Insulin safety injection devices evidence summary

A summary of the clinical evidence
supporting the use of insulin safety injection devices

embecta™

Publications and guidelines have played an important part in helping to promote a stronger culture of safety and reduce needlestick injuries

Research and expert recommendations have made it increasingly clear that the use of safety-engineered injection devices with short needles and other safety features are important to help minimize the risk of needlestick injuries (NSIs) and intramuscular (IM) injections.[1,2] The following publications outline key findings on skin thickness, needle length, injection technique and delivering safe injections.

American Diabetes Association standards of medical care in diabetes[1]

Diabetes Care

Shorter needles may reduce the risk of IM injection, which has been associated with frequent and unexplained hypoglycemia.

Proper injection technique includes injecting into appropriate body areas, injection site rotation, appropriate care of injection sites to avoid infection or other complications, and avoidance of IM insulin delivery.

Recent evidence supports the use of shorter needles as effective and well tolerated when compared with longer needles, including a study performed in obese adults.

New insulin delivery recommendations[2]

Mayo Clinic Proceedings

To minimize the risk of NSI through a pinch-up, the use of 5mm pen needles or 6mm insulin syringe needles without a pinch-up is recommended.*

Key recommendations for reducing NSI from the FITTER *(Forum for Injection Technique and Therapy: Expert Recommendations)* workshop include the following:

- Safety-injection devices should be considered first line choice if injections are given by a third party.
- Pen needles and insulin syringes used in this setting should have protective mechanisms for all sharp ends of the delivery device.
- Needle recapping should not be done.

Skin and subcutaneous adipose layer thickness in adults with diabetes at sites used for insulin injections: implications for needle length recommendations[3]

Current Medical Research & Opinion

Short needles are appropriate for all demographics, as skin thickness doesn't vary significantly.

MRI imaging shows that skin thickness varies minimally between different patient demographics. Needles with lengths of 4 and 5 mm are estimated to provide reliable subcutaneous insulin delivery with reduced risk of IM injection vs longer needles.

Intramuscular risk at insulin injection sites – measurement of the distance from skin to muscle and rationale for shorter-length needles for subcutaneous insulin therapy[4]

Diabetes Technology & Therapeutics

Shorter needles have a lower risk of IM injection.

Data from ultrasound measurements of 341 adults supports the use of short needles for insulin injection. Gender, body mass index and body site *(abdomen, arm, thigh or buttock)* affect subcutaneous thickness and the associated risk of IM injection. However, the use of shorter needles with proper injection technique can greatly reduce this risk.

The changing impact of sharps injuries, given a growing prevalence of people with diabetes[5]

Infection Control Today

Both sharp ends of safety-engineered pen needles should have protective mechanisms.

With a growing population of people with diabetes and associated comorbidities like hepatitis B and C, prevention of NSI and exposure to bloodborne pathogens are more important than ever. The Occupational Safety and Health Administration (OSHA) requires the use of safety-engineered devices for any device with a commercially available safety option—including insulin syringe needles, pen needles and lancets. Because pen needles have the potential for injury at both ends of the needle, it's recommended that safety mechanisms cover *both* ends.

Employers using pen needles for delivery of insulin to patients or residents should evaluate these devices in accordance with the OSHA Bloodborne Pathogens Standard.

ISMP guidelines for optimizing safe subcutaneous insulin use in adults[6]

Institute for Safe Medication Practices

A 4 to 6mm needle is effective for subcutaneous insulin injections in the adult population, including obese adults.

Poor glycemic control, transmission of infections, medication errors, and other adverse effects can be attributed to improper injection technique. For example, during insulin therapy, inadvertent IM injections may increase pain and/or adversely affect glucose control. Evidence suggests that a 4-6mm needle is effective for insulin injections.

OSHA bloodborne pathogens standard[7]

Occupational Safety and Health Standards

Consideration and implementation of safer medical devices designed to eliminate or minimize occupational exposure should be documented annually.

Key OSHA standards related to bloodborne pathogens and needlestick prevention include the following:

- Contaminated needles shall not be recapped unless the employer can demonstrate that no alternative is feasible.
- Employers shall involve frontline employees in the evaluation and selection of devices with safety features that reduce the risk of needlestick injury.

Optimizing insulin delivery for patients with diabetes[8]

Geriatric Nursing

Appropriate injection technique, including needle selection, can be important in ensuring improved insulin delivery and glycemic control.

With 20–40% of residents in long-term care living with diabetes, it's important to follow injection technique recommendations. Expert FITTER recommendations applicable to the post-acute and long-term care setting state that:

- Injections with needle lengths of 4, 5 or 6 mm should be given without a pinch-up in order to reduce the risk of an NSI through the pinch-up to the injector.*
- Safety-engineered devices should be the first-line choice if injections are given by a third party and that those devices should have protective mechanisms for all sharp ends of the device.

* Patients ≤ 6 years old and very thin adults may require a pinch-up.

Protection for healthcare workers and patients

AutoShield Duo™ 5mm Pen Needle

Compatible with widely used pen injection devices[9]

- Safety pen needle that automatically conceals both the front and back end of the needle after use.
- 5mm needle may help minimize the risk of IM injection compared to longer needles.[3*]
- A 5mm needle can be used with a no pinch-up technique, minimizing the risk of needlestick injury through a skinfold.[2†]
- A red indicator band that automatically deploys with the shield after use, confirming that it is locked and that the needle has been used.

Catalog #	NRC #
329515	83017-9515-03

Needle size	Quantity
30G x 3/16” (5 mm)	100/box

Ultra-Fine™ SAFETY 6mm Insulin Syringe

- A 6mm needle may help minimize the risk of IM injection compared to longer needles.[3*]
- A 6mm needle does not require a pinch-up technique for most patients when given by a healthcare provider, minimizing the risk of a needlestick injury through a skinfold.[2†]
- One-handed technique to activate safety mechanism.

Catalog #	NRC #	Barrel and needle size
328446	83017-8446-03	1 mL 31G x 6 mm
328447	83017-8447-03	0.5 mL 31G x 6 mm
328449	83017-8449-03	0.3 mL with Half-unit scale 31G x 6 mm

For more information or to order, please contact your local embecta Sales Representative.

* 388 US adults with diabetes were evaluated using ultrasound to determine skin (ST) and subcutaneous layer thickness (SCT) measurements across four injection sites. By combining the measurements of ST and SCT, estimates were made of the depth of drug delivery with needles of varying lengths inserted at 90° and 45° without raising a skin fold. Analysis of 1208 pairs of measurements resulted in numeric reduction of estimated risk of intramuscular injection for each decrease in needle length.
† Patients ≤ 6 years old and very thin adults may require a pinch-up.

embecta is committed to be your trusted safety partner for diabetes injections

The embecta portfolio of insulin safety devices—AutoShield Duo™ 5mm Safety Pen Needle and Ultra-Fine™ SAFETY 6mm Insulin Syringe—features safety technologies aligned with clinical recommendations to help improve healthcare worker and patient safety.[1,2] embecta provides comprehensive insulin injection technique training and support intended to help healthcare professionals feel confident in delivering the highest standard of care with safety for themselves and their patients.

Aligning with clinical recommendations

Safety portfolio includes 5mm safety pen needles and 6mm safety insulin syringes, which meet clinical recommendations for safe insulin delivery.[1,2]

Prioritizing safety

Safety-engineered devices that have protective mechanisms for all sharp ends of the delivery device.

Providing diabetes education and support for patients and HCPs

embecta has clinical training and support programs intended to help empower healthcare professionals to provide optimal care for patients with diabetes.

1. American Diabetes Association. Standards of medical care in diabetes—2023. Diabetes Care. 2023;46(suppl 1):S1-S291. **2.** Frid AH, Kreugel G, Grassi G, et al. New insulin delivery recommendations. Mayo Clin Proc. 2016;91(9):1231-1255. **3.** Gibney MA, Arce CH, Byron KJ, Hirsch LJ. Skin and subcutaneous adipose layer thickness in adults with diabetes at sites used for insulin injections: implications for needle length recommendations. Curr Med Res Opin. 2010;26(6):1519-1530. **4.** Hirsch L, Byron K, Gibney M. Intramuscular risk at insulin injection sites – measurement of the distance from skin tomuscle and rationale for shorter-length needles for subcutaneous insulin therapy. Diabetes Technol Ther. 2014;16(12):867-873. **5.** Hogan Mitchell A, Parker GB. The changing impact of sharps injuries, given a growing prevalence of people with diabetes.Infection Control Today. 2017. Accessed on March 1, 2018 at http://www.infectioncontroltoday.com/sharps-safety/changing-impact-sharps-injuries-given-growing-prevalence-peoplediabetes. **6.** Institute for Safe Medication Practices. ISMP guidelines for optimizing safe subcutaneous insulin use in adults, 2017. **7.** OSHA. Bloodborne Pathogens and Needlestick Prevention. Accessed September 29, 2020. https://www.osha.gov/bloodborne-pathogens/standards. **8.** Pandya N, Losben N, Moore J. Optimizing insulin delivery for patients with diabetes. Geriatr Nurs. 2018;pii: S0197-4572(17)30309-9. doi: 10.1016/j.gerinurse.2017.11.007 [Epub ahead of print]. **9.** BD Compatibility Confirmation for Safety Pen Needles: Document Number 149OTH-0003-77 Rev Q Dated 28 Sept 2021.

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