



FIT4Safety Canada

**2nd
Edition**

**Recommendations
for Best Practice
in the Safe Use
of Diabetes Sharps**



Optimizing
Diabetes Care

FIT4Safety Canada will provide evidence-based best-practice information to promote safe and effective use and disposal of sharps used in the provision of care for people with diabetes. The goal of these recommendations is to protect all who are at risk of needlestick injury by ensuring safe practice through professional and patient education, risk management and awareness training.

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Objectives:

- 1. Increase awareness of risk for needlestick injury for all healthcare providers involved in the care of people living with diabetes.
- 2. Identify evidence-based best practice to minimize the risk for needlestick injuries.
- 3. Promote safe practice when using and disposing of sharps in diabetes care through the dissemination and implementation of the recommendations stated in this document.



Introduction

Everyday healthcare providers (HCPs) and healthcare workers are at risk for life-threatening infections due to needlestick injuries (NSI) that result from the improper use and disposal of lancing, injection as well as insertion devices that are used in the care of people living with diabetes (PWD).¹⁻⁴

Figure 1. Needlestick injuries occur from improper use and disposal of sharps.



The growing prevalence of diabetes coupled with the increased use of injectable medications and devices are driving a greater need for attention to safety measures to prevent NSIs.^{5,6}

In Canada it is estimated that more than 69,000 workers are injured by sharps and devices annually which in turn imposes a financial strain of 45 to 73 million dollars on our healthcare system.⁷ There is also the human burden on our HCPs with an increase in anxiety, fear of carrying out injections, psychological stress and loss of productivity.⁸⁻¹¹

Many bloodborne pathogens (e.g., viruses, fungi and microorganisms) may be transmitted through an NSI. The rapid spread of many of these pathogens has heightened awareness on the potential to exposure with the handling of all sharps.⁴

To prevent exposure to these bloodborne pathogens and protect all individuals who are at risk, safety procedures need to be clearly articulated and implemented.^{8,12}

Publications from the World Health Organization (WHO), the Workshop on Injection Safety in Endocrinology (WISE) and the Mayo Clinic Procedures have fuelled the development of contemporary policies and procedures to protect HCPs from NSIs via immunization practices, safer equipment, and education.¹²⁻¹⁴

In the wake of the precedent set by WISE,¹⁴ a group of Canadian diabetes educators convened to outline the safety priorities when using and disposing of sharps in the context of managing diabetes treatment. The leading priorities were identified as:

- 1. Risk awareness
- 2. Best practice initiatives
- 3. Education to promote a ‘safety culture’

In the current update, these priorities have continued to guide our discussions and recommendations. The reader is encouraged to use this document in conjunction with the Canadian FIT guidelines (4th edition).¹

In Canada, several provinces have been proactive with the introduction of legislation that require healthcare institutions to mandate the use of safety engineered devices (SEDs).^{4,15} Although this is a positive step, the implementation of this ruling has not only been slow but has also not always taken into consideration all scenarios where sharps are used in the management of diabetes.¹⁶ For example, in the settings of patient homes and extended care, patients and caregivers do not always utilize SEDs. Moreover, there are data that show that the use of an SED is not always sufficient to significantly lower the occurrence of an NSI.¹⁶⁻¹⁹

Ongoing research continues to highlight the need for HCPs to be appropriately educated on injection techniques as well as the proper use and disposal of all devices that are related to diabetes treatment.^{4,12-14,19}

Administrators also need to be held responsible for creating a ‘safety culture’ within the healthcare settings that they oversee. In addition to having the safety procedures and protocols documented and easily accessible, a ‘no blame’ reporting policy is essential to establishing a safe practice environment.^{13,20}

The Canadian FIT4Safety Board has developed this document based on the stated priorities. The recommendations listed herein are designed to protect HCPs and prevent injuries when administering injectable diabetes therapy as well as when performing the different procedures of blood glucose monitoring. They have been reviewed by an expert panel and where evidence does not exist, expert opinion has guided the statements.



Definitions

- 1. **Sharps:** lancets, pen needles, syringes, infusion sets for pumps and insertion sets for both intermittent (isCGM) and continuous glucose monitoring (itCGM).⁶
- 2. **Settings:** hospitals, ambulatory care, prisons, homes for physically or intellectually challenged people, assisted and long-term care facilities, retirement homes, medical offices, schools, camps, daycare settings. Inclusive of wherever diabetes treatment is occurring.
- 3. **Healthcare providers (HCPs):** regulated and unregulated HCPs that include but are not limited to, community care nurses, paramedics, pharmacists, primary care givers, school staff and childcare workers.
- 4. **Safety engineered device (SED):** a needle device that is used for withdrawing body fluids, accessing a vein or administering medication with a built-in safety feature or a mechanism that effectively reduces the risk of an exposure incident.¹⁵
- 5. **Needlestick injury (NSI):** a penetrating stab wound from a needle (or other sharp object) that may lead to unwarranted exposure to blood or other body fluids.⁴
- 6. **Safe injection:** an injection that does not harm the recipient, does not expose the HCP and healthcare worker to any avoidable risk, and does not result in any waste that is dangerous to the community.¹²
- 7. **Safe disposal:** all used sharps are immediately placed in an approved sharps container which is disposed of according to the regulations of the local community or healthcare organization.^{4,12,21}

1.0

Risks

Any use of sharps associated with the management of diabetes has the potential to cause an NSI. Injury can occur from the improper use or disposal of standard devices and SEDs.

There are multiple forms of sharps used in diabetes care which include lancets, injection devices (e.g., insulin syringes, pen needles), infusion sets for pumps including automatic insertion sets, and continuous glucose monitoring equipment.^{4,6,14} The frequent use of these sharps for daily diabetes treatment presents a high degree of exposure and an increased risk for injury.^{3,14}

With the use of any of these devices there is a risk of transmission of bloodborne pathogens. While hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV) are the most common bloodborne pathogens, they represent only three of the many viruses, fungi and microorganisms that can be transmitted through NSIs. The potential for infection from exposure to blood by an NSI depends on the size of the needle, the depth of penetration and the amount of contact with the blood. The immune status of the person who has been exposed and the availability for follow-up care are essential elements in risk assessment.^{4,12,19,22}

An NSI can happen at any time in the preparation, during or immediately following the injection or during the disposal process.¹⁹ While approximately 70% of NSIs occur during the process of giving an injection or doing an insertion, approximately 22% happen due to the improper disposal of these sharps.⁴

It is important to identify two distinct groups of workers who are at risk for NSI. The HCP who is handling the sharp has a direct risk of an NSI, but improper disposal or re-sheathing can expand the risk of exposure to other ‘downstream’ workers in healthcare facilities, public works and private homes.^{6,23}

DID YOU KNOW?

“Downstream workers at risk for NSI include housekeepers, food service workers, porters, home care workers and waste disposal personnel”.⁶

1.1

Risk Mediation

The WHO and the Canadian Centre for Occupational health have stated that immunization is the best protective measure against bloodborne pathogens induced through NSIs. They advocate for the immunization of all HCPs at risk of exposure including waste disposal workers, emergency, and safety workers.^{4,10,12,23,24}

Although double gloving has been shown to help reduce exposure to NSIs in some situations, personal protective equipment} (PPE) is deemed to offer the least effective protection against bloodborne pathogens.^{4,7,25}

Research has shown that SED technology, when used and disposed of correctly by informed HCPs, can lead to declines in NSIs.^{12,16,25,26} Therefore it is recommended that policies enforcing routine use of SEDs be implemented and that proper injection technique and disposal procedures be followed with the goal of creating a safer environment for all.^{15,19,22}

In situations where SEDs are not used, i.e. home settings, proper disposal of all sharps in the proper containers must be emphasized.

When developing policies and procedures, emphases should be placed on personnel immunization, applying correct technique when using the devices, adoption of SEDs and safe disposal of the sharps.^{4,12,13}

DID YOU KNOW?

Immunization is the best protective measure against bloodborne pathogens induced through NSIs.²³

2.0

Injection Process

Two components of a safe injection for the patient involves delivering an accurate dose of medication into the correct and appropriate tissue.^{1,13,30}

To accomplish this, the HCP must choose the appropriate device and use it safely with the correct technique to deliver the medication into the subcutaneous tissue.^{1,13,14,30,31}

Features specific to the safety of the injection are highlighted in this document. Please refer to the FIT 4 diabetes document for a complete description of injection technique.¹

DID YOU KNOW?

When using an insulin pen, there must be an enforced policy of: “one pen per patient”.³⁶

Recommendations

- 1. Organizations should develop and communicate appropriate policies and procedures to implement the full list of FIT4Safety recommendations to foster a safer environment for all.^{4,12,13,27}
- 2. All HCPs at risk of exposure should be immunized prior to commencing training.^{12,24}
- 3. SEDs (i.e., syringes, pen needles, lancets) should be used by every HCP.^{4,7,16,19,28}
- 4. SEDs should also be used in high-risk patients i.e., those positive for HIV, HBV or HCV when injecting in a home setting; where there are young children; where elderly patients have mobility and/or dexterity issues; and where there is limited access to resources for appropriate disposal of sharps.^{14,20}
- 5. Used needles and lancets should be disposed of immediately and never recapped.^{1,4,12,13,19,20,29,30}

Figure 2. Examples of safety-engineered devices (5 mm pen needle, etc.)



2.1

Injection Equipment

Since the use of a skin lift also accounts for a high percentage of NSIs it should be avoided wherever possible.^{1,13,30} This can be done by using the shortest pen needle or syringe. With the introduction of shorter needles there is no longer substantiated use for the 12.7 mm needle and limited use for the 8 mm needle for insulin injections.^{32,33}

There has been considerable discussion regarding the safety of pen use versus syringes for insulin delivery. More accurate dosing and ease of use have been attributed to the pens but there have been concerns expressed regarding the use of pens with multiple patients thereby contributing to cross contamination.^{34,35} With pen use the one pen per patient concept must be stressed as well as the use of SEDs for each injection.^{13,36}

Figure 3: HCP should avoid skin lift to reduce NSIs.

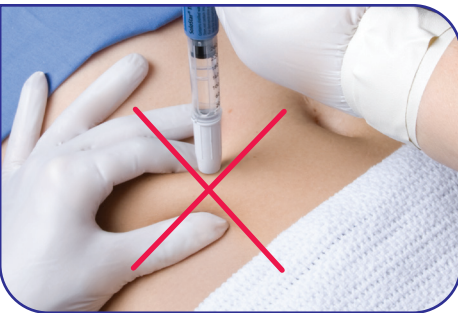
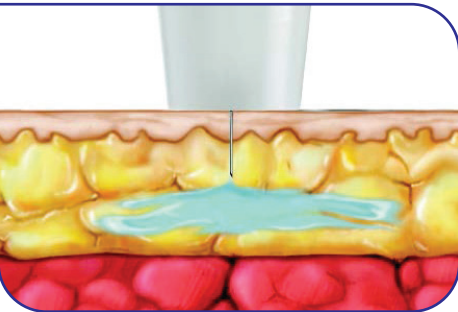


Figure 4: Proper delivery of insulin into subcutaneous tissue



DID YOU KNOW?

Due to the potential for nosocomial infections in healthcare settings, alcohol wipes can be used to clean (not disinfect) the injection sites. Soap and water is an alternative as per the institution's policies.)

HCPs should be familiar with the SEDs to be used. They should also be aware that the safety features vary among SEDs with some offering more protection than others.^{12,19}

The most common reasons for NSIs when using SEDs are technical problems that cannot only inhibit proper use but also result in improper disposal.^{19,37}

Involving HCPs in the choice of the SEDs has shown to be an effective means for improving acceptance and reliable use of SEDs especially in institutional settings.^{12,37}

DID YOU KNOW?

Studies have demonstrated fewer NSIs when pens with an SED are used versus vial and safety syringes.³⁶

Recommendations

1. Frontline and occupational health workers should be included in the decision-making process when considering which SEDs to choose.^{12,25,37}
2. HCPs should be trained in the use of the SEDs.^{4,7,19,25,27}
3. All SEDs selected for use should have the following features:
 - a. an easy, one-hand activation mechanism⁸
 - b. a clear view of the tip of the sharp at the entry site
 - c. a clear indication of the dose
 - d. a clear indication of the activation of the safety feature
 - e. no exposure to the sharp following the dose administration.^{2,13,25}
4. A SED pen needle should have protection from exposure at both ends of the needle to prevent the occurrence of NSIs before and after use.^{5,7,13,14,25,27}
5. Lancets should be removed from the lancing device as per manufacturer instructions to avoid any handling of the lancet.³⁰
6. HCPs should use the shortest possible length of SED for the pen or syringe to avoid using a skin lift and ensure delivery of the medication into the subcutaneous tissue.^{13,14,31-33}
7. Where pen devices are used there must be an enforced policy of "one pen per patient".^{36,38,39}

2.2

Injection Technique: Best Practice

The use of excess force during the injection can contribute to bleeding and bruising at the injection site as well as increase the potential for an intramuscular injection. When injecting, minimum force should be used to prevent indentation of the skin.¹ Contoured pen needles have shown a greater distribution of the injection force over a larger area allowing for less bruising and a decreased risk for intramuscular injections.⁴⁰

Patient movement during the injection is also a contributing factor to NSIs.¹⁹ Educating the patient as to the reason for the injection and the process involved creates a safer environment.

Recommendations

1. To avoid excess force there should be no indentation of the skin observed during the injection process.^{13,40}
2. Patients should be informed and prepared for all injections.^{1,19,23}
3. Pen Devices
 - a. HCPs should use a 90° insertion angle.^{1,41}
 - b. HCPs should count to a minimum of 10 seconds before withdrawing the needle to ensure appropriate delivery of the medication.³⁰
 - c. To remove the pen needle, HCPs should use a two-fingered technique to grasp either side of the pen needle safety device and avoid putting fingers near the top of the device.³⁰

4. Syringes

- a. If using an 8 mm SED syringe, a 45° angled injection is preferred over the skin lift except in very young children, muscular adults and thin elderly where a skin lift may also be required.^{13,42}

Figure 6: Proper two-fingered techniques to safely remove SED (in place)



DID YOU KNOW?

That too much force may lead to:

1. Increased risk of intramuscular injections
2. More uncomfortable injections
3. Inconsistent insulin absorption
4. Glycemic variability

3.0

Insertion Process

NSIs are on the rise with the increased use of insertion devices for CGM and insulin pumps. Accordingly, attention needs to be paid to the insertion procedures as well as the safe disposal of these equipment.⁶

Recommendations:

1. All CGM and pump insertions devices should be used according to instructions provided by the manufacturers.^{6,43-46}
2. All HCP should be trained on the use of insertion equipment when they have patients in their care who use these devices.⁴⁷
3. A one-hand approach should be used in the insertion wherever possible.⁴⁶⁻⁴⁹
4. A visual sight line should be used to mark the insertion site avoiding the use of the hand as a marker.⁴⁶⁻⁴⁹

Figure 7: Correct disposal of pump CGM supplies



4.0

Safe Sharps Disposal

Easy access to standard sharp disposal units as well as best practice initiatives are essential components to the safe disposal of sharps.^{6,48,49} All HCPs have the responsibility of protecting not only themselves and their patients but also community members who may be exposed to NSIs.^{48,50}

The use of SEDs has decreased but not eliminated the risk of NSIs in the disposal phase.^{12,16,25} Organizational policies and the individual HCP's attention to safe disposal will have the largest impact in further decreasing the risk of NSIs following the use of sharps.^{25,50}

Ecological concerns have been well documented in regard to the inappropriate disposal of diabetes-related sharps.^{6,50} HCPs should identify and seek all opportunities to decrease the volume of waste products.

Is there a potential to decrease the use of sharps or eliminate packaging? There are ongoing programs that are evaluating the potential of disinfecting biomedical waste before autoclaving the devices to render them safe for municipal disposal. Safe recycling of plastics would also help to decrease the carbon footprint.

DID YOU KNOW?

Pharmacies often have programs offering free sharps containers.

Recommendations

- 1. Needles and sharps should not be uncapped unless there is a proper sharps disposal container available within the immediate vicinity.^{4,22,27,29,30}
- 2. The sharps container should be in clear sight, preferably at eye level, to prevent excessive handling of the sharp.⁴
- 3. Used (contaminated) sharps should be disposed of immediately after use in an approved sharps container that is readily available, clearly labelled, as well as puncture-resistant.^{1,4-6,30,50}
- 4. Sharps containers should have tight-fitting lids.³⁰
- 5. HCP should fill sharps containers to no more than 3/4 full or until the indicated fill line on the container. When full, the lid should be secured as per the manufacturers' instructions.^{4,30}
- 6. Sharps should be disposed of in sharps containers at the site of use. If travelling in a vehicle with contaminated sharps, the sharps must be stored in a closed container.^{4,30}
- 7. HCP should not recap, bend or manipulate needles or lancets in any way for disposal.^{4,30,51}
- 8. Safe placement of the sharps container in the client's home and mobile clinics must be a priority in consideration of children, confused adults, drug abusers, etc.^{4,12,30}

- 9. Sharps including CGM and pump inserters should never be disposed of in the public or with household garbage.^{4,6,30,49}
- 10. Sharp disposal units should be available in workplaces and public washrooms to help prevent the occurrence of NSIs in downstream workers.^{4,6}
- 11. Used sharps containers should be disposed of according to regulations passed by local, municipal, provincial and territorial authorities.³⁰
- 12. When available, HCPs should use safe and effective alternatives to needles.^{12,20}
- 13. HCP should be vigilant for opportunities for waste reduction.⁵⁰

Figure 8: Sharps containers stored at eye level or slightly below (always out of reach of children) are more readily usable.



5.0

Education

Wherever diabetes care is being delivered, it is the responsibility of the HCPs and the institution to ensure that policy and procedures are being followed to promote the safest environment for anyone who may be exposed to the potential for an NSI.

In the past many NSIs were not reported because of the fear of disciplinary actions and the expectancy of a lengthy reporting process. For the safety and protection of both patients and HCPs we must upgrade our education programs and streamline our reporting procedures.⁵²⁻⁵⁶

A 'no blame' approach needs to be taken where the health of the individual is the priority and information gathered serves to prevent further injuries. These actions have proven effective for risk as well as cost reduction.^{13,20}

Research data have repeatedly supported the concept that risk assessments coupled with education and continuous quality improvement (QI) programs positively contribute to the development and sustainability of a 'safety culture'.^{2,13,30}

Recommendations

- 1. All HCP and care providers who are at risk of experiencing an NSI injury should be trained by qualified professionals on the proper use of injection and lancing devices, PPE, safe disposal of the devices and the reporting procedure for any NSI.^{4,5,12,19,22,30,51,57,58}

- 2. Administrators should ensure a 'no blame' approach in the reporting process of an NSI, a near miss or improper technique with emphasis on treatment, education and future prevention.^{4,13,20,30}
- 3. The procedure for post-exposure prophylaxis (PEP) should be made readily available and implemented immediately upon exposure.^{10,27,57}
- 4. Education on all aspects listed in FIT4Safety Canada should be incorporated in all healthcare curricula.
- 5. Continuous QI programs such as surveillance initiatives should be established to afford regular updating of training programs with the aim to reinforce the values intrinsic to the growth of the 'safety culture for injections'.^{2,4,8,30}

DID YOU KNOW?

Disseminating this document can increase awareness and help create a safety culture to prevent needlestick injuries.



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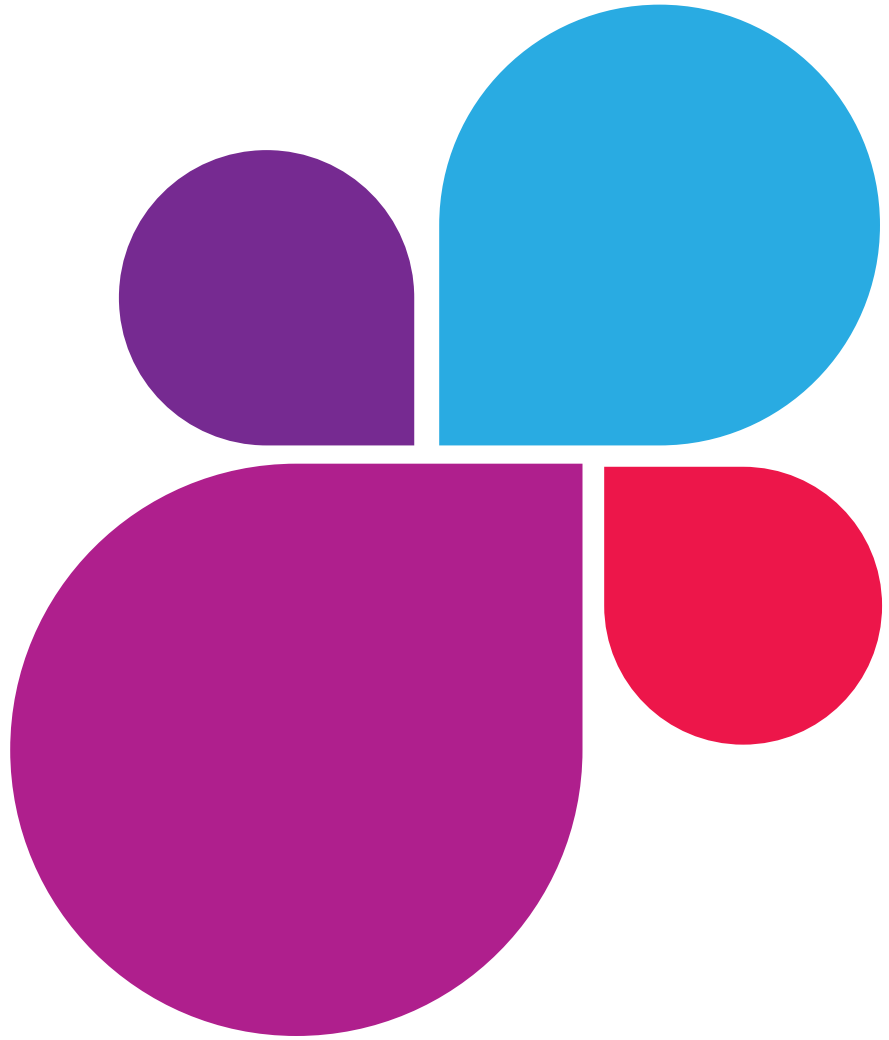
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