cold cooking consistently produces higher recovery of the active ingredient in oral formulations, the BC Centre for Disease Control (BCCDC) recommends cold cooking. More information on both hot and cold cooking techniques can be found in the [medication table below](#) and on the BCCDC [website](#).

PROVIDE INFORMATION ON SYRINGE FILTERS, WHICH ARE RECOMMENDED WHEN ORAL FORMULATIONS ARE PREPARED AND INJECTED

- Harm reduction filters (e.g., sterile cotton and/or Sterifilts[®]) should be used when available and instead of cigarette filters or other makeshift filters.
 - Makeshift filters are not sterile and are often kept for reuse.
 - Reusing filters provides an ideal environment for bacterial growth, and—if sold or exchanged—can transmit HIV, hepatitis C, hepatitis B, and other viruses.¹⁰
 - Cigarette filters may contain glass fibres that can cause harm if injected.
 - Results from a 2011 French study found that Sterifilt syringe filters are effective at filtering out large particles, which are responsible for major harm.²¹
- The [BCCDC](#) recommends Sterifilt FAST (15mm) as it does not require the use of a cotton filter. Sterifilt BASIC (10mm) may also be used, but it requires the use of a cotton filter.
- The BCCDC has created an education tool for people who use drugs with information on recommended filters and instructions on how filters should be used, available [here](#).

[®] Sterifilt FAST (15mm) or Sterifilt BASIC (10mm)

ENSURE PATIENTS HAVE ACCESS TO A NALOXONE KIT AND HAVE RECEIVED TRAINING ON HOW TO RESPOND TO AN OVERDOSE

- Where feasible, clinicians or programs may provide naloxone kits and training directly to their patients. Otherwise, patients should be referred to local services that provide naloxone kits (e.g., community pharmacies, harm reduction sites) and naloxone training.
- Information on where naloxone kits are available to the public can be found at [Toward the Heart](#).

FACILITATE ACCESS TO HARM REDUCTION SUPPLIES

- Clinicians should provide or refer to sites or services that can provide sterile harm reduction supplies to patients including:
 - Cooker
 - Sterile water
 - 15mm Sterifilt FAST
 - 1cc syringe
 - Alcohol swab
 - Cotton ball or tissue (to apply pressure post-injection)
 - Tourniquet (can be reused if not shared and does not have blood on it)
 - Sterile ascorbic acid packets, if needed
- Information on where to access harm reduction supplies, including filters, can be found at [Toward the Heart](#).

4.0 COVID-19-SPECIFIC GUIDANCE

Clinicians should provide information on physical distancing and hand hygiene practices during the ongoing COVID-19 pandemic. The BCCDC has information on [hand hygiene](#) practices and other information [specific to people who use drugs](#) in the context of COVID-19. The BC Centre on Substance Use released interim clinical guidance, [Risk Mitigation in the Context of Dual Public Health Emergencies](#), which provides guidance in cases where patients' risk cannot be lowered with standard evidence-based approaches, including prescribing substances to support self-isolation or physical distancing and facilitating delivery of evidence-based treatments (e.g., opioid agonist treatment). If the patient requires other forms of support during the pandemic, provide them with information about appropriate and available community services.

5.0 MEDICATION TABLE

Some individuals may express concern that using a filter will decrease the amount of active ingredient consumed. The following table provides information on the average percentage of active ingredient present after hot and cold cooking morphine sulphate (slow- and sustained-release formulations) and hydromorphone hydrochloride (immediate- and extended-release formulations). Each formulation was filtered using sterile cotton, Sterifilt 10mm (without cotton), and Sterifilt 15mm, and then washed and filtered again. These findings come from work performed by Health Canada's Drug Analysis Services Laboratory, in partnership with the BCCDC.

Medication	Brand Name	Strength/Dosage Form	Filter Type	Hot or Cold Filtering	Average Recovery % - pre wash	Average recovery % -after wash
Morphine sulphate (slow-release)	Kadian	100mg/capsule	COTN	Cold	59.0	100.2
			SF10	Cold	61.9	99.5
			SF15	Cold	63.6	92.4
			COTN	Hot	72.2	78.8
			SF10	Hot	80.3	84.3
			SF15	Hot	79.5	84.3
	M-Eslon	100mg/capsule	COTN	Cold	55.9	79.7
			SF10	Cold	64.7	87.4
			SF15	Cold	65.9	85.4
			COTN	Hot	76.8	88.0
			SF10	Hot	81.3	87.2
			SF15	Hot	82.8	90.1
Hydromorphone hydrochloride	Dilaudid	8mg/tablet	COTN	Cold	59.5	79.0
			SF10	Cold	66.9	78.4
			SF15	Cold	58.8	83.9
			COTN	Hot	62.8	75.4
			SF10	Hot	70.6	69.7
			SF15	Hot	68.6	75.5
	Apo	8mg/tablet	COTN	Cold	47.1	68.3
			SF10	Cold	55.7	63.1
			SF15	Cold	49.0	65.3
			COTN	Hot	53.3	57.5
			SF10	Hot	57.7	59.4
			SF15	Hot	53.6	60.6
	PMS	8mg/tablet	COTN	Cold	79.6	98.8
			SF10	Cold	92.6	101.3
			SF15	Cold	84.2	105.0
			COTN	Hot	92.5	107.0
			SF10	Hot	104.1	109.2
			SF15	Hot	81.5	101.9

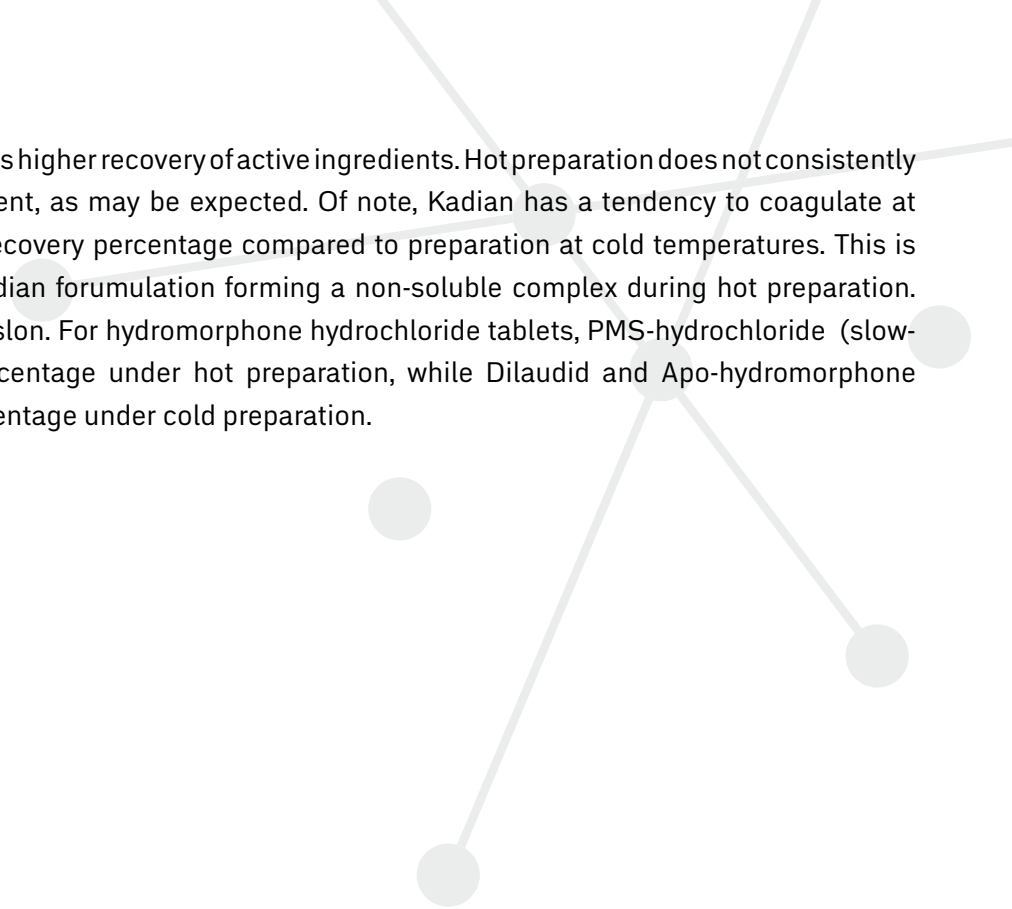
COTN: sterile cotton filter

SF10: Sterifilt 10mm, without cotton

SF15: Sterifilt 15mm

Average recovery %: percent of active ingredient recovered^f

^f Note: There is accepted variance in the amount of active ingredient present in a tablet and variance in the weight of an average tablet, which accounts for recovery percentages above 100%.



No cooking technique consistently produces higher recovery of active ingredients. Hot preparation does not consistently produce higher recovery of active ingredient, as may be expected. Of note, Kadian has a tendency to coagulate at hot temperatures and produces a lower recovery percentage compared to preparation at cold temperatures. This is possibly due to gelatin present in the Kadian formulation forming a non-soluble complex during hot preparation. The same trend was not observed for M-Eslon. For hydromorphone hydrochloride tablets, PMS-hydrochloride (slow-release) produced a higher recovery percentage under hot preparation, while Dilaudid and Apo-hydromorphone appeared to produce higher recovery percentage under cold preparation.

6.0 RESOURCES

- BCCDC: [Safer Tablet Injection](#)
- BCCDC: [Toward the Heart](#)
- BCCDC: [COVID-19 and People Who Use Substances](#)
- BCCSU: [Guideline for the Clinical Management of Opioid Use Disorder](#)
- BCCSU: [COVID-19 and Substance Use](#)
- CATIE: [Best Practices for Canadian Harm Reduction Programs](#)
- Vancouver Coastal Health: [Safer Injecting](#)

REFERENCES

1. Special Advisory Committee on the Epidemic of Opioid Overdoses. National report: Apparent opioid-related deaths in Canada. June 2019. Ottawa: Public Health Agency of Canada; 2019.
2. BC Coroners Service. *Illicit Drug Toxicity Deaths in BC: January, 1 2010 — July 31, 2020*. Burnaby, BC 2020.
3. McLean S, Patel R, Bruno R. Injection of Pharmaceuticals Designed for Oral Use: Harms Experienced and Effective Harm Reduction Through Filtration. *Curr Top Behav Neurosci*. 2017;34:77-98.
4. Chiang W, Goldfrank L. The medical complications of drug abuse. *The Medical Journal of Australia*. 1990;152(2):83-88.
5. Cherubin CE, Sapira JD. The medical complications of drug addiction and the medical assessment of the intravenous drug user: 25 years later. *Ann Intern Med*. 1993;119(10):1017-1028.
6. Dwyer R, Topp L, Maher L, et al. Prevalences and correlates of non-viral injecting-related injuries and diseases in a convenience sample of Australian injecting drug users. *Drug Alcohol Depend*. 2009;100(1-2):9-16.
7. Wurcel AG, Merchant EA, Clark RP, Stone DR. Emerging and Underrecognized Complications of Illicit Drug Use. *Clinical infectious diseases: an official publication of the Infectious Diseases Society of America*. 2015;61(12):1840-1849.
8. BC Coroners Service. *Illicit Drug Toxicity Deaths in BC: Knowledge Update Mode of Consumption*. Burnaby, BC; 2020.
9. BC Coroners Service. *Illicit Drug Overdose Deaths in BC: Findings of Coroners' Investigations*. Burnaby, BC 2018.
10. Strike C, Hopkins S, Watson TM, et al. *Best Practice Recommendations for Canadian Harm Reduction Programs that Provide Service to People Who Use Drugs and are at Risk for HIV, HCV, and Other Harms: Part 1*. Toronto, ON. 2013.
11. Shah M, Wong R, Ball L, et al. Risk factors of infective endocarditis in persons who inject drugs *Harm Reduct J*. 2020;17(35).
12. Gordon RJ, Lowy FD. Bacterial Infections in Drug Users. *N Engl J Med*. 2005;353(18):1945-1954.
13. Hope VD, Marongiu A, Parry JV, Ncube F. The extent of injection site infection in injecting drug users: findings from a national surveillance study. *Epidemiol Infect*. 2010;138(10):1510-1518.
14. Weir MA, Slater J, Jandoc R, Koivu S, Garg AX, Silverman M. The risk of infective endocarditis among people who inject drugs: a retrospective, population-based time series analysis. *CMAJ*. 2019;191(4):E93-E99.
15. Ball L, Venner C, Tirona R, et al. Heating injection drug preparation equipment used for opioid injection may reduce HIV transmission associated with sharing equipment. *J Acquir Immune Defic Syndr*. 2019;81(4):e127-e134.
16. Roy E A, N, Bourgois P. The growing popularity of prescription opioid injection in downtown Montreal: New challenges for harm reduction. *Subst Use Misuse*. 2011;46(9):1142-1150.
17. Abdala N, Reyes R, Carney JM, Heimer R. Survival of HIV-1 in syringes: effects of temperature during storage. *Subst Use Misuse*. 2000;35(10):1369-1383.
18. Ciesek S, Friesland M, Steinmann J, et al. How stable is the hepatitis C virus (HCV)? Environmental stability of HCV and its susceptibility to chemical biocides. *J Infect Dis*. 2010;201(12):1859-1866.
19. Paintsil E, He H, Peters C, Lindenbach BD, Heimer R. Survival of hepatitis C virus in syringes: implication for transmission among injection drug users. *J Infect Dis*. 2010;202(7):984-990.
20. Phillips KT, Stein MD, Anderson BJ, Corsi KF. Skin and needle hygiene intervention for injection drug users: results from a randomized, controlled Stage I pilot trial. *J Subst Abuse Treat*. 2012;43(3):313-321.
21. Roux P, Carrieri MP, Keijzer L, Dasgupta N. Reducing harm from injecting pharmaceutical tablet or capsule material by injecting drug users. *Drug Alcohol Rev*. 2011;30(3):287-290.