Clinical resources

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Clinical resources

Teaching and training plan for insulin injections using a syringe

Date and initial: _____

Day	Staff	Patient	Expected outcome	Completed
1	Identify and review injection supplies needed: 1 Syringe 2 Insulin vial 3 Alcohol swabs 4 Gloves	Have the patient identify injection supplies.	The patient will be able to recognize supplies needed for the injection process.	☐
2	Review injection supplies and talk through the process of drawing up the insulin 1 Appropriate type of insulin 2 Adequate amount of insulin 3 Expiration date 4 General appearance *(See additional handout labeled "Drawing up one type of insulin" or Drawing up two types of insulin in the same syringe")*	Have the patient repeat the process and identify the injection supplies.	The patient will be able to recognize the supplies needed for the injection process and repeat the steps to the process.	☐
3	Demonstrate the drawing up of insulin and talk through the process when performing it.	Have the patient verbalize how insulin is drawn up.	The patient will be able to verbalize the process of drawing up insulin.	☐
4	Review the process of drawing up insulin.	Have the patient return demonstrate how to draw up insulin.	The patient will be able to give a return demo of drawing up the insulin.	☐
5	Demonstrate how to administer insulin with a syringe. *(See additional handout labeled "Administering an insulin injection using a syringe")*	Have the patient verbalize how to inject insulin via a syringe.	The patient will be able to verbalize the process of injecting insulin via a syringe.	☐
6	Review the process of injecting insulin with a syringe.	Have the patient draw up and inject insulin in an orange.	The patient will be able to draw up and administer insulin via a syringe.	☐
7	Discuss appropriate injection sites and site rotation with the patient. Ask the patient to draw up and inject insulin. *(See additional handout labeled "Injection site rotation")*	Have patient 1 Draw up insulin 2 Identify what location he/she will use for injection 3 Self-inject the insulin and properly dispose of the syringe	Patient will be able to draw up insulin via a syringe, identify a chosen injection site and self-inject insulin.	☐

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Drawing up one type of insulin into a syringe

1. Gather insulin and injection supplies.
2. Wash hands with soap and water. Dry them and wear gloves.
3. Check the labels on the insulin vials. Make sure it is the correct insulin.[1]
4. The vial should not look frosted. The insulin should not:
   a. Look lumpy or grainy[2]
   b. Seem unusually thick
   c. Stick to the vial
   d. Seem to be discolored
   e. Contain crystals[1]

   If any of these observations are made, discard the vial and open a new one.
5. Mixing insulin[1]
   a. Intermediate-acting insulin *(N or NPH)* is cloudy. Roll it between your hands to mix it. **Do not** shake the vial.[2]
   b. Clear insulin does not need to be mixed.[2]
6. If the insulin vial has a plastic cap/top/cover, remove it.
7. Wipe the top of the vial with an alcohol wipe. Let it dry. **Do not** blow on it.[1]
8. Verify the dose of insulin required.
9. Take the cap off the needle, being careful not to touch the needle to keep it sterile.[1] Pull back the plunger of the syringe to put air in the syringe equal to the number of units of insulin you must take from the insulin vial.[2]
10. Push the needle straight through the center of the rubber top of the insulin vial and push the plunger down completely.
11. Leave the needle in the insulin vial. Carefully turn the vial and the insulin syringe upside down so the vial is on top.
12. With the tip of the needle in the liquid, slowly pull back on the plunger to get the correct dose of insulin into the syringe.[1]
13. Check the syringe for air bubbles. If there are bubbles, inject the insulin back into the vial and start from step 10.
14. When there are no bubbles, take the syringe out of the vial and inject using proper injection technique. See additional handout "Administering insulin injection using a syringe."
15. Put the syringe down carefully so the needle does not touch anything.[2] Activate the safety mechanism of the syringe and safely dispose of it in a sharps container.

1. Mayo Clinic website. Insulin *(parenteral route)*: proper use. Available at: https://www.mayoclinic.org/drugs-supplements/insulin-parenteral-route/proper-use/drg-20069501. Last reviewed August 7 2016. Accessed August 9, 2018.
2. MedlinePlus. Giving an insulin injection. Available at https://medlineplus.gov/ency/patientinstructions/000660.htm. Last updated January 1, 2016. Accessed August 1, 2018.

Drawing up two types of insulin in the same syringe

1. Never mix two types of insulin in one syringe unless you are told to do so.[1]
2. Gather insulin and injection supplies.
3. Wash hands with soap and water. Dry them and wear gloves.
4. Check the labels on the insulin vials. Make sure it is the correct types of insulin.
5. The vials should not look frosted. The insulin should not:[2]
   a. Look lumpy or grainy
   b. Seem unusually thick
   c. Stick to the bottle
   d. Seem to be discolored
   e. Contain crystals[2]

   If any of these observations are made, discard the vial and open a new one.
6. The patient's prescriptions will tell you how much of each insulin you will need. Add these two numbers together. This is the amount of insulin you should have in the syringe before injecting it.[1]
7. Mixing[1]
   a. Intermediate-acting insulin *(N or NPH)* is cloudy. Roll it between your hands to mix it. **Do not** shake the vial.
   a. Clear insulin does not need to be mixed.
8. If the vials have plastic caps/tops/covers, take them off.
9. Wipe the top of each bottle (***clear*** *and* ***cloudy***) with an alcohol wipe. Let them dry. **Do not** blow on them[1]
10. Pick up the **cloudy** bottle, turn it upside down and roll between your hands to mix it.
11. Check the dosage of each insulin you are going to need.
12. Take the cap off the needle, being careful not to touch the needle to keep it sterile.[1] Pull the plunger down to the correct unit mark for the **cloudy** insulin dose ordered.
13. Insert the needle through the rubber top of the **cloudy** insulin bottle. Push the plunger to inject air into the **cloudy** insulin bottle. Pull the needle out of the cloudy insulin bottle. **You are not going to draw out any of the cloudy insulin yet.**
14. Pull back the plunger of the syringe to the correct unit mark for the **clear** insulin dose.
15. Insert the needle through the center of the rubber top of the **clear** insulin bottle. Push the air into the **clear** insulin bottle and turn the insulin vial and syringe upside down.
16. With the tip of the needle in the liquid, slowly pull back on the plunger to the correct unit mark for the **clear** insulin dose.
17. Check the syringe for air bubbles.[1] If there are bubbles, inject the insulin back into the bottle and start from step 13.
18. When there are no bubbles, take the syringe out of the bottle and verify that you have the correct dose of **clear** insulin.
19. Push the needle through the center of the rubber top of the **cloudy** insulin bottle. Turn the bottle upside down.
20. With the tip of the needle in the liquid, slowly pull back on the plunger to exactly the correct unit mark of **cloudy** insulin. **Do not** draw extra insulin in the syringe, because you cannot push any insulin back into the bottle.
21. Check the syringe for air bubbles. If there are bubbles, hold both the bottle and syringe in one hand, and tap the syringe with your other hand. The bubbles will float to the top. If you still see air bubbles, discard the dose and start from step 12.
22. Remove the needle from the bottle then push out the air bubbles.
23. Make sure you have the correct total dose of insulin.[1]
24. Move the syringe away from the patient and anyone else, activate safety mechanism of the syringe and safely dispose of it in a sharps container.

1 Medline Plus. Giving an insulin injection. Available at https://medlineplus.gov/ency/patientinstructions/000660.htm. Last updated August 7, 2016. Accessed August 9, 2018.

2 Mayo Clinic website. Insulin *(parenteral route)*: proper use. Available at https://www.mayoclinic.org/drugs-supplements/insulin-parenteral-route/proper-use/drg-20069501. Last updated January 1, 2016. Accessed August 9, 2018.

Administering an insulin injection using a syringe

1. Document on an injection site chart which locations you have used. Refer to that chart prior to administering the injection so you can choose a new location. Provide a location chart to the patient.
2. Keep injection sites 1 inch *(2.5 centimeters, cm)* away from scars and 2 inches *(5cm)* away from the navel. **Do not** inject into an area that is bruised, swollen, or tender.[1]
3. The site chosen for the injection should be clean and dry. If the skin is visibly dirty, clean it with soap and water. **Do not** use an alcohol wipe on the injection site.[1]
4. The insulin needs to go into the fat layer under the skin.
   a. Longer needles *(greater than 6mm)* may require an injection at a degree angle, whereas shorter needles *(less than or equal to 6mm)* may be given straight into the skin at a degree angle. Check with the facility protocols to determine the best injection technique for the patient.
   b. Longer needle: Pinch the skin *(inch portion of the skin and fat)* and insert the needle at a degree angle.
   c. Shorter needles: Insert the needle straight into the skin at a degree angle.
   d. Push the needle through the skin. Push the insulin in with the plunger. Leave the syringe in place for 5 seconds after injecting to ensure that the entire dose has been injected. Pull the needle out and release the skin if it is pinched.
5. If insulin leaks from the injection site, press the injection site for a few seconds after the injection. If this happens often, check with the healthcare provider. You may need to change the site or the injection angle.
6. Place the needle and syringe in a safe, hard container *(such as a sharps container or detergent bottle)*. When nearly full, close the container tightly with a screw-on cap and tape closed. Dispose according to your local department of sanitation.
7. Never reuse needles or syringes.[1]

Insulin storage *(vials)*

General information

- Insulin is very sensitive to sunlight, indoor lights and to extremely hot or cold temperatures.[2]
- Insulin is not OK to use if exposed to very hot or cold weather.[2]
- Heat and freezing makes insulin break down and therefore will not work well to lower the blood sugar.[2]
- Injecting cold insulin can sometimes make the injection more painful.[3]
- Never use insulin if it has expired.[2]

General rules

1. To ensure that the insulin remains effective, stable and undamaged, discard the "in use" insulin after 28 days.[4]
2. Insulin that is not in use should be stored in the refrigerator. If refrigeration is not possible, it can be kept at room temperature *(15–25°C)* for 28 days.[4]
3. The in-use vial may be kept at room temperature *(15–25°C)* for 28 days.[4]
4. Write the date on the vial that you opened and use that date to determine when 28 days has elapsed. *(**Open** means the insulin cap is removed and the rubber stopper was punctured.)*
5. Inspect the insulin before each use. Look for changes in color or clarity. Look for clumps, solid white particles or crystals in the bottle. Insulin that is clear should always be clear and never look cloudy.[2]

1 MedlinePlus. Giving an insulin injection. Available at https://medlineplus.gov/ency/patientinstructions/000660.htm August 7, 2016. Accessed August 9, 2018.

2 Institute for Safe Medication Practices. Storage of insulin. Available at http://www.consumermedsafety.org/tools-and-resources/insulin-safety-center/storage-of-insulin. Accessed August 9, 2018.

3 American Diabetes Association. Insulin storage and syringe safety. Available at http://www.diabetes.org/living-with-diabetes/treatment-and-care/medication/insulin/insulin-storage-and-syringe-safety.html. Last edited April 7, 2014. Accessed August 9, 2018.

4 InDependent Diabetes Trust. Storing insulin: looking after your insulin and injecting devices. Available at https://www.iddt.org/about/living-with-diabetes/storing-insulin. Accessed August 9, 2018.

Reviewed by NADONA

Teaching and training plan for insulin injections using an insulin pen

Date and initial:

Day	Staff	Patient	Expected outcome	Completed
1	Identify and review injection supplies needed: 1 Insulin pen 2 Pen needle 3 Alcohol swabs 4 Gloves	Have the patient identify injection supplies.	The patient will be able to recognize the supplies needed for the injection process.	☐
2	Review injection supplies and talk through the process of checking the pen for: 1 Appropriate type of insulin 2 Adequate amount of insulin 3 Expiration date 4 Appearance *(See additional handout labeled "Administering an insulin injection using an insulin pen")*	Have the patient repeat the process and identify injection supplies.	The patient will be able to recognize the supplies needed for the injection process and repeat the steps to the process.	☐
3	Demonstrate how the insulin pen is prepared for use and talk through the process when performing it.	Have the patient verbalize how the insulin pen is prepared for use.	The patient will be able to verbalize the process of preparing the insulin pen for use.	☐
4	Review how the insulin pen is prepared for use.	Have the patient return demonstrate how to prepare the insulin pen for use.	The patient will be able to give a return demo of preparing the insulin pen for use	☐
5	Demonstrate how to administer insulin with an insulin pen. *(See additional handout labeled "Administering an insulin injection using an insulin pen")*	Have the patient verbalize how to inject insulin using a pen.	The patient will be able to repeat/verbalize the process of how to inject insulin using an insulin pen.	☐
6	Review the process of administering insulin with a pen.	Have the patient prepare the insulin pen and inject insulin in an orange.	The patient will be able to prepare an insulin pen and administer insulin via a pen.	☐
7	Discuss appropriate injection sites and site rotation with the patient. Ask the patient to prepare the insulin pen and inject insulin.	Have the patient: 1 Prepare the insulin pen. 2 Identify what location will be used for injection. 3 Self-inject the insulin and properly dispose of the needle.	The patient will be able to prepare the insulin pen, identify the chosen injection site and self-inject insulin.	☐

Reviewed by NADONA

Administering an insulin injection using an insulin pen

1. Check the pen for:
   a. Correct insulin by reading the label
   b. Enough insulin in the pen for the correct dose
   c. Expiry date *(either over the 28 days or the manufacturer's expiration date)*
2. If using intermediate or premixed insulin, gently stir it by laying the pen on its side and rolling it between the palms of the hands.
3. Attach a new pen needle—click or screw the needle in place securely.
4. Remove the cap(s) from the needle.
5. Prime the pen by dialing one or two units on the pen and pressing the plunger down fully. Repeat until 2-3 drops occur.
6. Turn the dial on the pen to the correct dose.
7. Document on an injection site chart which locations have been used. Refer to that chart prior to the injection to choose a new location. **Provide a location chart to the resident.**
8. Keep injection sites 1 inch *(2.5 centimeters, cm)* away from scars and 2 inches *(5 cm)* away from the navel. **Do not** inject into an area that is bruised, swollen, or tender.[1]
9. The site chosen for the injection should be clean and dry. If the skin is visibly dirty, clean it with soap and water. ***Do not* use an alcohol wipe on the injection site.**[1]
10. The insulin needs to go into the fat layer under the skin.

Long needles: >6 mm

   a. Pinch the skin *(1- to 2-inch portion of the skin and fat)*.
   b. Push the needle quickly through the skin at 90° *(straight in)* to the skin surface.
   c. Push the thumb button at a moderate and steady pace until the insulin is completely injected. **Keep the pen needle in the skin for 10 seconds to ensure the entire dose has been injected**.
   d. Pull the needle out of the skin.
   e. Release the skin pinch-up.

Short needles: <6 mm

   a. While skin is flat, push the needle quickly through the skin at 90° *(straight in)* to the skin surface.
   b. Push the thumb button at a moderate and steady pace until the insulin is completely injected.
   c. **Keep the pen needle in the skin for 10 seconds to ensure the entire dose has been injected**.
   d. Pull the needle out of the skin.

11. If insulin leaks from the injection site, press the injection site for a few seconds after the injection. For patients who report frequent skin leakage, direct observation of their self-injection is important for detecting possible technique-related issues that can be modified.[2]
12. Remove the needle from the pen by replacing the large cover and unscrewing.
13. Dispose of the used needle by placing it in a thick plastic container *(such as a sharps container or detergent bottle)*.[1] When nearly full, close the container tightly with a screw-on cap and tape closed. Dispose according to local department of sanitation.
14. Never reuse needles or syringes.[1]

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Insulin storage *(pens)*

General information

- Insulin is very sensitive to sunlight, indoor lights, and to extremely hot or cold temperature.[4]
- Insulin is not OK to use if exposed to very hot or cold weather.[4]
- Heat and freezing makes insulin break down and therefore it will not work well to lower blood sugar.[4]
- Injecting cold insulin can sometimes make the injection more painful.[3]
- Never use insulin if it has expired.[4]
- Once used for the first time, insulin pens should not be stored in the fridge. Instead, they should be stored at **controlled** room temperature. The number of days the pen can be used will depend on the brand of the pen.[4]
- Pens last 7-28 days if stored at **controlled** room temperature.[4]

General rules:

1. To ensure that insulin remains effective, stable and undamaged, **discard "in use" insulin after 28 days or number of days indicated by the manufacturer**.[5]
2. Insulin that is not in use should be stored in the refrigerator. If refrigeration is not possible, it can be kept at room temperature *(15-25˚C)* for 28 days.[5]
3. In-use pens should be kept at room temperature and **should not** be kept in the refrigerator.[5]
4. Write the date of the first time the pen was ever used and use that date to determine when 7-28 days *(based on the manufacturer)* has elapsed.[5]
5. Inspect the insulin before each use. Look for changes in color or clarity. Look for clumps, solid white particles or crystals in the pen. Insulin that is clear should always be clear and never look cloudy.[4]

1 MedLinePlus. Giving an insulin injection. Available at https://medlineplus.gov/ency/patientinstructions/000660.htm. Last reviewed August 7, 2016. Accessed August 9, 2018.

2 Mayo Clinic website. Insulin *(parenteral route)*: proper use. Available at https://www.mayoclinic.org/drugs-supplements/insulin-parenteral-route/proper-use/drg-20069501. Last updated January 1, 2016. Accessed August 9, 2018.

3 American Diabetes Association. Insulin storage and syringe safety. Available at http://www.diabetes.org/living-with-diabetes/treatment-and-care/medication/insulin/insulin-storage-and-syringe-safety.html. Last edited April 7, 2014. Accessed August 9, 2018.

4 Institute for Safe Medication Practices. Storage of insulin. Available at http://www.consumermedsafety.org/tools-and-resources/insulin-safety-center/storage-of-insulin. Accessed August 9, 2018.

5 InDependent Diabetes Trust. Storing insulin: looking after your insulin and injecting devices. Available at https://www.iddt.org/about/living-with-diabetes/storing-insulin. Accessed August 9, 2018.

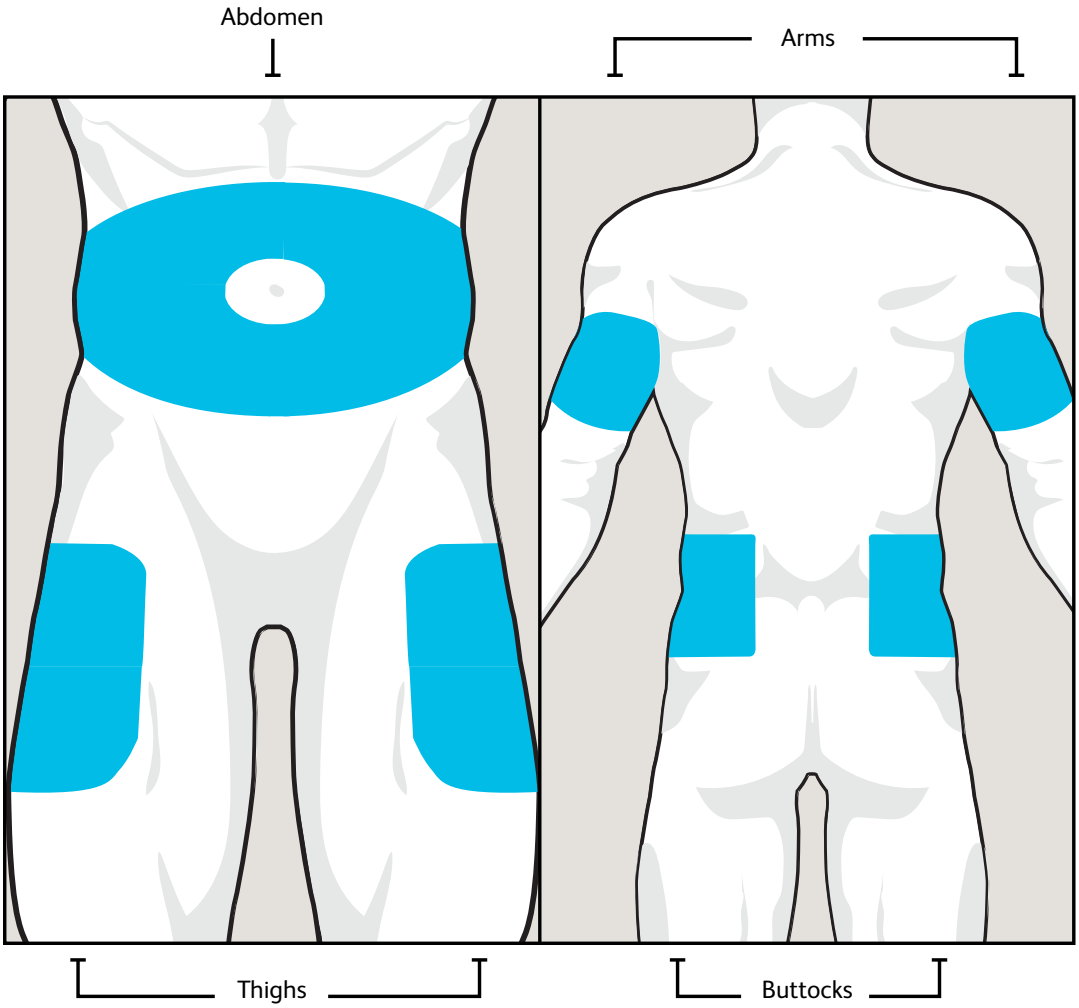
Reviewed by NADONA

Injection site rotation

There are several areas on the body that are recommended for injecting insulin. Diabetes experts recommend consistent injection site rotation as the best way to keep injection sites healthy.[1]

Where to inject?

It's generally recommended to inject insulin into:



Reference

1. Frid AH, et al. New insulin delivery recommendations. Mayo Clinic Proceedings. 2016;91*(9)*:1231–1255