

Insulin Education Checklist

Insulin is a commonly used medication for patients with type 1 and type 2 diabetes. Insulin requires detailed teaching in order to ensure patients use it safely and effectively. Education may also help decrease anxiety patients feel about using insulin. See our chart, *Tips to Improve Insulin Safety*, for more on safe insulin use. The chart below provides counseling tips to cover when providing discharge instructions to patients who use insulin.

Topic	Counseling Tips
Injection sites and proper care	<ul style="list-style-type: none"> <input type="checkbox"/> Tell patients they can inject insulin into the abdomen (should avoid a 2 inch circle around the belly button), buttock, thigh, or the upper arm. Highlight these points during teaching:¹ <ul style="list-style-type: none"> ○ Wash hands prior to preparing and injecting insulin doses. ○ Inspect the injection site for redness, irritation, swelling, or lipohypertrophy (fatty lump at the skin's surface). <ul style="list-style-type: none"> ▪ Use a different site if any of these are noted. ○ Clean visibly dirty skin prior to injections (using an alcohol prep pad is not necessary prior to all injections, but don't discourage patients that feel more comfortable using them routinely). ○ Pinching the skin at the injection site is to ensure insulin delivery to the subcutaneous tissue, not the muscle. This is more important when longer needles are used (≥ 6 mm) or when injecting in areas with less subcutaneous fat (e.g., arms, thighs), especially in thinner patients.⁷
Injection site rotation	<ul style="list-style-type: none"> <input type="checkbox"/> Remind patients to rotate sites with each injection, spacing them at least one inch apart, to avoid lipohypertrophy.¹ <input type="checkbox"/> Use these tips to make injection site rotation an easy to follow process:¹ <ul style="list-style-type: none"> ○ Divide an injection area into four quadrants (divide into two halves for the thigh or buttock). ○ Use each quadrant or half for about a week. ○ Rotate among the halves or quadrants in a clockwise direction.
Insulin pens	<ul style="list-style-type: none"> <input type="checkbox"/> Tell patients that most insulin pens have two caps, an outer and an inner cap. BOTH need to be removed before injections.² <input type="checkbox"/> Remind patients to use a new needle with each injection to reduce infection risk and pain associated with injections.¹ <input type="checkbox"/> Discourage storing pens with needles attached. This can allow air to get inside and possibly lead to inaccurate dosing.¹ <input type="checkbox"/> Emphasize priming insulin pens prior to each use to remove air bubbles and ensure the right dose is injected.¹ <ul style="list-style-type: none"> ○ Most pens are primed with 2 units of insulin. Refer patients to product specific patient instructions for step-by-step instructions on priming their particular insulin pen. ○ Patients should see a drop of insulin at the needle tip to know it is primed.¹ <input type="checkbox"/> Tell patients to push the button to inject the dose and count to ten before removing the needle from the skin.¹ <ul style="list-style-type: none"> ○ This ensures that the full dose is delivered without leakage. Higher doses may require longer than ten seconds.¹

More . . .

Topic	Counseling Tips
Insulin vials	<ul style="list-style-type: none"> <input type="checkbox"/> Patients should use a new insulin syringe for each dose to reduce infection and pain associated with injections.¹ <input type="checkbox"/> To avoid unnecessary pressure making it difficult to draw up insulin doses, instruct patients to inject the amount of air into the vial that equals the amount of insulin they need to draw up.¹ <input type="checkbox"/> Teach patients how to inspect and remove bubbles from insulin syringes before removing the needle from the vial to ensure the proper dose is given.⁴ <input type="checkbox"/> Clarify that it is not necessary to keep the syringe needle under skin for 10 seconds after depressing the plunger [Evidence Level C].¹ This is only necessary with pen needles.¹ <input type="checkbox"/> Take your time teaching patients who use concentrated insulin (e.g., U-500). Dosing errors can lead to significant hypoglycemia. <input type="checkbox"/> Emphasize the importance of using the U-500 insulin syringe for patients using the <i>Humulin R U-500</i> vial. <ul style="list-style-type: none"> <input type="checkbox"/> This prevents unnecessary calculations and possible errors when converting doses for a U-100 syringe.
Hypoglycemia management	<ul style="list-style-type: none"> <input type="checkbox"/> Teach patients about symptoms of low blood sugar including feeling shaky, dizzy, sweaty, anxious, or confused.⁵ <input type="checkbox"/> Encourage patients to check their blood sugar if they have any of these symptoms or just don't feel right.⁵ <input type="checkbox"/> Remind patients to keep a fast-acting carbohydrate snack with them or readily available at all times (e.g., five or six lifesaver candies, two tablespoons of raisins, or commercial products like glucose tablets or gel).⁶ <input type="checkbox"/> Review and provide our patient education handout, <i>How to Handle Low Blood Sugar</i>, for proper treatment.
Minimizing injection-site pain	<ul style="list-style-type: none"> <input type="checkbox"/> Use a new needle or syringe for each injection.¹ <input type="checkbox"/> Insert needle at a 90° angle to the skin surface.¹ <input type="checkbox"/> Keep opened insulin vials or partially used pens at room temperature (store in the refrigerator prior to opening).¹ <ul style="list-style-type: none"> <input type="checkbox"/> See our chart, <i>Comparison of Insulins</i>, for details on room temperature stability and expiration dates. <input type="checkbox"/> If using alcohol to clean injection-site, wait until the area is completely dry before injecting.¹ <input type="checkbox"/> Use syringes or pen needles with shorter needles with a smaller diameter (higher gauge = smaller diameter).^{1,3} <input type="checkbox"/> Discourage patients from rubbing the injection site after a dose. This can cause insulin to be absorbed more rapidly.¹
Proper sharps disposal	<ul style="list-style-type: none"> <input type="checkbox"/> Tell patients to discard syringes and pen needles in a commercial sharps bin (e.g., BD Home Sharps). <ul style="list-style-type: none"> <input type="checkbox"/> Patients can make their own sharps bin using a plastic container (e.g., bleach or liquid detergent bottle with a lid).³ <input type="checkbox"/> Full containers should be disposed of as medical waste.³ <ul style="list-style-type: none"> <input type="checkbox"/> Commercially available products may have a mail back program (e.g., BD Home Sharps by Mail).³ <input type="checkbox"/> Otherwise, tell patients to check with their local health department for available locations.³
Patients with poor vision or dexterity	<ul style="list-style-type: none"> <input type="checkbox"/> Consider recommending the following to patients with poor vision or dexterity issues: <ul style="list-style-type: none"> <input type="checkbox"/> Syringe magnifier (e.g., <i>Magni-Guide</i>, <i>Ezy-Dose</i>). <input type="checkbox"/> Device that indicates the correct dose has been drawn up (e.g., <i>Count-a-dose</i>) <input type="checkbox"/> Consider asking prescribers to change Rx's from vials to pens for patients with poor vision or dexterity, as these may be a little easier to use.

Users of this resource are cautioned to use their own professional judgment and consult any other necessary or appropriate sources prior to making clinical judgments based on the content of this document. Our editors have researched the information with input from experts, government agencies, and national organizations. Information and internet links in this article were current as of the date of publication.

Levels of Evidence

In accordance with our goal of providing Evidence-Based information, we are citing the **LEVEL OF EVIDENCE** for the clinical recommendations we publish.

Level	Definition	Study Quality
A	Good-quality patient-oriented evidence.*	1. High-quality RCT 2. SR/Meta-analysis of RCTs with consistent findings 3. All-or-none study
B	Inconsistent or limited-quality patient-oriented evidence.*	1. Lower-quality RCT 2. SR/Meta-analysis with low-quality clinical trials or of studies with inconsistent findings 3. Cohort study 4. Case control study
C	Consensus; usual practice; expert opinion; disease-oriented evidence (e.g., physiologic or surrogate endpoints); case series for studies of diagnosis, treatment, prevention, or screening.	

*Outcomes that matter to patients (e.g., morbidity, mortality, symptom improvement, quality of life).



RCT = randomized controlled trial; SR = systematic review
[Adapted from Ebell MH, Siwek J, Weiss BD, et al. Strength of Recommendation Taxonomy (SORT): a patient-centered approach to grading evidence in the medical literature. *Am Fam Physician* 2004;69:548-56. <http://www.aafp.org/afp/2004/0201/p548.pdf>.]

Project Leader in preparation of this clinical resource (340337): Beth Bryant, Pharm.D., BCPS, Assistant Editor

References

1. Spollett G, Edelman SV, Mehner P, et al. Improvement of insulin injection technique. Examination of current issues and recommendations. *Diabetes Educ* 2016;42:379-94.
2. Goldman-Levine J. Common insulin pen errors: diabetes questions & answers. *Diabetes Self-Management*. August 2017. <https://www.diabetesselfmanagement.com/managing-diabetes/treatment-approaches/common-insulin-pen-errors-diabetes-questions-answers/>. (Accessed February 14, 2018).
3. Diabetes Digest. Get rid of needles safely. <http://diabetesdigest.com/safety-with-diabetes-needle-disposal/>. (Accessed February 15, 2018).
4. American Association of Diabetes Educators. Learning how to inject insulin. https://www.diabeteseducator.org/docs/default-source/legacy-docs/_resources/pdf/general/Insulin_Injection_How_To_AADE.pdf. (Accessed February 16, 2018).
5. American Diabetes Association. The diabetes advisor. Hypoglycemia. <https://professional.diabetes.org/sites/professional.diabetes.org/files/media/hypoglycemia.pdf>. (Accessed February 16, 2018).
6. Diabetes self management. Fast-acting carbohydrate. Updated June 1, 2016. <https://www.diabetesselfmanagement.com/diabetes-resources/definitions/fast-acting-carbohydrate/>. (Accessed February 16, 2018).
7. Saliel-Berzin R, Cypress M, Gibney M. Translating the research in insulin injection technique: implications for practice. *Diabetes Educ* 2012;38:635-43.

Cite this document as follows: Clinical Resource, *Insulin Education Checklist*. *Nurse’s Letter/Hospital Pharmacist’s Letter*. March 2018.

	<p><i>Evidence and Recommendations You Can Trust...</i></p>	
<p>3120 West March Lane, Stockton, CA 95219 ~ TEL (209) 472-2240 ~ FAX (209) 472-2249 Copyright © 2018 by Therapeutic Research Center</p>		

Subscribers to the *Letter* can get clinical resources, like this one, on any topic covered in any issue by going to **Nurses-Letter.com** or **HospitalPharmacistsLetter.com**