



Nurse Delegation Training

For Nursing Assistants



Self Study

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Acknowledgements

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Introduction

Introduction

Introduction

Welcome to Nurse Delegation for Nursing Assistants:
Special Focus on Diabetes.

In spring of 2008, a law was passed by the Washington State legislature allowing nursing assistants to perform insulin injections as a nurse delegated task.

Because of this law and nursing assistants like you, DSHS clients with diabetes now have the choice and freedom to live at home or in a residential care facility when insulin injections are needed.

This self-study course is designed for nursing assistants who:

- Are registered or certified (NA-R's or NA-C's).
- Have successfully completed the *Nurse Delegation for Nursing Assistants Self-Study Training Course*.
- Need this additional, required training to administer insulin injections under nurse delegation.



Because of you, your DSHS client has more freedom and choices.

Who Must Take This Course?



The course includes this workbook and a companion DVD. Both the workbook and DVD are divided into three sections or Modules.

- Module 1: All About Diabetes
- Module 2: All About Insulin
- Module 3: All About Insulin Injections

Course Process

**Course Process
Continued**

This workbook is yours to keep and use. It contains information, job aids, and checklists that you can use as a valuable resource in the future.

The DVD repeats key information from the modules and demonstrates and reinforces important concepts from the workbook.

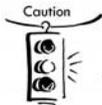
Use this workbook and DVD for each Module:

- Read Module 1.
- Watch the first DVD segment.
- Take the Practice Test for Module 1.
- Review the Answer Key for the Practice Test.
- Re-read and/or review sections where you missed questions.
- Repeat these steps for Modules 2 and 3.

**Learning
Aids**

To help you identify and learn important concepts, the workbook:

- Boxes **KEY WORDS** you need to know.
- Provides Summary Tables and Review boxes.
- Contains helpful information/job aids in the back (Appendices).
- Uses the following icons:

	<p>A critical safety concept that you must know and apply as you care for your client.</p>
	<p>A description of how your delegating RN will work with you on a particular aspect of your client's care.</p>
	<p>An important rule that you must know and follow when handling and administering insulin.</p>
	<p>A reminder to verify the 5 Rights of Medication Administration.</p>
	<p>A section or module review that reinforces key concepts from the text.</p>
	<p>A reminder to stop and move on to a different part of the training.</p>

The Practice Tests at the end of each Module are designed to prepare you for the final written test. The final written test is very similar in format and content.

Successfully Completing the Course

To successfully complete this course, you will need to:

- Present your workbook—with practice tests completed—to your instructor for review.
- Pass the final written test.
- Return the DVD to the Training Coordinator.

Once you pass the written test, you can begin your hands-on training with your delegating RN. This on-the-job training is an essential part of learning to work with insulin and administer it safely.

Hands-on Training

For your own confidence and the safety of your client, you will receive this ongoing training, practice, and supervision before and after you begin administering insulin.

Your on-the-job training includes:

- Hands-on practice.
- Learning the specifics about your client's care needs related to the delegated tasks you will be performing.

Your delegating RN will work with you to make sure you are competent to administer your client's insulin safely before you give an insulin injection to your client.

As with any delegated task, tell the delegating RN if you have concerns or questions about being able to perform the task safely.

After you have begun administering insulin to your client, your delegating RN will continue to supervise you at least weekly for four weeks.

As you can see, you will have plenty of training, supervision, and support as you take on this task.

Good luck!



You will have plenty of training, support, and supervision as you take on this task.



Module

1

All About DIABETES

Module

1

In Module 1, you will learn about:

- What diabetes is and how it impacts a person's health.
- High blood sugar.
- Your role in helping your client manage diabetes safely.

DIABETES

Basically, diabetes mellitus or simply **DIABETES** is an illness that causes the sugar level in a person's blood to be too high. Another word for blood sugar is glucose.

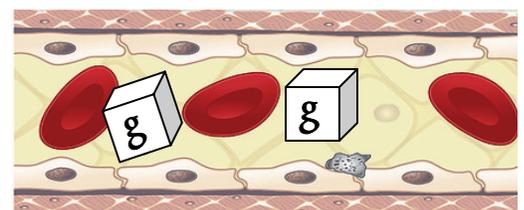


Glucose

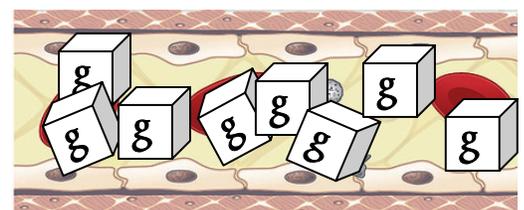
GLUCOSE is the type of sugar that is the main source of energy needed by the human body. In order to live, the human body must have glucose.

Not only does the body need to *have* glucose, the body must also control *where* glucose goes. Some of the body's glucose must **stay in the blood**, and some of the body's glucose must **leave the blood** and move to other parts of the body where it is needed or stored for later use.

When a person has diabetes, too much of the body's glucose stays in the blood.



Normal amount of glucose in blood



Too much glucose in blood

How the Body Normally Uses Glucose

Let's learn how the body uses glucose normally. After that, it will be easy to understand what happens **differently** with diabetes.

Where does glucose come from?

If you think about glucose as energy for the body, you can probably guess where it comes from. Yes, glucose comes mostly from food—or what a person eats and drinks.

Amazingly, the body turns most of the food it gets into glucose. Foods high in sugar or carbohydrates—such as candy, desserts, or sugary drinks—create especially high amounts of glucose.

Where does the glucose go?

After a person eats, glucose goes into the blood. Glucose travels around or circulates inside of the blood vessels, mixing with the blood.

Normally, how does extra glucose move out of the blood and get to the rest of the body?

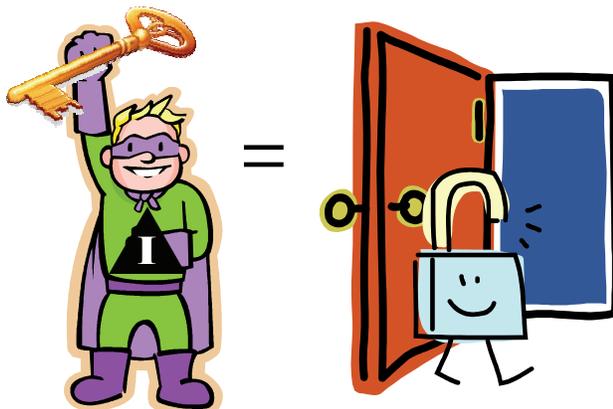
To move out of the blood, glucose must get through tiny “doors” or cells in the walls of the blood vessels. But first, glucose must have the “key” to unlock those doors.



The key that unlocks the doors and allows extra glucose to leave the blood is a hormone called **INSULIN**.

Normally, how does insulin work?

After a person eats, the body senses that the amount of glucose in the blood is getting higher. The body then sends insulin into the blood. Once in the blood, insulin acts like a key and allows extra glucose to leave the blood.



Insulin is the key that unlocks the doors and allows extra glucose to leave the blood.

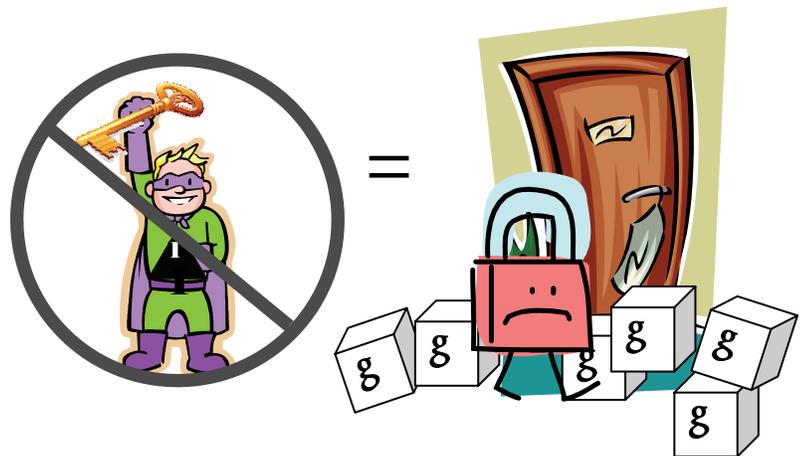
How the Body Works Differently With Diabetes

Now let's look at what happens differently with diabetes. Simply stated, when a person has diabetes, the body's insulin does not work normally. This can happen for different reasons:

Insulin might not work normally because. . .	This problem is called....
The body may not make any insulin	Type 1 diabetes
The body may make too little insulin	Type 2 diabetes
The tiny "doors" or cells of the blood vessels may not unlock for insulin the way that they should	Insulin Resistance (part of Type 2 diabetes)

For your work purposes, the reasons why insulin may not work normally are not as important as this **one concept**:

When a person has diabetes, the body's insulin is not able to act like a key to help extra glucose leave the blood. As a result, too much glucose stays in the blood.

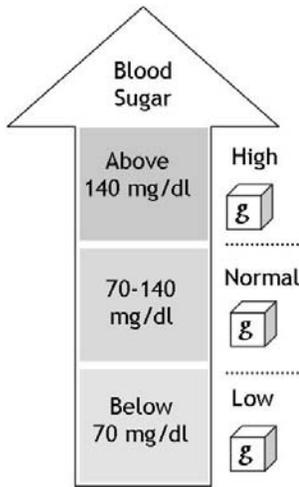


What Happens After a Person Eats?

Normally . . .	With diabetes . . .
<ul style="list-style-type: none"> • Food is turned into glucose that enters the blood. 	<ul style="list-style-type: none"> • Food is turned into glucose that enters the blood.
<ul style="list-style-type: none"> • The body senses the amount of glucose in the blood is getting higher. 	<ul style="list-style-type: none"> • The body senses the amount of glucose in the blood is getting higher.
<ul style="list-style-type: none"> • The body sends insulin into the blood. 	<ul style="list-style-type: none"> • Insulin is not able to work normally.
<ul style="list-style-type: none"> • Insulin acts like a key to help extra glucose move out of the blood. 	<ul style="list-style-type: none"> • Extra glucose builds up in the blood.

HIGH BLOOD SUGAR

Too much glucose in the blood is called **HIGH BLOOD SUGAR** or **HYPERGLYCEMIA**. You may also hear people call it high blood glucose.



Blood sugar levels can be measured using a machine called a **GLUCOMETER**.



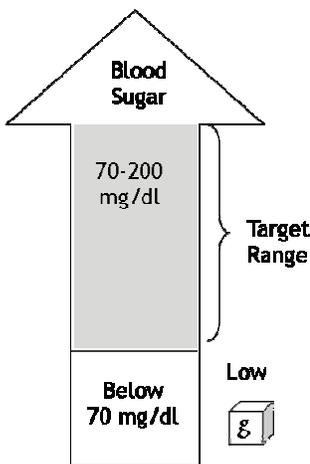
Your delegating RN will:

- Show you how to use your client's glucometer.
- Let you know when your client's blood sugar needs to be checked.

Except for the first two hours after a person eats--when it is normal for blood sugar to get higher--the **NORMAL RANGE** for blood sugar levels is between **70-140 mg/dl**.

Blood sugar higher than 140 mg/dl two or more hours after eating is considered high.

Target Range



Sample Target Range

Some people with diabetes struggle each day to keep their blood sugar from being too high. It is very difficult for them to keep their blood sugar within the normal blood sugar range.

As a result, healthcare providers give some people with diabetes an individualized **TARGET RANGE** for their blood sugar.

For example, a client's Target Range might be 70-200 mg/dl. This means that the client has a goal of keeping high blood sugar from going above 200 mg/dl.



Your delegating RN will let you know:

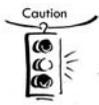
- If your client has an individualized Target Range and what it is.
- The plan and steps you need to take if your client has high blood sugar above this individualized Target Range.

Always follow the plan and steps that come from your delegating RN.

Common **HIGH BLOOD SUGAR SYMPTOMS** include fatigue or drowsiness, blurred vision, frequent urination, extreme thirst, weakness, headache, and dry skin and mouth.

Recognizing High Blood Sugar

Nausea, rapid breathing, or sweet/fruity breath odor are considered “**late**” symptoms of high blood sugar because they usually occur **after** other symptoms.



Late symptoms usually mean that a person’s blood sugar is dangerously high and requires immediate medical attention.

If a person with diabetes shows symptoms of high blood sugar, then check his or her blood sugar level using a glucometer.

High blood sugar can lead to a medical emergency if not treated. As a result, healthcare providers usually prescribe individualized plans for diabetic patients who experience high blood sugar above their Target Range.



Your delegating RN will let you know:

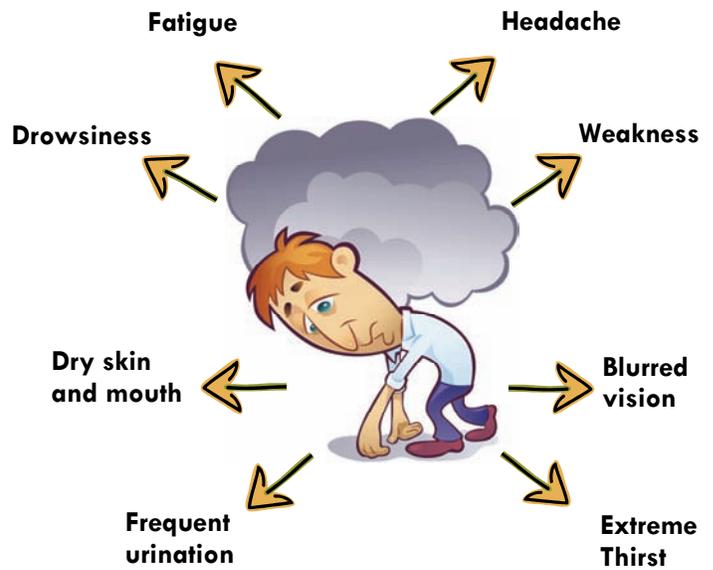
- The plan for your client and the steps you need to take if your client has high blood sugar above the Target Range.

Always follow the plan and steps that come from your delegating RN.



Call 911 immediately if your client is non-responsive. Notify your delegating RN as soon as possible after the client has received emergency help.

High Blood Sugar Symptoms



Late Symptoms

Nausea
Rapid breathing
Sweet/fruity breath odor



HIGH BLOOD SUGAR REVIEW: **Important Points to Remember**

- Know your client's individualized Target Range** for blood sugars.
- Use a glucometer** to check your client's blood sugar if he or she shows symptoms of high blood sugar.
- Follow your delegating RN's instructions for high blood sugar** whenever your client's blood sugar tests above his or her individualized Target Range.
- Call 911 immediately** if your client is non-responsive. Notify your delegating RN as soon as possible after your client has received emergency help.

HIGH BLOOD SUGAR AND SERIOUS HEALTH PROBLEMS

Over time, high blood sugar can lead to serious health problems by causing damage to large blood vessels, small blood vessels, nerves, and the body's ability to fight infection.

Damage to. . .	Can lead to these health problems. . .
<p>Large Blood Vessels</p> 	<ul style="list-style-type: none"> • High blood pressure • Stroke • Heart attack
<p>Small Blood Vessels</p> 	<ul style="list-style-type: none"> • Eye problems that can lead to poor vision or blindness • Kidney disease or kidney failure • Poor circulation and healing, especially in the legs and feet
<p>Nerves</p> 	<ul style="list-style-type: none"> • Pain • Loss of feeling and muscle weakness especially in the feet, legs, and hands • Wounds and amputations related to loss of feeling and poor circulation and healing
<p>The Body's Ability to Fight Infection</p> 	<ul style="list-style-type: none"> • Frequent infections • Dental problems

To better visualize how high blood sugar can damage the body, see page 76 in Appendix A.

MANAGING DIABETES

The good news is: diabetes can be managed! Did you know that serious health problems from diabetes can be prevented?

The best way for people to manage diabetes is to keep their blood sugar levels within their Target Ranges.

People with diabetes can take action steps to prevent serious health problems.

Fortunately, there are ways to control blood sugar when a person is diabetic and the body's insulin does not work normally. Yes, people with diabetes can take action steps to prevent serious health problems.

Action steps to stay healthy are different for each person with diabetes. These action steps are part of each person's individualized **DIABETES MANAGEMENT PLAN**.

A person's Diabetes Management Plan is developed with help from healthcare providers or the person's **DIABETES CARE TEAM**.

For some, the diabetes care team may include a doctor, a registered dietician, and a pharmacist. For others, the diabetes care team may also include a nurse educator, a podiatrist (foot doctor), and a delegating RN.

You are an important part of the care team.

Because you will be providing care under nurse delegation, your client will always have a delegating RN on the diabetes care team-- and you will also be an important member of the team.



Your delegating RN will:

- Teach you about your client's Diabetes Management Plan.
- Let you know when and what to communicate and report to him or her.

Always follow the plan and steps that come from your delegating RN.

DIABETES MANAGEMENT PLANS

Most Diabetes Management Plans contain action steps in four areas. An easy way to remember the four parts of a Diabetes Management Plan is to think of them as **THE FOUR M's**: MEALS, MOVEMENT, MEDICATION, AND MONITORING.

Let's look briefly at each of these areas and learn how they can help people with diabetes stay as healthy as possible.

THE FOUR M's:	1	2	3	4
	MEALS	MOVEMENT	MEDICATION	MONITORING
				
	Eating healthy	Getting physical activity	Taking medications as prescribed	Monitoring blood sugar levels

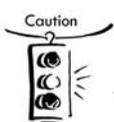
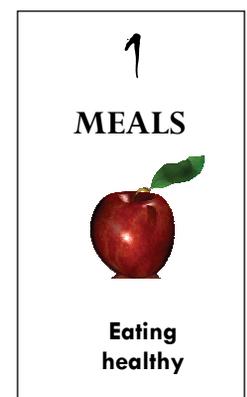
Making healthy food choices can help people with diabetes to control their blood sugar levels.

Some people with diabetes need to follow daily meal plans. These plans are individualized for each person. Other people do not use daily meal plans, but try to make healthy food choices each day.

Food choices that are healthy for people with diabetes are the same food choices that are healthy for people in general. Find helpful information about healthy food choices on page 78 and a meal planning tool on page 79 in Appendix A.

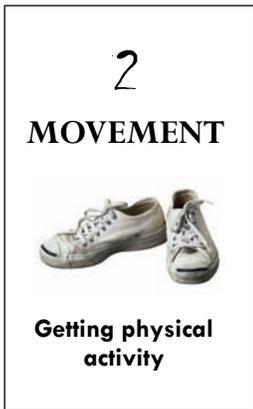
If your client has a specialized diet or needs to follow a daily meal plan, the details will be included in the client's individualized care plan or the instructions from your delegating RN.

Eating Healthy



Do not make changes in your client's dietary habits without notifying your client's case manager or your delegating RN. Dietary changes need to be written in your client's individualized care plan or the instructions from your delegating RN.

Getting Physical Activity

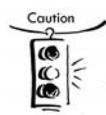


Getting regular physical activity can help people with diabetes to control high blood sugar.

Generally, everyone should try to get some physical activity every day. However, many people have limits on how much or what kind of exercise they can do.

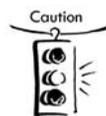


Because exercise **lowers** blood sugar, people with diabetes need to be careful about changing their physical activity patterns suddenly.



Doing too much too fast can make blood sugar too low, which would be dangerous. To be safe, people with diabetes need to set individualized exercise goals with the help of their healthcare providers.

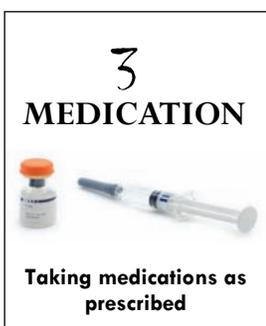
If your client has a specialized exercise plan, the details will be included in the client's individualized care plan or the instructions from your delegating RN.



Do not make changes in your client's exercise habits without notifying your client's case manager and/or your delegating RN. New exercise plans need to be written in your client's individualized care plan or the instructions from your delegating RN.

Find some additional helpful information on exercise and diabetes on page 80 in Appendix A.

Taking Medications



Some people with diabetes do not need medications to help them control their blood sugar levels, but many do.

One person may use one or more types of oral medications or pills. Another person may need injections of one or even two types of insulin. Another person may use a combination of oral medication and insulin injections.

Healthcare providers work with people individually to create the best list of prescribed medication for them.

You may be helping your client with diabetes medications under nurse delegation, including insulin injections.

You will learn more about insulin and injections in the next two training modules. For now, what you need to know is this:

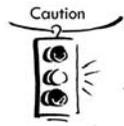


Your delegating RN will:

- Teach you about your client's individualized medication list.
- Give you specific instructions about helping your client with diabetes medications.



Always follow the plan and steps that come from your delegating RN.



Never administer a client's medications before you have received instruction and approval from your delegating RN.

Regular monitoring of blood sugar levels with a glucometer can help people to manage their diabetes better.

Monitoring blood sugar levels tells people how close they are to their Target Range. If they are frequently outside of their Target Range, then they can work with their healthcare providers to make needed changes to their Diabetes Management Plan.

People with diabetes usually monitor their blood sugar according to an individualized schedule they set up with their healthcare provider.

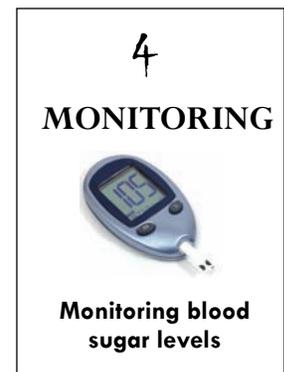


Your delegating RN will:

- Show you how to use your client's glucometer.
- Let you know the plan for your client and the steps you need to take if your client has high blood sugar.

Always follow the plan and steps that come from your delegating RN.

Monitoring Blood Sugar Levels



YOU AND YOUR CLIENT'S HEALTH!

You can make a positive difference in your client's health!

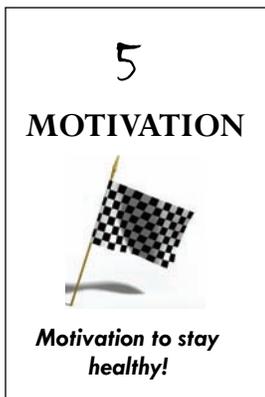
As you follow instructions and help your client with your assigned and delegated tasks of the Diabetes Management Plan—such as giving medications as prescribed—you are helping your client to manage diabetes.

As you positively encourage and support your client's efforts to follow the Diabetes Management Plan, you are also helping your client to manage diabetes. Your positive support will help your client feel motivated about working so hard to stay healthy!

In fact, feeling motivated is so important to your client, it can be considered **THE FIFTH M:** MOTIVATION to stay healthy!

Finally, as you help your client with other assigned or delegated tasks—such as monitoring blood pressure or providing good skin care—you are helping to prevent or minimize serious health problems that can occur with diabetes.

Learn ten ways you can help motivate your client to follow his or her Diabetes Management Plan on page 81 in Appendix A.



So, remember, you are an important member of the Diabetes Care Team, and your work matters! Doing your assigned and delegated tasks well is important.



MODULE REVIEW:

Important Points to Remember

- ☑ Diabetes is an illness that causes high blood sugar.
- ☑ People with diabetes have high blood sugar because their body's insulin does not work normally to remove extra glucose from the blood.
- ☑ Too much glucose in the blood is called high blood sugar or hyperglycemia.
- ☑ Common symptoms of hyperglycemia include fatigue or drowsiness, blurred vision, frequent urination, and extreme thirst.
- ☑ If your client shows symptoms of high blood sugar:
 - Do a blood sugar check using a glucometer.
 - Follow your delegating RN's instructions for high blood sugar.
 - **Call 911 immediately** if the client is non-responsive. Notify your delegating RN as soon as possible after the client has received emergency help.
- ☑ Over time, high blood sugar causes damage to:
 - Large blood vessels.
 - Small blood vessels.
 - Nerves.
 - The body's ability to fight infection.
- ☑ Damage from high blood sugar can lead to serious health problems such as a heart attack, eye problems (low vision or blindness), poor circulation and healing, loss of feeling, and frequent infections.



MODULE REVIEW:

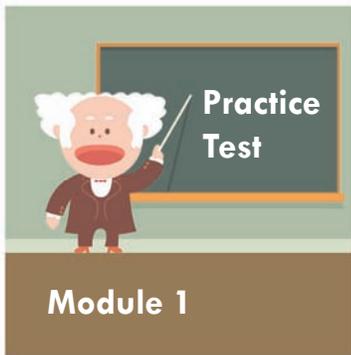
Important Points to Remember (continued)

- ✓ The normal range for blood sugar is 70-140 mg/dl.
- ✓ People who have difficulty keeping their blood sugar in the normal range may have an individualized Target Range as their goal.
- ✓ Each person with diabetes has a Diabetes Care Team, including the person's doctor and healthcare professionals such as your delegating RN and yourself.
- ✓ Your delegating RN is your link to the Diabetes Care Team. You will get instructions from, communicate with, and report to your delegating RN regarding your client's diabetes and care.
- ✓ The Diabetes Care Team works with the person with diabetes to develop a Diabetes Management Plan which usually includes the Four M's:
 - **MEALS:** Eating healthy
 - **MOVEMENT:** Getting physical activity
 - **MEDICATIONS:** Taking medications as prescribed
 - **MONITORING:** Monitoring blood sugar levels
- ✓ You are an important member of the Diabetes Care Team. By performing your delegated and assigned tasks well, you can make a positive difference in helping your client to manage diabetes and feel the **Fifth M: MOTIVATION** to stay healthy!



**IT'S TIME
TO:**





Section 1—Multiple Choice:

Place an “X” in the space next to the best answer for each question below.

1. When people have diabetes:

- a. It causes them to have frequent low blood sugar.
- b. Glucose (sugar) passes too easily from the blood.
- c. Their bodies do not produce glucose (sugar).
- d. The body’s insulin does not work normally and glucose (sugar) builds up in the blood.

2. Insulin:

- a. Comes mostly from food--or what a person eats and drinks.
- b. Acts like a key to help extra glucose (sugar) move out of the blood.
- c. Builds up in the blood and causes high blood sugar.
- d. Causes damage to large blood vessels.

3. Diabetes can lead to serious health problems. Damage to small blood vessels can lead to **all** of the following **except**:

- a. Low vision or blindness.
- b. Kidney disease or kidney failure.
- c. Decreased circulation and healing.
- d. Skin cancer.

4. An example of blood sugar in the Normal Range is:

- a. 110.
- b. 150.
- c. 65.
- d. 60.

5. Your client’s individualized Target Range:

- a. Is your client’s individualized goal for blood sugar levels.
- b. May go higher than the normal range.
- c. Will be given and explained to you by your delegating RN.
- d. All of the above.

6. **All** of the following are symptoms of high blood sugar **except**:

- ___ a. Fatigue or drowsiness.
- ___ b. More energy than usual.
- ___ c. Extreme thirst and frequent urination.
- ___ d. Blurred vision.

Section 2—Short Answer:

Write your answers to the following questions in the space provided.

7. The blood sugar range that is considered normal (2 or more hours after eating) is:
_____ mg/dl.

8. If your client is alert and has symptoms of high blood sugar, what is the first action you should take?

_____.

9. If your client is non-responsive, what action should you take immediately:

_____.

10. An individualized Diabetes Management Plan helps people with diabetes to keep blood sugar levels in the Target Range. Most plans contain action steps in these four areas (called “The Four M’s”):

1. _____.

2. _____.

3. _____.

4. _____.

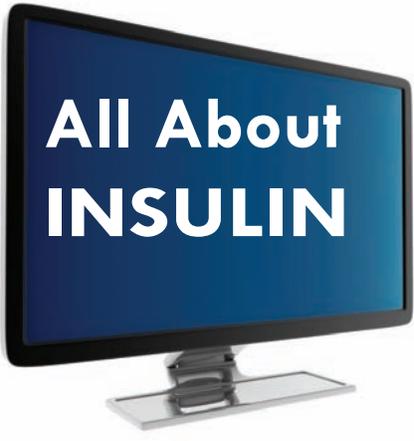


The Answer Key is on the next page. Use it to review your answers and study the areas that are not clear to you.



Use this Answer Key to check your answers. The page number following the question is where you will find the information in the Module.

1. When people have diabetes: (page 6)
d. The body's insulin does not work normally and glucose builds up in the blood.
2. Insulin: (page 5)
b. Acts like a key to help extra glucose move out of the blood.
3. Diabetes can lead to serious health problems. Damage to small blood vessels can lead to all of the following except: (page 10)
d. Skin cancer.
4. An example of blood sugar in the Normal Range is: (page 7)
a. 110.
5. Your client's individualized Target Range: (page 7)
d. All of the above.
6. All of the following are symptoms of high blood sugar except: (page 8)
b. More energy than usual.
7. The blood sugar range that is considered normal (2 or more hours after eating) is: (Page 7)
70-140 mg/dl.
8. If your client is alert and has symptoms of high blood sugar, what is the first action you should take? (page 8 and 9)
Check his or her blood sugar using a glucometer.
9. If your client is non-responsive, what action should you take immediately: (page 8 and 9)
Call 911.
10. An individualized Diabetes Management Plan helps people with diabetes to keep blood sugar levels in the Target Range. Most plans contain action steps in these four areas (called "The Four M's"): (page 12)
Meals, Movement, Medication, and Monitoring



Module

2

All About INSULIN

Module

2

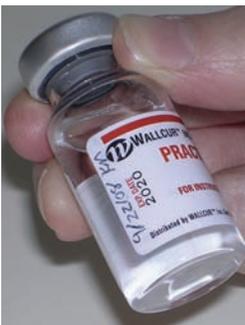
In Module 2, you will learn about:

- Prescribed insulin.
- Other factors that affect blood sugar.
- Low blood sugar and your role in recognizing and responding to it.

PRESCRIBED INSULIN Appearance

Let's begin with how prescribed insulin looks. Prescribed insulin comes in liquid form. Different types of insulin are described as either **CLEAR INSULIN** or **CLOUDY INSULIN**.

Some types of insulin are clear and look like water. Other types of insulin have a white powder mixed in, and look cloudy white when mixed.



Clear Insulin



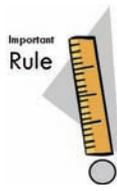
Cloudy Insulin

It is important to know what your client's insulin looks like normally. That way, if the insulin ever looks different or unusual, you can avoid using it.

For example, you should never use insulin if it appears yellow, discolored in any way, or has unusual particles in it.

Appearance Continued

Plan ahead and have an extra insulin container available.



A good rule to follow is this:

Check the appearance of your client's insulin before each use. If your client's insulin appears discolored or unusual in any way, do not use it. Instead, open a new container of insulin.

In order to follow this rule, you need to plan ahead and have an extra insulin container available.

Containers

Prescribed insulin comes in various containers. You may be administering clear or cloudy insulin that comes in a:

- Small glass bottle—also called a **VIAL**.
- Disposable pen-like device called an **INSULIN PEN**.
- **CARTRIDGE** that gets loaded into a re-useable insulin pen.



Vial



Disposable Insulin Pen

Prescribed insulin can also come in a cartridge that gets loaded into a small device called an insulin pump, worn by some people with diabetes.

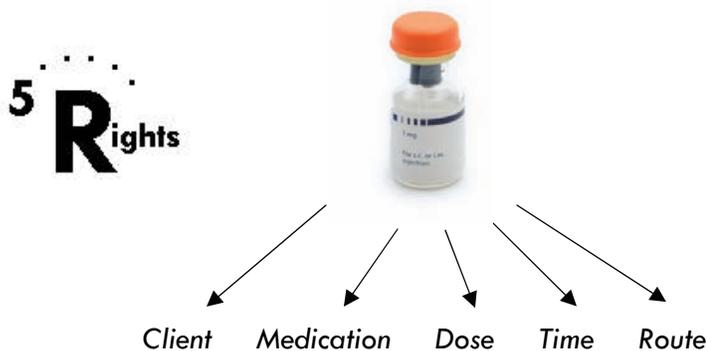
With some training, nursing assistants are allowed to help clients with the set-up of an insulin pump just as they are with other insulin devices.

Nursing assistants are not allowed to administer insulin through insulin pumps under nurse delegation.

However, nursing assistants are not allowed to administer insulin through insulin pumps under nurse delegation. As a result, we will not focus on their use in this training.

Whether your client's insulin comes in a vial, pen, or pen cartridge, it will always have a prescription label. You need to read and check the prescription label carefully for insulin the same way that you do for other medications.

This means that you use the prescription label as you verify the **5 RIGHTS OF MEDICATION ADMINISTRATION** before you administer insulin.

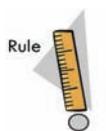


From your previous nurse delegation training, you know that you need to verify the 5 Rights **three times** before you administer a medication. The same is true for insulin.

We will talk more about the steps of insulin administration in Module 3. If you have questions about the 5 Rights and how to apply them, review Lesson Three in your previous nurse delegation training manual.

When administering any medication, always check for the expiration date and never use a medication that has expired.

With insulin, there is one more rule to know about expiration:



After the first use, a container of insulin can only be used for a **maximum of 28 days**.

Even if the expiration date printed on a vial is three months away, you must stop using that vial 28 days after its first use.

The 28-day rule is true for insulin that comes in a vial, an insulin pen, or a pen cartridge.

Prescription Labels

Read and check the prescription label carefully for insulin.

Expiration Dates

After the first use, a container of insulin can only be used for a maximum of 28 days.

The rules for insulin use and expiration dates can be summarized in two points:



Date and initial the insulin container when you first open it.



- At each use, check to see that the insulin has not expired.
- Once opened, use the insulin for 28 days or until it expires, whichever comes first.

As you can see, writing down the date when you first open a container of insulin is necessary. This date is written in permanent ink on the container of insulin along with the writer's initials; also, the writer avoids covering important label information.

Storage

Insulin does not work properly if it gets too hot or too cold, so there are several rules for safe insulin storage. Each rule applies to vials, pens, and pen cartridges unless a specific difference is noted.



Rules for Insulin Storage

- New or unused insulin should be stored in the refrigerator.
- Once a **vial** of insulin is opened or used, it can be stored either in the refrigerator or at room temperature.
- Once an **insulin pen** is in use, it must be stored at room temperature (not in the refrigerator).
- Do not use hot storage areas such as near a window on hot days, next to a stove or heat source, or in a parked car.
- Do not use cold storage areas like the freezer.
- Freezing destroys insulin. Never use insulin if its vial or container has frost on it.
- Keep an extra vial, pen, or cartridge available at all times.
- If at all possible, keep enough insulin and supplies for two weeks ahead in case of bad weather or other unexpected conditions.



Store new or unused insulin in the refrigerator.

Summary Table:

Information to Know About Prescribed Insulin

Let's put all of the general information we have discussed into a table so you can review and learn it more easily.



To work safely with prescribed insulin, knowing this information is necessary.

Appearance

Do	Don't
<ul style="list-style-type: none">• Do know that insulin is either clear or cloudy.• Do know what your client's insulin normally looks like.• Do use a new container of insulin if your client's current insulin looks discolored or unusual in any way.	<ul style="list-style-type: none">• Don't use insulin that is yellow or discolored in any way.• Don't use insulin if it has unusual particles in it.• Don't use insulin if its vial or container has frost on it.

Containers

Do	Don't
<ul style="list-style-type: none">• Do know that the insulin you will be working with may come in:<ul style="list-style-type: none">• Vials• Disposable insulin pens• Cartridges to load into re-useable insulin pens	

Prescription Labels

Do	Don't
<ul style="list-style-type: none">• Do check the prescription label as you verify the 5 Rights of Medication Administration three times before you administer insulin.	

Expiration Dates

Do	Don't
<ul style="list-style-type: none">• Do check at each use to see that insulin has not expired.• Do use insulin for a maximum of 28 days after its first use.• Do date and initial the insulin container when you first open it (using permanent ink).	<ul style="list-style-type: none">• Don't ever use insulin that has expired.• Don't use insulin that has been opened <i>more than</i> 28 days ago.

Storage

Do	Don't
<ul style="list-style-type: none">• Do store new insulin in the refrigerator.• Do store vials in use in the refrigerator or at room temperature.• Do store pens in use at room temperature—not in the refrigerator.• Do keep an extra vial, pen, or pen cartridge available at all times.• Do store enough insulin and supplies for 2 weeks ahead in case of bad weather or unexpected conditions.	<ul style="list-style-type: none">• Don't use hot storage areas such as:<ul style="list-style-type: none">• Near a window on hot days.• Next to a stove or heat source.• In a parked car.• Don't use cold storage areas like the freezer.

LOW BLOOD SUGAR AND PRESCRIBED INSULIN

Let's talk about how prescribed insulin works.

Prescribed insulin works the same way the body's insulin works. Yes, prescribed insulin acts like a key to help extra glucose move out of the blood and into the body where it is needed or stored for later use.

When the body's insulin does not work normally, prescribed insulin can be used in its place to lower a person's blood sugar into his or her Target Range.

However, a person's blood sugar can sometimes get too low after using prescribed insulin.

In Module 1, we talked about how high blood sugar or hyperglycemia can be dangerous to the body.

LOW BLOOD SUGAR or **HYPOGLYCEMIA** is dangerous to the body, too.

When blood sugar is **BELOW 70 mg/dl**, there is not enough glucose or energy to keep the body working normally. If left untreated, low blood sugar can lead to a medical emergency or death.

Because low blood sugar can be so dangerous, we will be spending a lot of time learning about it and what to do when it occurs. Right now, you need to know that:



Low blood sugar is the main risk to think about when you administer insulin.

Even if a person takes the same dose of insulin every day, low blood sugar can occur on some days and not others. How is this possible? Please read on for some important answers and information.

Prescribed insulin can be used to lower a person's blood sugar.



Low blood sugar is the main risk when you administer insulin.

Low Blood Sugar and the Four M's

Other factors besides prescribed insulin lower blood sugar.

Let's start by explaining that prescribed insulin is only one factor that can lower a person's blood sugar. Other factors can lower blood sugar as well. So, even though a person's prescribed insulin may be the same from one day to the next, other factors may change and cause blood sugar to drop too low.



To help your client use insulin safely, you need to know about other factors that affect your client's blood sugar.

The Four M's of a person's Diabetes Management Plan can affect blood sugar: MEALS, MOVEMENT, MEDICATION, and MONITORING.

To keep blood sugar stable and within the Target Range, the four parts of the plan (the Four M's) must work together in a balanced way each day and be kept in balance from one day to the next.

By itself, we know that prescribed insulin lowers blood sugar. Let's look at how prescribed insulin relates to the Four M's of a Diabetes Management Plan.

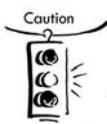
The Four M's of the Diabetes Management Plan must work together and be kept in balance each day.



You already know that the body turns most of what you eat into glucose, which causes blood sugar to get higher. Foods high in sugar (carbohydrates) raise blood sugar the most.

If a person uses a regular pattern for healthy meals and snacks along with regular insulin doses, blood sugar is likely to stay in the Target Range.

If a person makes a sudden change and eats extra meals or snacks (especially sweets) or larger portion sizes than usual, blood sugar will get higher. The usual dose of insulin may not keep this person's blood sugar from being too high.

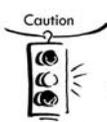


If a person makes a sudden change and skips a meal or snack, blood sugar will be lower than usual. Taking the usual dose of insulin may then cause dangerously low blood sugar.

You already know that regular exercise can help to control a person's blood sugar. This is true because exercise lowers blood sugar by using up the body's fuel—or glucose—for energy.

If a person combines a regular pattern of exercise along with regular insulin doses, blood sugar is likely to stay in the Target Range.

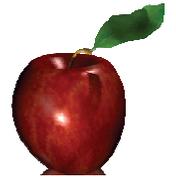
If a person makes a sudden change and stops exercising, blood sugar will get higher. The usual dose of insulin may not keep this person's blood sugar from being too high.



If a person makes a sudden change and starts or increases exercise, blood sugar will get lower than usual. Taking the usual dose of insulin may then cause dangerously low blood sugar.

Prescribed Insulin and:

MEALS



Prescribed Insulin and:

MOVEMENT



Prescribed Insulin and:

MEDICATIONS

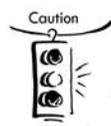


You already know that prescribed insulin and other diabetes medications lower blood sugar. There are also some medications that make blood sugar higher.

As you know, each person uses different medications. Your delegating RN will teach you about your client's unique medications.

For now, you need to know that errors in medication administration can affect your client's blood sugar.

Skipping doses of insulin or other diabetes medication can cause blood sugar to be higher than usual.



It is especially important to realize that too much prescribed insulin and/or other diabetes medication can cause dangerously low blood sugar.

Prescribed Insulin and:

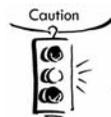
MONITORING



Monitoring blood glucose can affect blood sugar by telling you how the other parts of the Diabetes Management Plan are working and by helping you know what action steps are needed.

If you monitor your client's blood sugar and it is above the Target Range, you know that you need to follow your client's individualized plan for high blood sugar as provided by your delegating RN.

If you monitor your client's blood sugar and it is lower than usual or below the Target Range, you will need to follow your client's individualized plan for low blood sugar as provided by your delegating RN.



You need to monitor blood sugar **before** you administer insulin. Administering insulin when blood sugar is lower than usual or below the Target Range can cause dangerously low blood sugar.



BLOOD SUGAR AND THE FOUR M's REVIEW:

Important Points to Remember

- Prescribed insulin is only **one** part of a person's Diabetes Management Plan.
- It is very important that **all** of the parts of the plan work together in a balanced and consistent way (MEALS, MOVEMENT, MEDICATIONS, and MONITORING).
- To help your client manage diabetes safely, follow instructions for your client's care as provided in his or her individualized care plan and by your delegating RN.
- Sudden or unapproved changes to a person's individualized plan can create dangerous results for a person with diabetes. For example, you now know that suddenly skipping a meal or exercising more than usual can be dangerous for a client taking insulin.

Other Factors That Affect Blood Sugar

Besides the Four M's of the Diabetes Management Plan, there are a few more factors that can affect blood sugar and use of prescribed insulin. To work safely with insulin, you need to know about **all** of the factors that can affect blood sugar.

**Prescribed insulin
and ...**

Sick days



When people are sick, their blood sugar usually gets higher. As a result, many people work with their diabetes care team to create a “sick day plan” to use when they have a cold, the flu, an infection, or some other illness.

Your delegating RN will let you know if your client has a “sick day plan” and teach you about it.

**Prescribed insulin
and ...**

Stress



Any time the body feels stress, blood sugar usually gets higher.

Stress can be emotional, such as when a person is afraid, angry, or anxious. Stress can be physical, such as when a person gets injured, goes through surgery, or feels pain.

If a client's blood sugar is higher because of these factors, be sure to follow your client's plan for high blood sugar as instructed by your delegating RN.

**Prescribed insulin
and ...**

**Alcoholic
beverages**

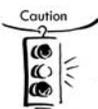


Alcohol can lower blood sugar.

If people with diabetes drink alcohol, they should work with their diabetes care team to include these beverages in their overall dietary plan.

If alcohol is part of your client's dietary plan, it will be included in the care plan or in the instructions you receive from your delegating RN.

If your client is drinking alcohol that is not part of a dietary plan, notify your delegating RN and case manager immediately so important adjustments to the plan can be made.



If a person with diabetes makes a sudden change and increases use of alcohol, blood sugar can get lower than usual. Taking the usual dose of insulin may cause dangerously low blood sugar.

Summary Table: Factors That Affect Blood Sugar



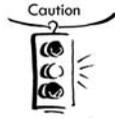
Let's put all of the information about factors that raise and lower blood sugar into **one table** so you can review and learn it more easily. To work safely with prescribed insulin, knowing this information is necessary:

Factor	↑ Raises Blood Sugar	↓ Lowers Blood Sugar
Meals	<ul style="list-style-type: none"> • Extra helpings or snacks, especially those high in carbohydrates (candy, cookies, breads, etc.) 	<ul style="list-style-type: none"> • Skipped meals or snacks
Movement	<ul style="list-style-type: none"> • Getting less exercise than usual 	<ul style="list-style-type: none"> • Getting more exercise than usual
Medications	<ul style="list-style-type: none"> • Skipping doses of insulin or other diabetes medication • Making changes in other medications (unique to each client) 	<ul style="list-style-type: none"> • Insulin/diabetes medications: <ul style="list-style-type: none"> • Usual dose with usual routine = less risk of low blood sugar • Usual dose with changes in routine = more risk for low blood sugar • Usual dose with blood sugar that is lower than usual or less than 70 mg/dl = dangerous risk for low blood sugar • Too much insulin or diabetes medication = dangerous risk for low blood sugar
Monitoring	<ul style="list-style-type: none"> • Monitoring does not raise blood sugar, but helps you to take action steps according to the client's plan to keep blood sugar in the Target Range and avoid high blood sugar 	<ul style="list-style-type: none"> • Monitoring does not lower blood sugar, but helps you to take action steps according to the client's plan to keep blood sugar in the Target Range and avoid low blood sugar
Sickness	<ul style="list-style-type: none"> • Having a cold, the flu, infection, or other illness 	
Stress	<ul style="list-style-type: none"> • Feeling emotional stress such as fear, anxiety, or anger • Feeling physical stress such as injury, pain, or surgery 	
Alcoholic Beverages		<ul style="list-style-type: none"> • Drinking more alcohol than usual

LOW BLOOD SUGAR

In this Module, we have discussed prescribed insulin and other factors that affect blood sugar. We have focused on how insulin and certain factors *together* can cause low blood sugar.

Low blood sugar or hypoglycemia can lead to a medical emergency.



As we said before, low blood sugar or hypoglycemia can lead to a medical emergency or death if left untreated. Let's talk more about this.

LOW BLOOD SUGAR or **HYPOGLYCEMIA** is blood sugar that falls **BELOW 70 mg/dl**. If a person's blood sugar is below 70 mg/dl, it is too low.

Blood Sugar Ranges to Know

Name of Range	Blood Sugar Level
↑ High Blood Sugar or Hyperglycemia	Above 140 mg/dl
Normal Blood Sugar	70-140 mg/dl
↓ Low Blood Sugar or Hypoglycemia	Below 70 mg/dl

It is easy to remember these three blood sugar ranges by learning the normal range. From there, it makes sense that:

- High blood sugar is any number **above** normal.
- Low blood sugar is any number **below** normal.

Even though Target Ranges are sometimes individualized above 140 mg/dl, Target Ranges are not usually individualized below 70 mg/dl.

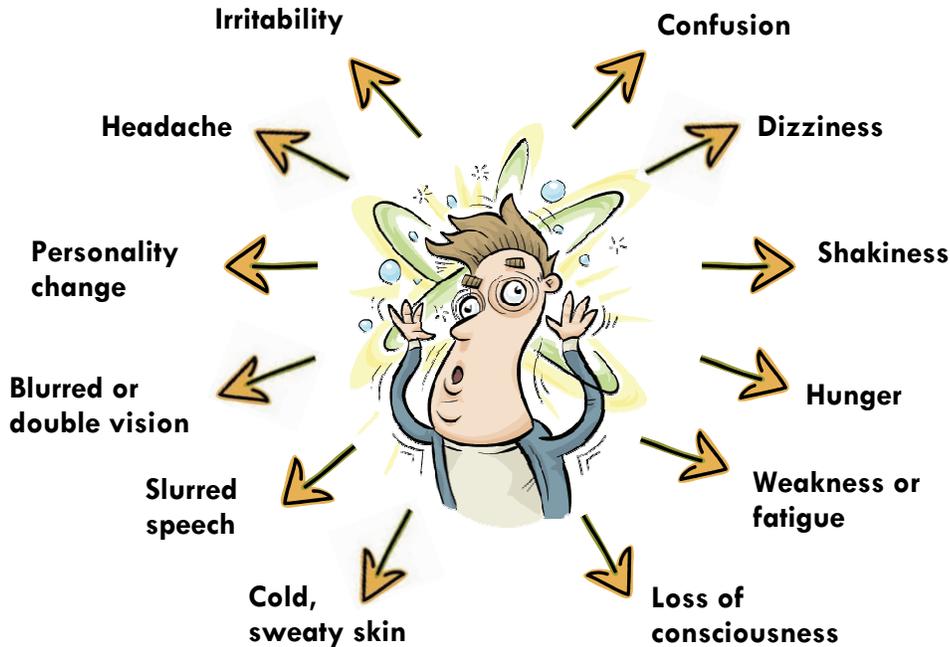
In other words, a blood sugar level below 70 mg/dl is considered low for people generally and means that the body needs more glucose to work normally.



To work safely with a client who has diabetes, you must be able to recognize **LOW BLOOD SUGAR SYMPTOMS** when you see them.

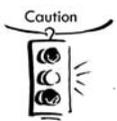
Recognizing Low Blood Sugar

Low Blood Sugar Symptoms



It is very important that you know and recognize symptoms of low blood sugar.

If the first symptoms of low blood sugar are not recognized and treated, a person can get worse and eventually pass out or lose consciousness.



A person who loses consciousness needs emergency medical help immediately. Without it, an unconscious person with low blood sugar can die.

Some people with diabetes can feel when their blood sugar is low and can recognize their symptoms. However, some people with diabetes can't tell when their blood sugar is low and do not recognize their symptoms.

These people count on glucose monitoring and the observations of others—like you—to help them recognize and respond to low blood sugar.

Please study and learn the symptoms of low blood sugar. You need to know them well enough to recognize them and respond if they occur in your client.

WHAT TO DO WHEN LOW BLOOD SUGAR OCCURS

The Rule of 15

If a person with diabetes shows symptoms of low blood sugar, then check his or her blood sugar level using a glucometer.

If a person's blood sugar level is below 70 mg/dl, action steps need to be taken immediately to get the person a source of glucose (or sugar).

Health care providers often develop an individualized plan for their patients and caregivers to follow when low blood sugar occurs. However, some people may not have an individualized plan to follow.

If your client does **not** have an individualized plan for low blood sugar, these standard steps can be taken for blood sugar below 70 mg/dl. These steps are called **THE RULE OF 15**.

The Rule of

15

* **Give the person 15 grams of glucose.** There are 15 grams of glucose in:

- 4-6 ounces of fruit juice or ½ can of regular soda (not sugar-free).
- 3-4 glucose tablets.
- 5-7 lifesavers or hard candy.

Tip: Juice can be bought in small 4-6 ounce cans and soda can be purchased in the half-can size and used to treat low blood sugar.

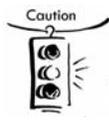
* Have the person rest and **re-check blood sugar in 15 minutes.**

* **Repeat the steps above as needed** if the person's blood sugar is still low or if he or she is still having symptoms of low blood sugar.



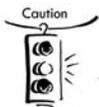
There are a few important points to keep in mind about using The Rule of 15:

1. If your client has symptoms of low blood sugar and you aren't able to check his or her blood sugar using a glucometer, go ahead and give him or her 15 grams of glucose.



It is always safest to treat symptoms of low blood sugar, even if you can't check the blood sugar with a glucometer.

2. Have a source of glucose (such as candy or glucose tablets) available for your client at all times.
3. After your client's low blood sugar has been raised:
 - Observe your client for the return of low blood sugar symptoms.
 - Re-check your client's blood sugar if symptoms return.
 - Have your client eat meals and snacks as planned to keep blood sugar up.



Call 911 immediately if your client passes out or loses consciousness. Never attempt to give an unconscious person a source of glucose by mouth.

4. There are times when a person with low blood sugar is conscious, but may not be able to swallow food, drinks, or tablets safely. You know your client can't swallow safely if the:
 - Client's speech is very slurred.
 - Client is sleepy or not alert enough to follow directions.



Call 911 immediately if your client cannot safely swallow or use a source of glucose by mouth.

Your client may have an individualized plan and steps to follow for low blood sugar. Your client's individualized plan and steps may be different from The Rule of 15.



Your delegating RN will:

- Let you know if your client has an individualized plan to follow for low blood sugar.
- Instruct you about the plan and steps to follow.

Always follow the plan and steps that come from your delegating RN.



Have a source of glucose such as candy or glucose tablets available at all times.

**Individualized
Client Plans For
Low Blood Sugar**

Reporting Low Blood Sugar

Report to your delegating RN when your client has low blood sugar.

You will need to report to your delegating RN when your client has low blood sugar.

Reporting guidelines are individualized for each client. Depending on your workplace, you may also need to report low blood sugar to certain co-workers and supervisors.

If your client begins to have frequent and/or serious problems with low blood sugar, then your client's healthcare provider may make changes to the Diabetes Management Plan. A change in insulin doses or other medications may be made.



Your delegating RN will:

- Let you know the specific guidelines for reporting your client's low blood sugar to him or her.
- Instruct you when there are changes to your client's Diabetes Management Plan.

Glucagon

Injections of Glucagon can not be delegated to nursing assistants.

Finally, you should know that some people with diabetes have a prescription for a medication called Glucagon.

Glucagon is a medication that can be injected into the body to raise a person's blood sugar. It is usually prescribed for people who have frequent or serious problems with low blood sugar.

Injections of Glucagon can not be delegated to nursing assistants in Washington State. It is important to remember that you can not administer Glucagon injections under nurse delegation.

Instead, you can follow:

- Your client's individualized plan for low blood sugars—as provided by your delegating RN.
- The Rule of 15 if your client has no individualized plan.

Review of what to do when low blood sugar occurs

Low blood sugar is a serious problem, and the role you play in recognizing and responding to it is very important.

Take time to review the table on the next page to be sure you understand it well and feel confident in your role.



LOW BLOOD SUGAR REVIEW:

Important Points to Remember

- If your client has symptoms of low blood sugar, use a glucometer to check his or her blood sugar.
- If your client's blood sugar is below 70 mg/dl or you aren't able to check it with a glucometer, get your client a source of glucose (or sugar) immediately.
- Follow your client's individualized plan for low blood sugar as instructed by your delegating RN

OR

- Follow The Rule of 15 if your client does not have an individualized plan:
 - ✓ Give the person 15 grams of glucose. There are 15 grams of glucose in:
 - 4-6 ounces of fruit juice or regular soda (not sugar-free soda).
 - 3-4 glucose tablets.
 - 5-7 lifesavers or hard candy.
 - ✓ Have the person rest and re-check blood sugar in 15 minutes.
 - ✓ Repeat the steps above as needed if the person's blood sugar is still low or if the person is still having symptoms of low blood sugar.
- After your client's low blood sugar has been raised:
 - ✓ Observe your client for the return of low blood sugar symptoms.
 - ✓ Re-check your client's blood sugar if symptoms return.
 - ✓ Have your client eat meals and snacks as planned to keep blood sugar up.
- Call 911 immediately** if your client is:
 - ✓ Non-responsive or unconscious.
 - ✓ Unable to swallow or use a source of glucose safely by mouth. For example, when:
 - His or her speech is very slurred.
 - He or she is sleepy or not alert enough to follow directions.

Notify your delegating RN as soon as possible after your client has received emergency help.
- Low blood sugar is a serious problem. The role you play in recognizing and responding to it is important.

INSULIN CATEGORIES

Now that you know what low blood sugar is, how to recognize it, and how to respond to it, you are ready to learn about the main categories of insulin.

Insulin types are divided into four broad categories.

There are many different types of insulin, and it would be very difficult to learn about all of them. However, insulin types can be divided into four broad categories which are much easier to learn about. They are:

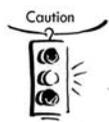
1. **RAPID-ACTING**
2. **SHORT-ACTING**
3. **INTERMEDIATE-ACTING**
4. **LONG-ACTING**

As you can tell from their names, the four categories of insulin differ mainly in terms of their **ACTION TIMES** or when they are working to lower a person's blood sugar.

As the category names indicate: rapid-acting insulin starts working the fastest—in about 15 minutes—and works in the body for the shortest amount of time—only for a few hours.

From there, the categories take longer to start working, and they last longer in the body. Long-acting insulin, for example, can take a few hours to start working and keeps working in the body for 24 hours.

You need to know when your client is at greatest risk for low blood sugar.



You must learn the category and action times of the insulin(s) you are working with in order to:

- Know the time-frame when your client is at the greatest risk for low blood sugar.
- Recognize and respond to low blood sugar before it becomes a medical emergency.



Your delegating RN:

- Will teach you about the category and action times of your client's insulin(s).
- May use the Insulin Table on page 90 of Appendix B as a resource when working with you.



MODULE 2 REVIEW:

Important Points to Remember

- ☑ Study and learn the information in the following Summary Tables:
 - Information to Know About Prescription Insulin on page 26 and 27.
 - Factors that Affect Blood Sugar on page 34.
 - Low Blood Sugar Review on page 40.

- ☑ Prescribed insulin is used to lower blood sugar into the Target Range. However, blood sugar can sometimes get too low after using insulin.

- ☑ Blood sugar below 70 mg/dl is too low and means the body needs more glucose to work normally. If left untreated, low blood sugar (or hypoglycemia) can lead to a medical emergency or death.

- ☑ Low blood sugar is the main risk to think about when you administer insulin. Even if a client uses the same dose of insulin every day, other factors affect blood sugar and can put a client at risk for low blood sugar when insulin is given.

- ☑ Factors that affect blood sugar need to be balanced consistently in each person's Diabetes Management Plan. Sudden changes can cause dangerously low blood sugars. For example:
 - Usual insulin dose and:
 - Skipped meals or snacks.
 - More exercise than usual.
 - More alcohol than usual.
 - Blood sugar that is lower than usual or below 70 mg/dl.
 - Too much insulin or diabetes medication related to a medication error.



MODULE 2 REVIEW: Important Points to Remember (continued)

- Recognizing and responding to symptoms of low blood sugar is critical to caring for a client with diabetes safely. Symptoms of low blood sugar include:

Irritability	Headache	Hunger
Personality change	Confusion	Shakiness
Dizziness	Slurred speech	Blurred or double vision
Weakness/fatigue	Cold, sweaty skin	Loss of consciousness

- A person who loses consciousness needs emergency medical help immediately. Without it, an unconscious person with low blood sugar can die.

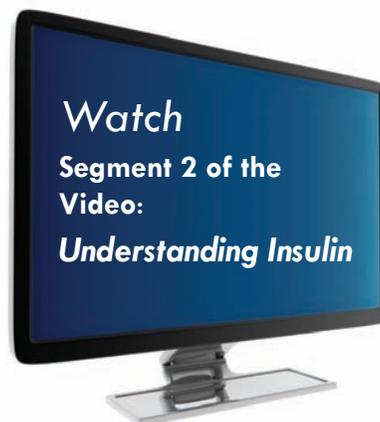
- If your client shows symptoms of low blood sugar, use a glucometer to check blood sugar. If blood sugar is below 70 mg/dl or you are not able to check it with a glucometer, then:
 - Follow your client's individual plan for low blood sugar as instructed by your delegating RN.
 - OR**
 - Follow the Rule of 15 if your client does not have an individualized plan.

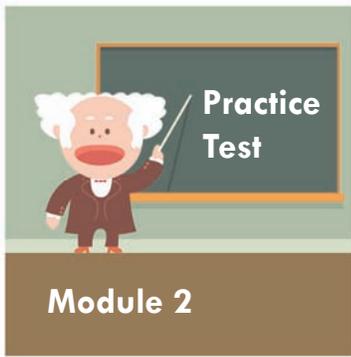
- From fastest to longest-acting, the four categories of insulin are:
 - Rapid-Acting
 - Short-Acting
 - Intermediate-Acting
 - Long-Acting

- You need to know the category and action time of the insulin(s) you administer so you know when your client is most at risk for low blood sugar.



**IT'S TIME
TO:**





Section 1—Multiple Choice:

Place an “X” in the space next to the best answer for each question below.

1. **All** of the following are symptoms of low blood sugar **except**:
___a. Irritability.
___b. Shakiness.
___c. Rashes on the hands and feet.
___d. Loss of consciousness.

2. When using the Rule of 15, you give a client 15 grams of glucose and then:
___a. Repeat 15 times.
___b. Have the person rest and re-check his or her blood sugar in 15 minutes.
___c. Have the person exercise for 15 minutes.
___d. Call 911.

3. A person’s usual insulin dose can cause blood sugar to become dangerously low when combined with:
___a. Skipped meals or snacks.
___b. More alcoholic beverages than usual.
___c. More exercise than usual.
___d. All of the above.

Section 2—Short Answer:

Write your answers to the following questions in the space provided:

4. Name the 5 Rights of Medication Administration:

Right _____.

Right _____.

Right _____.

Right _____.

Right _____.

5. The main risk to think about when administering insulin is:
_____.
6. Blood sugar that is below _____ mg/dl is considered too low.
7. If your client is alert and has symptoms of low blood sugar, the first action you should take is: _____.
8. If your client has low blood sugar and her speech is very slurred, the action you should take immediately is: _____.

Section 3—

Evaluation: Follow the directions written for each exercise below:

9. Knowing how to work safely with insulin is critical. For each item below, mark either as “S” for “safe” or “U” for “unsafe.”

___ If your client’s insulin appears discolored, roll it between your palms before using it.

___ Verify the 5 Rights of Medication Administration three times before you administer insulin.

___ If an insulin vial has frost on it, warm it up by placing it next to a heater.

___ Use insulin for 28 days or until it expires, whichever comes first.

___ New or unused insulin should be stored in the refrigerator.

10. Identify whether each factor below usually raises or lowers blood sugar.

Put either an \uparrow arrow or \downarrow arrow in the space provided.

___ a. More exercise than usual

___ b. Illness

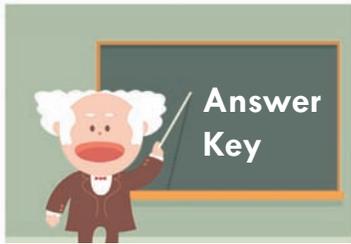
___ c. Skipping a meal

___ d. Forgetting to take insulin

___ e. Drinking more alcohol than usual



The Answer Key is on the next page. Use it to review your answers and study the areas that you need to.



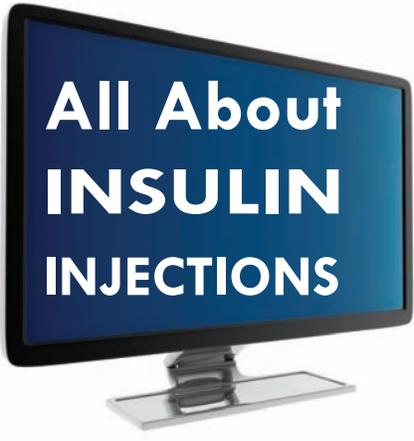
Use this Answer Key to check your answers. The page number following the question is where you will find the information in the Module.

1. **All** of the following are symptoms of low blood sugar **except**: (page 36)
c. Rashes on the hands and feet.
2. When using the Rule of 15, you give a client 15 grams of glucose and then: (page 37)
b. Have the person rest and re-check his or her blood sugar in 15 minutes.
3. A person's usual insulin dose can cause blood sugar to become dangerously low when combined with: (page 30 for a and c; page 33 for b)
d. All of the above.
4. Name the 5 Rights of Medication Administration: (page 24)
Right Client, Medication, Dose, Time, Route.
5. The main risk to think about when administering insulin is: (page 28)
Low blood sugar or hypoglycemia.
6. Blood sugar that is below **70 mg/dl** is considered too low. (page 28)
7. If your client is alert and has symptoms of low blood sugar, the first action you should take is: **Check his or her blood sugar using a glucometer.** (page 37,40)
8. If your client has low blood sugar and her speech is very slurred, the action you should take immediately is: **Call 911.** (page 38)
9. Knowing how to work safely with insulin is critical. For each item below, mark either as "S" for "safe" or "U" for "unsafe."
 - U** If your client's insulin appears discolored, roll it between your palms before using it. (page 23)
 - S** Verify the 5 Rights of Medication Administration three times before you administer insulin. (page 24)
 - U** If an insulin vial has frost on it, warm it up by placing it next to a heater. (page 25)
 - S** Use insulin for 28 days or until it expires, whichever comes first. (page 25)
 - S** New or unused insulin should be stored in the refrigerator. (page 25)

10. Identify whether each factor below usually raises or lowers blood sugar.

Put either an ↑ arrow or ↓ arrow in the space provided.

- ↓ a. More exercise than usual (Page 30)
- ↑ b. Illness (Page 33)
- ↓ c. Skipping a meal (Page 30)
- ↑ d. Forgetting to take insulin (Page 31)
- ↓ e. Drinking more alcohol than usual (Page 33)



Module

3

All About INSULIN INJECTIONS

Module

3

In Module 3, you will learn:

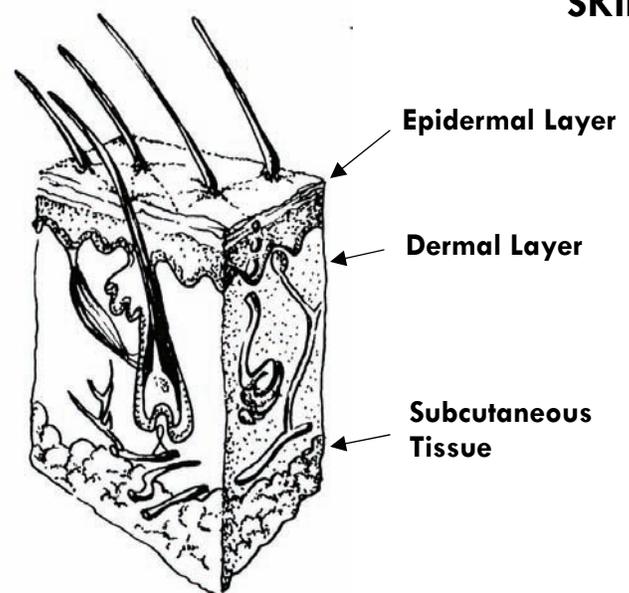
- The basic knowledge and step-by-step procedures for drawing a single type of insulin into a syringe and injecting it safely.

The needle used to give an insulin injection must go through two layers of skin to reach the fatty tissue below.

Specifically, the needle is quickly poked through the top (epidermal) layer and the bottom (dermal) layer of the skin and into the fatty **SUBCUTANEOUS TISSUE** below --where the insulin is injected.

In order to inject insulin into the subcutaneous tissue, the needle is usually inserted at a 90° angle into a fold of skin.

Some older or very thin clients may have a thinner epidermal layer, and less subcutaneous fat. To adjust for older or very thin clients, injections are sometimes given at a 45° angle. This angle keeps the needle from going too deeply and hitting the muscles or nerves below.





Injection at a 90° angle



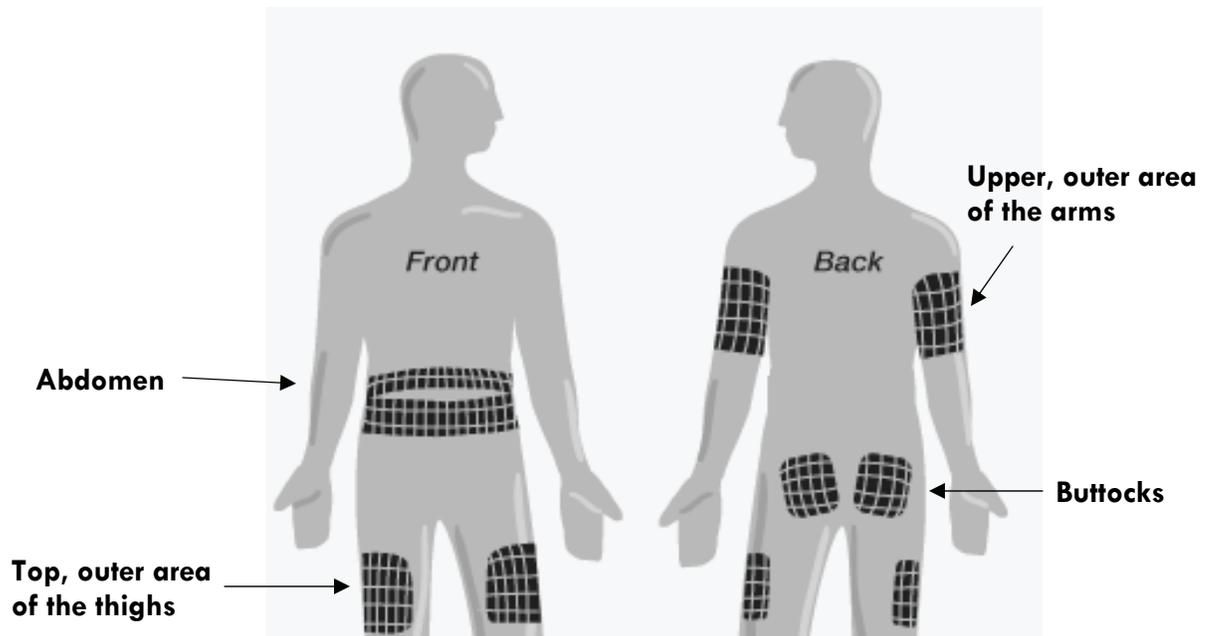
Injection at 45° angle



Your delegating RN will teach you the best injection angle to use with your client.

INJECTION SITES

There are several acceptable **INJECTION SITES** for subcutaneous injections: the abdomen; the upper, outer area of the arms; the top, outer area of the thighs; and the buttocks.



Different injection sites use up insulin at different rates. In other words, insulin starts working faster when injected into some body areas versus others.

As a result, insulin injections are often rotated **within one** body area, such as the abdomen. Staying within one body area helps a person use the insulin at the same rate from day to day.

While many people rotate injection sites within one body area, some people do rotate injection sites among **more than one** body area. For example, a person may rotate between the abdomen and the arm.



Your delegating RN will:

- Instruct you on which injection site to use with your client and how you should rotate injections.

A few more guidelines you need to know about injection sites are written in a table format below so you can study and learn them easily.

Additional Guidelines for Injection Sites

Do	Don't
<ul style="list-style-type: none"> • Do choose an area on the skin that is intact and free of irregularities such as scars, bruises, cuts, rashes, moles, etc. • Do observe skin in response to insulin injections. • Do report any skin changes or concerns to your delegating RN. 	<ul style="list-style-type: none"> • Don't inject insulin within two inches of the naval or belly button. • Don't do the following as they may increase the rate that the body uses the insulin. Specifically: <ul style="list-style-type: none"> ✓ Don't choose an area of the body that will be exercised (the thigh before a brisk walk). ✓ Don't inject insulin just before a bath, shower, hot tub use (or any activity that brings heat to the area). ✓ Don't rub or massage skin after an insulin injection.

SYRINGES

A **SYRINGE** is a pen-like device with a needle used to give an injection.

Prescribed insulin must be administered with a specialized **INSULIN SYRINGE**. Insulin syringes have specialized marks and numbering that relate directly to the **UNITS** of standard, prescribed insulin doses.

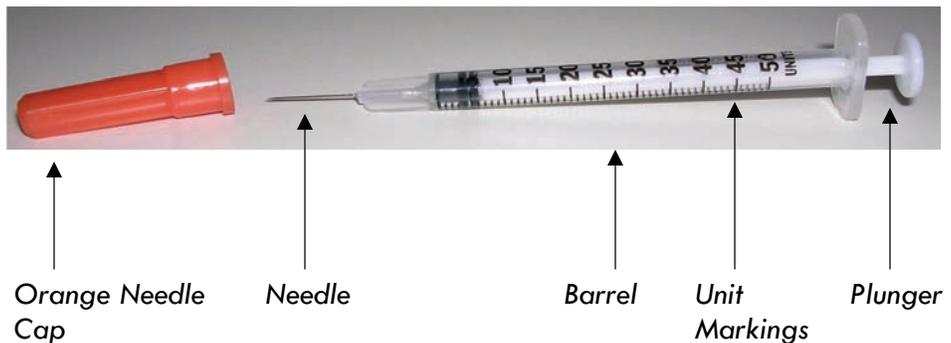
Always use an insulin syringe to administer insulin.



To avoid dangerous insulin dosage errors, always use an insulin syringe to administer insulin.

It is very helpful that insulin syringes are easy to identify and look different from any other type of syringe.

Insulin Syringe



*Insulin syringes **always** have a bright orange needle cap.*

The easiest way to identify an insulin syringe is by its **BRIGHT ORANGE CAP** over the needle. As a safety feature, insulin syringes **always** have a bright orange needle cap, and they are the **only** syringes that have a bright orange needle cap.

Each part of an insulin syringe has an important function and instructions for use.

NEEDLE CAP: Not only does the bright orange color act as a safety feature, but the needle cap also covers the needle and keeps it sterile until used.

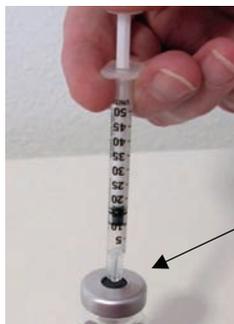
NEEDLE: The needle is used to pierce the skin and inject insulin. The capped needle of the insulin syringe is sterile and **must remain sterile until used.**



The needle must only touch the vial top and insulin as you prepare the insulin dose.

If the needle touches anything else, it is contaminated—or no longer sterile—and you must discard it and start over with a new syringe.

The needle is very fragile and can be easily bent when using it to draw insulin from a vial. If the needle gets bent before an injection, you must discard it and start over with a new syringe.



The needle must only touch the vial top and insulin.



Discard a bent needle and use a new syringe.

PLUNGER: The plunger is the moveable part of the syringe used to:

- Draw insulin through the needle and into the syringe.
- Measure the amount of insulin in the syringe accurately.



Dosage Measurement Line

Plunger Stem

Plunger Top

To draw insulin through the needle and into the syringe, the needle must be inserted into a vial so that it is completely covered by insulin. Pulling back on the **PLUNGER TOP** will then draw insulin into the syringe.



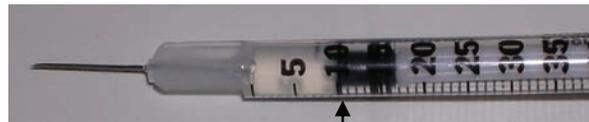
Completely cover the needle with insulin.



Pull back on the plunger to draw insulin into the syringe.

DOSAGE MEASUREMENT LINE: The dosage measurement line is the edge of the black rubber cap on the end of the plunger. Once insulin is drawn into the syringe, the dosage measurement line is used to measure the amount of insulin in the syringe.

If you compare the dosage measurement line to the marks and numbering on the syringe, you can tell how much insulin is in the syringe.



10 units of Insulin



15 units of Insulin



Hold the syringe and the dosage measurement line at eye level.

The best way to measure the insulin is to hold the syringe and the dosage measurement line at eye level. You may not see the dose accurately if the syringe is held above or below eye level.

Finally, because the **PLUNGER STEM** extends into the **inside** of the syringe, it is a sterile part of the syringe.

When you pull back on the plunger top, use your fingers to pull on the edge of the plunger top only, not the stem of the plunger.



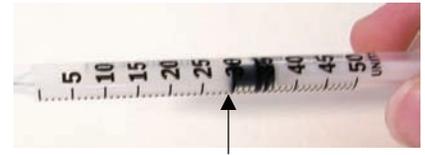
Pull on the edge of the plunger top only.



Don't touch plunger stem.

BARREL: The barrel is the main body of the syringe that holds the insulin dose. Insulin is drawn through the needle of a syringe and into its barrel.

As we said before, the barrel has marks and numbering that relate to the units used for standard doses of prescribed insulin. In simpler terms, if 30 units of insulin is ordered, then insulin is drawn into the syringe to the 30-unit mark.



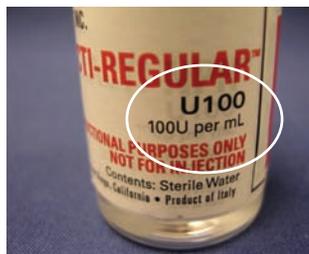
30 units of insulin ordered = insulin drawn into the syringe to the 30-unit mark.

Standard insulin containers and syringes are both marked with **U-100** to show that they match.

U-100 means that the insulin and the syringe are both made so one milliliter of insulin = 100 units of insulin.

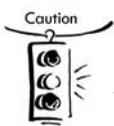


U-100 marking on an insulin syringe



U-100 marking on an insulin vial

Each time you administer insulin, be sure the insulin and syringe match and are both marked U-100. This step helps you know you have the Right medication and the Right dose and should be included in the process of checking the 5 Rights of Medication Administration.



To avoid dangerous insulin dosage errors, follow these two syringe rules each time you administer insulin:

- Always use an insulin syringe for insulin—look for the orange cap!
- Be sure the syringe and insulin match and are both labeled U-100.

Important Note:

A new type of insulin exists that is **five times** stronger than standard insulin. It is called U-500 insulin. U-500 insulin is not common at this time.

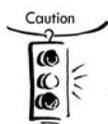
However, the best way to avoid a dosage error is:

- Be sure you are using **U-100** insulin with a **U-100** syringe.
- Do not use U-500 if you see it. Contact your delegating RN immediately for guidance.

Insulin Syringes Sizes

Insulin syringes come in three different sizes: 100-unit, 50-unit, and 30-unit.

All three sizes are U-100. So, no matter what size you use, the markings and numbers on the syringe relate to the units for standard doses of prescribed U-100 insulin.



One note of caution: on the 30 and 50-unit syringes, each unnumbered mark = 1 unit of insulin. On the 100-unit syringe, each unnumbered mark = 2 units of insulin.

To avoid dosage errors, you will need to:

- Work with your delegating RN to be sure that you understand the markings on *your client's* syringe size.
- Be sure to use the same syringe size consistently.



Your delegating RN will:

- Show you the syringe size that your client uses.
- Teach you how to read the marks on your client's syringe correctly.

SPECIAL CONSIDERATIONS

Avoiding Needlesticks

Be very careful not to poke or "stick" yourself with a used needle.

When you work with syringes, be very careful not to poke or "stick" yourself with a used needle. Sticking yourself with a used needle puts you at risk for infection with bacteria and serious viruses.

The two best ways to avoid needlesticks are:

1. Never try to put the cap back on a used needle.
2. Discard the syringe immediately after it is used for an injection.

If you stick yourself with a **sterile** needle, wash thoroughly with soap and water and check with your employer or supervisor for the procedures in your care setting. Get medical attention, if needed.

If you stick yourself with a **used** needle, check immediately with your employer or supervisor for the procedures in your care setting. If you work in a client's home, call your health care provider to discuss your exposure. You may need immediate treatment to protect your health.

Sharp Containers

Syringes are discarded into bright red plastic containers called **SHARPS CONTAINERS**. Sharps containers are made so they can safely hold sharp, infectious waste like used syringes.



Commercial Sharps Container



Non-commercial Sharps Container

If a commercial sharps container is not available, a heavy plastic container with a secure lid—such as an empty laundry detergent or juice container—can be used. The container must be clearly labeled, “Medical Waste.”



As a rule, sharps containers are sealed off with a secure lid when they are $\frac{3}{4}$ full.

Filling a sharps container beyond that can put you at risk for needlesticks when you try to discard a syringe or seal the lid of the container.



Your delegating RN will show you the:

- Sharps container to use at your workplace.
- Correct process for disposing of it.



Seal off the sharps container when it is $\frac{3}{4}$ full.

VIALS



Inject one unit of air into the vial for every unit of insulin you want to draw out of the vial.

You were introduced to insulin vials in Module 2. There is more to know about vials before you learn the steps of insulin administration.

Vials are sealed and airtight

Insulin vials are sealed and airtight. This means that you need to inject the same amount of air **into** a vial before you can draw that amount of insulin **out**.

For example, if you need to draw up 10 units of insulin, inject 10 units of air into the vial first.

Vials have specialized rubber tops

The rubber top of a vial does not lift up or come off. Instead, it is soft enough to let a syringe needle pass through it to draw insulin out of the vial.



The rubber top keeps germs and bacteria out by closing off or sealing over the hole where a needle was placed.

You keep germs and bacteria out of vials by cleaning the rubber top with a sterile alcohol wipe **each time** you use a vial.



To do so, start in the center of the rubber top and use a firm, circular motion as you work your way outward to the edge of the rubber top.

Be sure to let the alcohol dry completely before inserting a needle into the vial.

When a vial of insulin is new, there is a cap that covers the rubber top of the vial. For a new vial, remove the cap from the rubber top before cleaning it.



Vials and their prescription and medication labels

The prescription label is on the small box that the insulin comes in.



The medication label is found on the vial itself. The medication label identifies the name or type of insulin in the vial and:

- The number of units of insulin per milliliter in the vial (U-100 is the standard).
- The expiration date of the vial.



Because insulin vials have two labels—one on the box and one on the vial—you will need to store the vial in its original box and check both labels when you are verifying the 5 Rights of Medication Administration.



Check the 5 Rights of Medication Administration **three times** before you administer insulin:

1. At the start of set-up.
2. During set-up.
3. After you have the dose in the syringe.

THE MEDICATION ADMINISTRATION PROCESS

Before we move on to administering insulin, let's review the general steps for medication administration that you learned in your previous nurse delegation training. Do you remember them? They are:

Evaluate the client.

Set up the medication.

Administer the medication.

Document the medication administration.

Observe the client for side effects.

As these steps indicate, administering medication means that you are responsible for more than simply giving medication to a client.

When administering medication, you:

- Are the key person to monitor the client's condition before and after the medication is given.
- Are the best person to watch for side effects and take action early if you see them occurring.
- Need to know what to do if your client will not take a medication or if you discover a medication error.

If you are unsure about the steps of the medication administration process, review Lesson 3 in your previous nurse delegation training manual. You need to know these steps and your responsibilities before you go further in this module.

The Medication Administration Process and Insulin Injections

In this module, we will use the medication administration process to give an injection using an insulin syringe and one type of insulin.

We will not address mixing two insulin types in one syringe; using an insulin pen; or using a sliding scale.



Your delegating RN:

- Will teach you about these topics as they apply to your client.
- May use the resources in Appendix C to help you learn about them.

ADMINISTERING A SINGLE TYPE OF INSULIN USING AN INSULIN SYRINGE

The following is a detailed look at the steps you will take to administer insulin. Study and use the first set of steps until you know them well. Then use the checklist format on pages 69-70 to review and cue yourself through the steps.

Later, you will see the steps demonstrated on the DVD. Also, you will get hands-on practice with the steps under the guidance of your delegating RN. After you practice the steps using a real syringe and vial, you will be able to gain mastery of these skills.

Let's get started!

Step 1 — Evaluate the Client

You need to take the actions below—and possibly others—based on the instructions from your delegating RN and your client's individualized care plan:

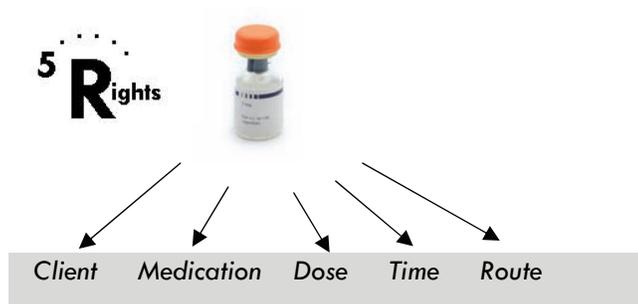
- Observe for and respond to symptoms of low or high blood sugar and follow your client's individualized plan for these events.
- Monitor blood glucose level and respond according to your client's individualized plan.
- Recognize additional factors that may affect the client's blood glucose such as skipped meals or more or less exercise than usual. Follow your delegating RN's plan for these events.
- Observe for other status changes or issues of concern and contact the delegating RN as needed.



Step 2 — Set Up the Medication

1 Check the 5 Rights of Medication Administration:

- Right client, Right medication, Right dose, Right time, Right route
- Use both the prescription label and the vial label when verifying the 5 Rights.
- Remember to verify that the vial contains U-100 insulin as part of the 5 Rights.



2 Gather your supplies on a clean surface near your client:

- A new insulin syringe
- Two alcohol wipes
- The proper insulin vial
- A sharps container
- Gloves



3 Inform your client of what you are doing:

- Prepare the client and discuss or answer client questions as needed.



4 Wash your hands:

- Use soap and warm water and dry them thoroughly on a clean towel.



5**Inspect the insulin vial:**

- Be sure that the insulin has not expired. Never use expired insulin. Once opened, the vial is good for a maximum of 28 days or when it expires, whichever comes first.
- When opening an insulin bottle for the first time, record the date and your initials in permanent ink on the vial label.
- Be sure that the insulin appears as it normally should (clear or cloudy type). If the insulin appears unusual in any way (discolored, floating particles, frost on bottle), do not use the vial. Open a new one.

5 Rights

- Re-Check the 5 Rights of medication administration: Right client, Right medication, Right dose, Right route, Right time.

**6****Clean the top of the vial with alcohol:**

- Use a sterile alcohol wipe to clean the rubber lid of the vial.
- Use a circular motion from the center of the lid outward.
- Wait for the alcohol to dry completely.
- For a new vial, remove the protective cap from the rubber lid before cleaning.

**7****For cloudy insulin only, roll the vial between your palms:**

- If the insulin is the cloudy type, mix by rolling the vial gently between the palms of your hands. Roll the bottle back and forth approximately 15-20 times.
- Be careful not to shake it. The white powder should mix into the solution.
- Turn the vial over to make sure no powder is left on the bottom.



8**Uncap the needle of the syringe:**

- Once you determine that you have a U-100 insulin syringe with an orange cap, remove the cap.
- Do not touch the needle. If you do, put the syringe into the sharps container and start over with a new one.

**9****Pull the syringe plunger back to the # of units of insulin that you need to administer:**

- For example, if you are giving 10 units of insulin, pull the plunger back to 10 units.
- Hold the syringe to eye level to verify that you have the correct amount of air in the syringe.

**10****Inject drawn air into the vial:**

- With the vial on the table, insert the needle of the syringe into the center of the rubber lid.
- Then push the plunger down so that the air in the syringe is injected into the vial.

**11****Turn the vial and syringe upside-down:**

- With the needle of the syringe still in the vial, turn the insulin vial and syringe upside-down.
- Be sure the end of the needle is covered by insulin. This will prevent air bubbles from being drawn into the syringe.
- The end of the needle will need to be covered by insulin the whole time insulin is being drawn into the syringe.



12 Pull the plunger back to the correct # of insulin units:

- Hold the syringe with the plunger at eye level to see accurately the number of units you have drawn up.



13 Check the syringe for air bubbles:

Air bubbles take up space where insulin should be and, so, can cause you to measure the wrong dose of insulin.

- If you see an air bubble, use the plunger to push the insulin back into the bottle and then fill the syringe again to the correct number of insulin units. Repeat until the syringe is free of bubbles.



14 Remove the needle from the vial:

- Remove the needle from the vial and put the syringe down.
- Make sure the needle does not touch anything and that it is not bent.
- If the needle touches anything or is bent, put the syringe in the sharps container and begin again.



Step 3 — Administer the Medication

1 Inform the client about what you are doing:

- Inform the client about what you are doing.
- Ask the client to relax the area of the body that will be injected and to remain as still as possible during the injection.



2 Re-check the 5 Rights of Medication Administration:

- 5 **R**ights
- Re-check the 5 Rights of Medication Administration: Right client, Right medication, Right dose, Right time, Right route.
 - Follow your delegating RN's instructions about whether the client or another staff member is able to double-check the dose you have in the syringe before administering it.



3 Put on gloves:

- Always wear gloves when giving an insulin injection.



4 Clean the skin:

- Clean the skin of the injection site with a sterile alcohol wipe.
- Wait a few seconds for the skin to dry completely.



5

Hold a fold of the skin between your fingers:

- A one to two inch fold of skin is recommended.



6

Give Insulin Injection:

6a

- Holding the syringe like a pencil, quickly poke the needle straight into the fold of skin at a 90° angle.
- If your client is older or very thin, your delegating RN may instruct you to use a 45° angle.



6b

- While holding the syringe in place, **release the fold of skin before injecting the insulin.**



6c

- While still holding the syringe in place, push the syringe plunger all the way down using a firm and smooth motion.



6d

- Pull the needle straight out at the same angle that it was inserted.



7

Drop the used syringe into the sharps container:

- A used syringe should not be recapped or set down. Drop it immediately into a sharps container.



8

If bleeding occurs:

- Gently press the site with a cotton ball or gauze.
- Do not rub or massage the area because this can speed up the action of the insulin.



9

Inform the client that the injection is complete:

- Communicate with the client about the process and his or her response to it as needed.



10

Remove gloves:

- Avoid touching the outside of your gloves with your bare hands when removing them.
- Dispose of used gloves promptly.



11

Wash your hands:

- Use soap and warm water and dry them thoroughly on a clean towel.



12

Put supplies away and clean your work area:

- Clean your work area according to your workplace policies.

Step 4 — Document the Administration

- Use standard documentation procedures for medication administration, according to the guidelines of your delegating RN and your workplace.
- Recording the site of each injection can help you follow a site rotation schedule, if your client has one. Follow your delegating RN's instructions regarding whether this is needed for your client.



Step 5 — Observe the Client for Side Effects

For this step, you need to take the actions below—and possibly others—based on the instructions from your delegating RN and your client's individualized care plan.

- Observe for symptoms of low blood sugar and respond according to your client's individualized plan.
- Notify your delegating RN about any negative side effects or status changes. Some examples include low blood sugar episodes or skin changes or problems related to injection sites.



- **Call 911** for emergency situations. For example, low blood sugar when the client is not conscious or alert enough to swallow a sugar source such as juice or candy.



Checklist For Administering a Single Type of Insulin in a Syringe

Step 1: Evaluate the Client

Step 2: Set up the Medication



- 1 Check the 5 Rights of Medication Administration.
- 2 Gather your supplies on a clean surface near your client.
- 3 Inform your client of what you are doing.
- 4 Wash your hands.



- 5 Inspect the insulin vial and re-check the 5 Rights of Medication Administration.
- 6 Clean the top of the vial with a sterile alcohol wipe.
- 7 If the insulin is the cloudy type, mix by rolling the vial gently between the palms of your hands.
- 8 Uncap the needle of the syringe.
- 9 Pull the syringe plunger back to the # of units of insulin that you need to administer.
- 10 Inject the drawn-up air into the vial.
- 11 With the needle of the syringe still in the vial, turn the insulin vial and syringe upside-down.
- 12 Pull the plunger back to the correct # of insulin units.
- 13 Check the syringe for air bubbles and remove them.
- 14 Remove the needle from the vial and put the syringe down.

Checklist For Administering a Single Type of Insulin in a Syringe

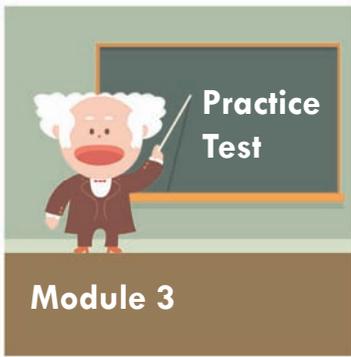
Step 3: Administer the Medication



- 1 Inform the client about what you are doing.
- 2 Re-check the 5 Rights of Medication Administration.
- 3 Put on your gloves.
- 4 Clean the skin of the injection site with a sterile alcohol wipe.
- 5 Hold a fold of skin between your fingers.
- 6 Give the insulin injection.
 - 6a Hold the syringe like a pencil and quickly poke the needle straight into the fold of skin at a 90° angle.
 - 6b While holding the syringe in place, **release the fold of skin.**
 - 6c While still holding the syringe in place, push the syringe plunger all the way down using a firm and smooth motion.
 - 6d Pull the needle straight out at the same angle that it was inserted.
- 7 Drop the used syringe into the sharps container.
- 8 If bleeding occurs, gently press the site with a cotton ball or gauze.
- 9 Inform the client the injection is complete.
- 10 Remove gloves.
- 11 Wash your hands.
- 12 Put supplies away and clean your work area.

Step 4: Document the Medication Administration

Step 5: Observe Client for Side Effects



Directions: Follow the directions for each question or exercise below:

1. Using arrows, label the following parts of the syringe correctly: barrel, plunger top, and dosage measurement line.



Example:
Needle Cap

2. Knowing how to give an insulin injection safely is critical. For each item below, mark either as “S” for “safe” or “U” for “unsafe.”
- ___ a. Always use an insulin syringe to administer insulin.
 - ___ b. Touching the needle of a syringe helps you to remove its cap.
 - ___ c. To measure the amount of insulin in a syringe accurately, hold the syringe at eye level.
 - ___ d. Clean the rubber top of the insulin vial each time before you use it.
 - ___ e. Inject insulin into the fatty subcutaneous tissue.
 - ___ f. When giving an injection, choose an area on this skin that is free from irregularities such as cuts and scrapes.
 - ___ g. Injecting insulin and then placing a heating pad over the same area of skin is safe.
 - ___ h. Rubbing and massaging the skin after an insulin injection is safe.
 - ___ i. If you notice odd changes in the client’s skin after an injection, you should contact your delegating RN.
 - ___ j. If your client skips his afternoon snack and dinner, he can probably take his usual dose of insulin safely.

3. How many times must the 5 Rights of Medication Administration be verified when you administer insulin: _____?

4. Some of the steps for drawing insulin into a syringe are listed below. Put the steps in the order that they should be completed (Step 1: e, Step 2: c, Step 3: d, etc.):

Step 1: _____.

Step 2: _____.

Step 3: _____.

Step 4: _____.

Step 5: _____.

- a. Clean the rubber top of the insulin vial with alcohol.
- b. Inject drawn up air into the insulin vial.
- c. Turn the vial upside down and pull the plunger back to draw in the correct # of units of insulin.
- d. Wash hands.
- e. Pull the syringe plunger back to draw in air (the # of units of insulin needed).

5. Some of the steps for giving an insulin injection are listed below. Put the steps in the order that they should be completed (Step 1: e, Step 2: c, Step 3: d, etc.):

Step 1: _____.

Step 2: _____.

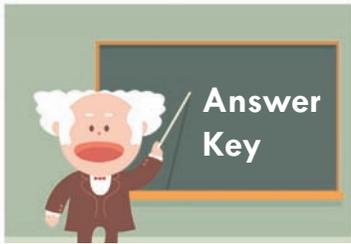
Step 3: _____.

Step 4: _____.

Step 5: _____.

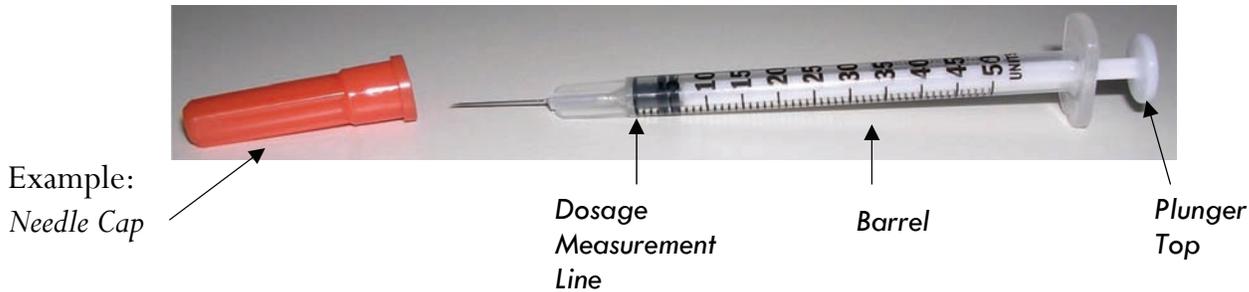
- a. Hold a fold of skin between your fingers.
- b. Quickly poke the needle straight into the fold of the skin at a 90° angle.
- c. Clean the skin of the injection site with an alcohol wipe.
- d. Release the fold of skin.
- e. While holding the syringe in place, push the syringe plunger all the way down using a firm, smooth motion.

6. Circle TRUE or FALSE: After giving an insulin injection, clean the work area before you put the used syringe into the Sharps container.



Use this Answer Key to check your answers. The page number following the question is where you will find the information in the Module.

1. Using arrows, label the following parts of the syringe correctly: barrel, plunger top, and dosage measurement line. (Pages 51, 52)



2. Knowing how to give an insulin injection safely is critical. For each item below, mark either as “S” for “safe” or “U” for “unsafe.”

- S** a. Always use an insulin syringe to administer insulin. (Page 51)
- U** b. Touching the needle of a syringe helps you to remove its cap. (page 52)
- S** c. To measure the amount of insulin in a syringe accurately, hold the syringe at eye level. (page 53)
- S** d. Clean the rubber top of the insulin vial each time before you use it. (page 57)
- S** e. Inject insulin into the fatty subcutaneous tissue. (page 48)
- S** f. When giving an injection, choose an area on this skin that is free from irregularities such as cuts and scrapes. (page 50)
- U** g. Injecting insulin and then placing a heating pad over the same area of skin is safe. (Page 50)
- U** h. Rubbing and massaging the skin after an insulin injection is safe. (Page 50)
- S** i. If you notice odd changes in the client’s skin after an injection, you should contact your delegating RN. (page 50)
- U** j. If your client skips his afternoon snack and dinner, he can probably take his usual dose of insulin safely. (page 60)

3. How many times must the 5 Rights of Medication Administration be verified when you administer insulin: **Three** ? (page 58)
4. Some of the steps for drawing insulin into a syringe are listed below. Put the steps in the order that they should be completed (e, c, d, etc.): (page 69)
- Clean the rubber top of the insulin vial with alcohol.
 - Inject drawn up air into the insulin vial.
 - Turn the vial upside down and pull the plunger back to draw in the correct # of units of insulin.
 - Wash hands.
 - Pull the syringe plunger back to draw in air (the # of units of insulin needed).

Step 1: **d**

Step 2: **a**

Step 3: **e**

Step 4: **b**

Step 5: **c**

5. Some of the steps for giving an insulin injection are listed below. Put the steps in the order that they should be completed (e, c, d, etc.): (page 70)
- Hold a fold of skin between your fingers.
 - Quickly poke the needle straight into the fold of the skin at a 90° angle.
 - Clean the skin of the injection site with an alcohol wipe.
 - Release the fold of skin.
 - While holding the syringe in place, push the syringe plunger all the way down using a firm, smooth motion.

Step 1: **c**

Step 2: **a**

Step 3: **b**

Step 4: **d**

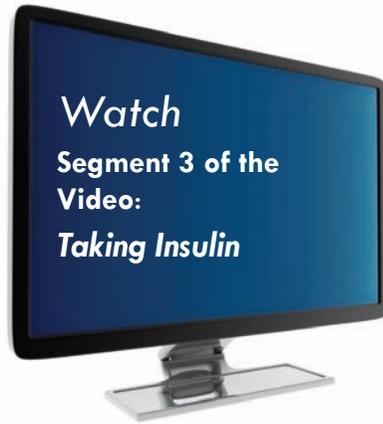
Step 5: **e**

6. Circle TRUE or FALSE: After giving an insulin injection, clean the work area before you put the used syringe into the Sharps container. (page 55, 70)

FALSE



**IT'S TIME
TO:**





Appendix A

Module 1 Resources

Visualization Exercise

(How High Blood Sugar Can Damage the Body)

Healthy Food Choices

(Nutritional Table)

Plate Method

Diabetes and Your Client's Physical Activity Plan

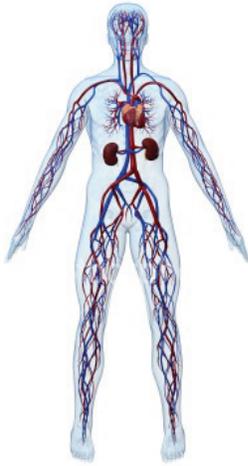
10 Ways to Help Motivate Your Client

High Blood Sugar

(Symptoms and What to Do for It)

VISUALIZATION EXERCISE

One good way to understand how high blood sugar can cause so much damage is to make a clear picture in your mind. Let's take a moment to imagine . . .

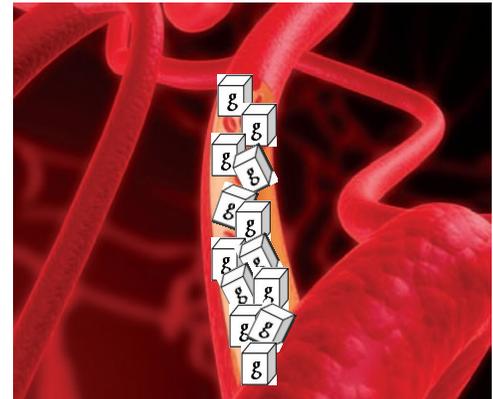


. . . the body's blood vessels as a delicate network of soft tubes. The tubes are big in some areas of the body—like through the chest and abdomen and legs. The tubes are very small--even tiny--in other areas like the eyes, kidneys, and feet.

Imagine the inside walls of these soft tubes, lined with soft pink “doors” or cells. Usually, the doors open easily to let glucose pass through. However, because of diabetes, all of the doors are closed and locked.

Now imagine the inside of the soft tubes as they become over-crowded with glucose. Try to see glucose cubes packed tightly into the tubes--bumping and banging into the soft, pink walls and doors, unable to get out.

With this picture in your mind, it is easy to see how the soft walls and doors of the delicate tubes—actually a person's blood vessels--can get damaged by too much glucose pushing its way through.



It is easy to imagine how damage would be the worst in places where the delicate tubes are smaller and more fragile. The same is true for the inside of very small blood vessels—like those in the eyes, kidneys, and feet.

It is easy to imagine how fragile objects *just behind* the soft walls of the delicate tubes might get battered and damaged. The same is true for the fragile nerves that are found next to, along and around delicate blood vessels.

Finally, it is easy to imagine how too much glucose could block or crush anything else that is trying to get through the overcrowded network of tubes. The same is true for the “helper cells” of the immune system that need to get through to fight infections in the body.

With that picture in your mind, you can clearly imagine the damage that high blood sugar can cause. Over time, this damage can lead to serious health problems.

Good nutrition is important for all people, including those with diabetes. Below are general guidelines for healthy eating. These guidelines are general and may not apply to clients with specialized diets, restrictions, or allergies. The websites listed on page 106 also have more information on this topic.

HEALTHY FOOD CHOICES

What is helpful to know	What is helpful to do
<p>A healthy diet includes a variety of foods from all of the food groups</p> 	<ul style="list-style-type: none"> • Include whole grains, fruits, vegetables, and fat-free or low-fat dairy products • Include lean meat, poultry, fish, beans, eggs, and nuts • Focus on foods that are low in fat, salt and added sugar
<p><i>Carbohydrate (or sugar) content of foods is what raises a person's blood sugar levels most.</i></p> 	<ul style="list-style-type: none"> • Avoid foods that are very high in carbohydrates (such as candy, desserts, and sugary drinks) • Choose healthy carbohydrates that are nutritious and filling (such as fruits, vegetables, whole grains, and fat-free or low-fat dairy products)
<p><i>Even with the healthy food choices, how much and how often are important questions</i></p> 	<ul style="list-style-type: none"> • Eat moderate portion sizes • Spread meals and snacks throughout the day • Eat about the same amount of food each day • Eat at regular times each day
<p><i>Fats should be used sparingly and wisely</i></p> 	<ul style="list-style-type: none"> • Use low-fat options (like margarine, low-fat salad dressing, skim milk) instead of high fat choices (like butter, regular salad dressing, cheese, and whole milk) • Eat lean cuts of meat, fish, and skinless chicken • Avoid fatty meats like bacon, bologna, hot dogs, sausage, and non-lean cuts of beef • Avoid fried foods; instead, try foods that are baked, broiled or steamed • Use heart-healthy fats like olive and canola oil, seeds, and nuts

Plate Method

The Plate Method is a visual guide for healthy eating. Many people living with diabetes have found the Plate Method a very helpful meal planning and weight management tool.

Begin with a nine-inch plate. A nine-inch plate allows for just the right size in food portions. Fill:

- One half of the plate with approximately 1 cup of **non-starchy** vegetables like broccoli, carrots, or cauliflower. This does **not** include starchy vegetables such as corn or potatoes. You can skip vegetables at breakfast.
- One quarter of the plate with lean protein (about 3 ounces of meat, poultry, fish, 1/3 cup nuts/seeds, 2 tablespoons of peanut butter).
- One quarter of the plate with starchy foods (such as bread, pasta, or beans. Choose whole grains over processed, refined grains.)
- Add a small serving of fruit and dairy (one cup of low fat milk or yogurt).

Make sure to pay attention to serving size. Serving size is always listed on a food label.

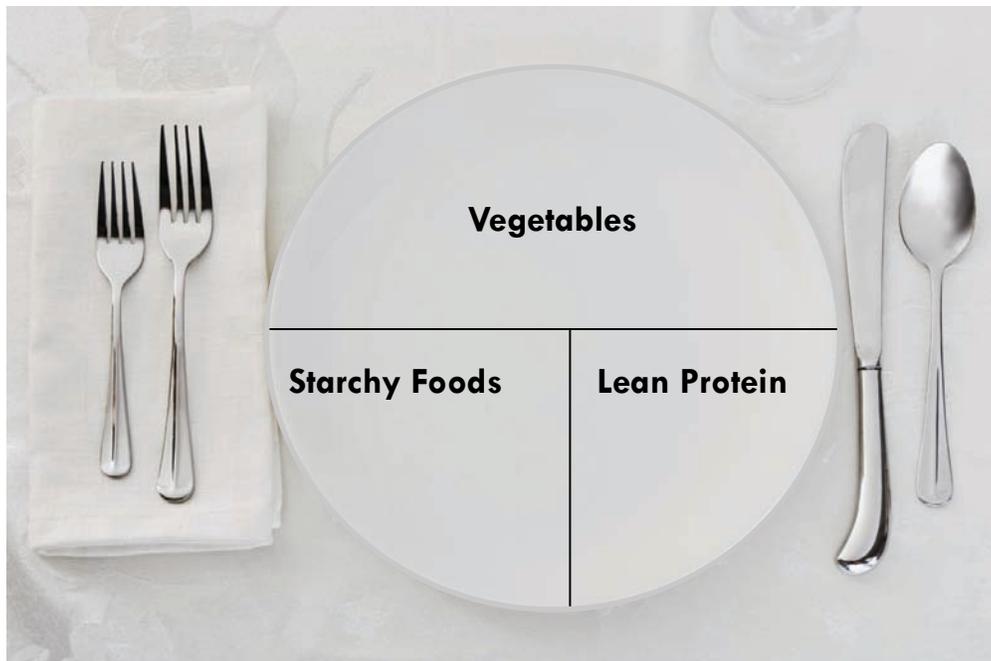
This approach also works well when eating in a restaurant or if you aren't making your own meal. Visualize how the foods would fill up a nine-inch plate. If you are lacking in vegetables, have a salad. If the meat portion looks too large, split it in half and take some home!



Small Serving of Fruit

Plate Method

Small Serving of Milk or Yogurt



As you learned in Module 1, physical activity is an important part of a diabetes management plan. Here are some tips for your client to exercise safely and comfortably:

- Talk with your health care provider about exercise and follow his or her recommendations.
- Wear comfortable, well-fitting shoes that have good support and don't rub or cause blisters. Wear clean, dry socks, preferably cotton. Consider talking to a podiatrist about the best type of footwear for you.
- Check feet for redness, blisters, or sores after exercising. If your feet are numb, you might not feel pain. Sores or blisters might get worse because you don't notice them. Without proper care, minor foot problems can turn into serious conditions.
- Drink water before, during, and after activity.
- Low blood glucose can happen during exercise, right afterward, or even up to a day later. Always have a source of glucose with you when you exercise.
- It is important to know how your body's blood sugar responds to activity. Keep a blood glucose log and write down how long you exercised and your blood sugar level afterwards. This allows you to track your progress and see how physical activity affects your blood glucose.
- Wear a medical identification or other ID.

Remember...

- Report sores that don't heal or any other concerns to the delegating RN or the appropriate person where you work.
- Watch for signs of low blood glucose if you are with your client during exercise and follow instructions from the delegating RN or the individualized care plan if they occur.
- Encourage and support your client in keeping to his or her individualized activity plan and help celebrate when activity goals are reached.

For more information, read *What I Need to Know About Physical Activity and Diabetes* from the National Diabetes Information Clearinghouse at http://diabetes.niddk.nih.gov/dm/pubs/physical_ez/physactivity.pdf or call 1-800-860-8747 and ask to have one sent to you. The websites listed on page 106 also have more information on this topic.



Physical activity is an important part of a Diabetes Management Plan.

10

WAYS TO HELP MOTIVATE YOUR CLIENT

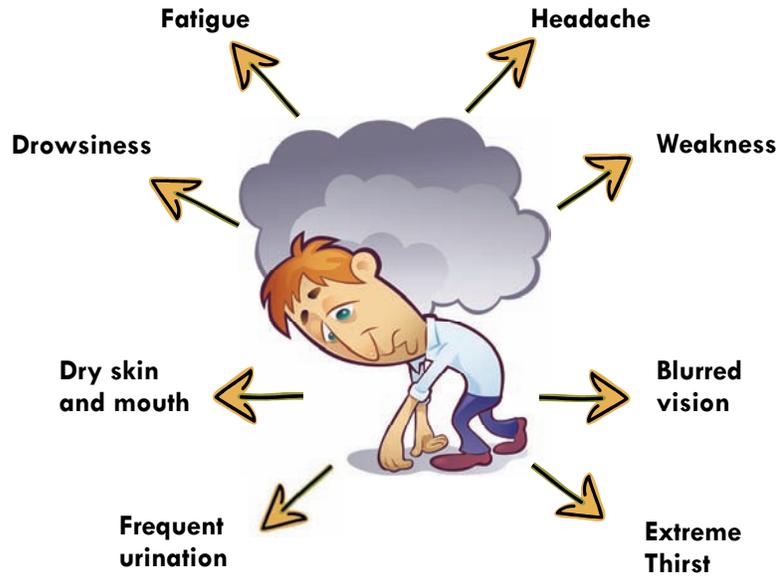
As you learned in Module 1, the FIFTH M is MOTIVATION to stay healthy. You play an important role as a positive motivator for your client. Your support can help your client follow his or her Diabetes Management Plan.

Ten Ways You Can Help!

For most people, a diagnosis of diabetes requires making many lifestyle changes. Lifestyle changes are often difficult and the motivation to change is personal. This means your client has to **want** to follow his or her Diabetes Management Plan -- you can't do it for your client. But, there are many ways you can help!

1. Be a good role model. The type of diet and physical activity that helps your client manage diabetes benefits you as well.
2. If you are still working on making healthy diet choices in your own life, don't tempt your client by bringing foods to work he or she can't eat.
3. Listen to your client's needs, complaints, worries, and fears about living with diabetes. Sometimes, the best way to support someone is simply to listen. Listening also lets your client know you are on his or her side and gives you important clues on what you can do to help.
4. Ask your client directly what you can do that will help him or her feel supported and encouraged. Everyone's needs are different. By knowing what works for your client, you can best tailor the support you provide.
5. Encourage your client to talk about anything that is making it difficult for him or her to follow the plan. Help brainstorm and problem-solve ways to work through barriers.
6. Remind your client about the many benefits of making positive changes such as better quality of life, being able to maintain his or her current abilities, and a decreased risk of serious health problems.
7. Help your client celebrate small steps and victories.
8. Be patient and non-judgmental. It takes time and support to make lifestyle changes.
9. Don't nag or threaten (e.g. "If you don't take care of yourself, you'll go blind"). It doesn't work and often backfires.
10. Stay alert for signs of depression. People living with diabetes are twice as likely to have depression as someone without diabetes. Alert the appropriate person where you work if you become concerned.

High Blood Sugar Symptoms



Late Symptoms

- Nausea
- Rapid breathing
- Sweet/fruity breath odor

Blood Sugar Ranges to Know

Name of Range	Blood Sugar Level
↑ High Blood Sugar or Hyperglycemia	Above 140 mg/dl
Normal Blood Sugar	70-140 mg/dl
↓ Low Blood Sugar or Hypoglycemia	Below 70 mg/dl



HIGH BLOOD SUGAR REVIEW: Important Points to Remember

- Know your client's individualized Target Range** for blood sugars.
- Use a glucometer** to check your client's blood sugar if he or she shows symptoms of high blood sugar.
- Follow your delegating RN's instructions for high blood sugar** whenever your client's blood sugar tests above his or her individualized Target Range.
- Call 911 immediately** if your client is non-responsive. Notify your delegating RN as soon as possible after your client has received emergency help.



Appendix B

Module 2 Resources

Summary Table

(Information to Know about Prescribed Insulin)

Summary Table

(Factors that Affect Blood Sugar)

Low Blood Sugar

(Symptoms and What to Do for It)

Insulin Table

(Categories and Action Times)

Summary Table:

Information to Know About Prescribed Insulin



To work safely with prescribed insulin, knowing this information is necessary.

Appearance

Do	Don't
<ul style="list-style-type: none"> • Do know that insulin is either clear or cloudy. • Do know what your client's insulin normally looks like. • Do use a new container of insulin if your client's current insulin looks discolored or unusual in any way. 	<ul style="list-style-type: none"> • Don't use insulin that is yellow or discolored in any way. • Don't use insulin if it has unusual particles in it. • Don't use insulin if its vial or container has frost on it.

Containers

Do	Don't
<ul style="list-style-type: none"> • Do know that the insulin you will be working with may come in: <ul style="list-style-type: none"> • Vials • Disposable insulin pens • Cartridges to load into re-useable insulin pens 	

Prescription Labels

Do	Don't
<ul style="list-style-type: none"> • Do check the prescription label as you verify the 5 Rights of Medication Administration three times before you administer insulin. 	

Expiration Dates

Do	Don't
<ul style="list-style-type: none">• Do check at each use to see that insulin has not expired.• Do use insulin for a maximum of 28 days after its first use.• Do date and initial the insulin container when you first open it (using permanent ink).	<ul style="list-style-type: none">• Don't ever use insulin that has expired.• Don't use insulin that has been opened <i>more than</i> 28 days ago.

Storage

Do	Don't
<ul style="list-style-type: none">• Do store new insulin in the refrigerator.• Do store vials in use in the refrigerator or at room temperature.• Do store pens in use at room temperature—not in the refrigerator.• Do keep an extra vial, pen, or pen cartridge available at all times.• Do store enough insulin and supplies for 2 weeks ahead in case of bad weather or unexpected conditions.	<ul style="list-style-type: none">• Don't use hot storage areas such as:<ul style="list-style-type: none">• Near a window on hot days.• Next to a stove or heat source.• In a parked car.• Don't use cold storage areas like the freezer.

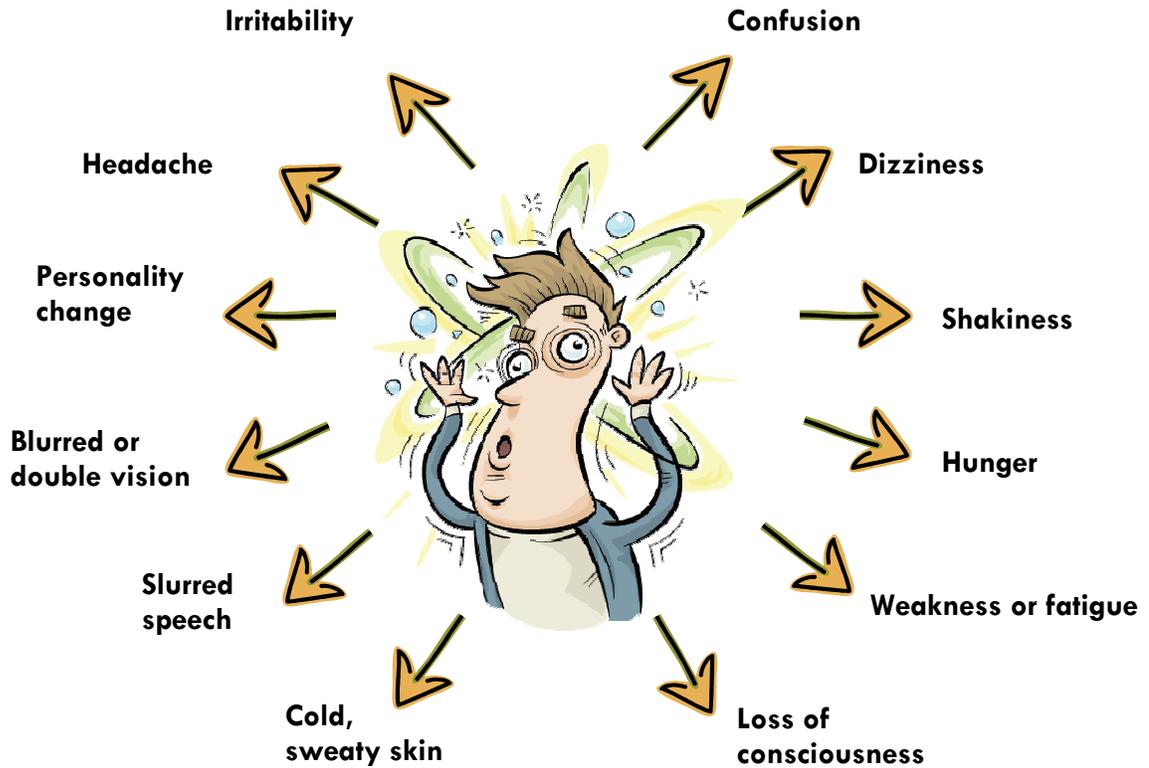
Summary Table: Factors That Affect Blood Sugar



To work safely with prescribed insulin, knowing this information is necessary:

Factor	↑ Raises Blood Sugar	↓ Lowers Blood Sugar
Meals	<ul style="list-style-type: none"> • Extra helpings or snacks, especially those high in carbohydrates (candy, cookies, breads, etc.) 	<ul style="list-style-type: none"> • Skipped meals or snacks
Movement	<ul style="list-style-type: none"> • Getting less exercise than usual 	<ul style="list-style-type: none"> • Getting more exercise than usual
Medications	<ul style="list-style-type: none"> • Skipping doses of insulin or other diabetes medication • Making changes in other medications (unique to each client) 	<ul style="list-style-type: none"> • Insulin/diabetes medications: <ul style="list-style-type: none"> • Usual dose with usual routine = less risk of low blood sugar • Usual dose with changes in routine = more risk for low blood sugar • Usual dose with blood sugar that is lower than usual or less than 70 mg/dl = dangerous risk for low blood sugar • Too much insulin or diabetes medication = dangerous risk for low blood sugar
Monitoring	<ul style="list-style-type: none"> • Monitoring does not raise blood sugar, but helps you to take action steps according to the client's plan to keep blood sugar in the Target Range and avoid high blood sugar 	<ul style="list-style-type: none"> • Monitoring does not lower blood sugar, but helps you to take action steps according to the client's plan to keep blood sugar in the Target Range and avoid low blood sugar
Sickness	<ul style="list-style-type: none"> • Having a cold, the flu, infection, or other illness 	
Stress	<ul style="list-style-type: none"> • Feeling emotional stress such as fear, anxiety, or anger • Feeling physical stress such as injury, pain, or surgery 	
Alcoholic Beverages		<ul style="list-style-type: none"> • Drinking more alcohol than usual

Low Blood Sugar Symptoms



Blood Sugar Ranges to Know	
Name of Range	Blood Sugar Level
↑ High Blood Sugar or Hyperglycemia	Above 140 mg/dl
Normal Blood Sugar	70 -140 mg/dl
↓ Low Blood Sugar or Hypoglycemia	Below 70 mg/dl



LOW BLOOD SUGAR REVIEW:

Important Points to Remember

- If your client has symptoms of low blood sugar, use a glucometer to check his or her blood sugar.
- If your client's blood sugar is below 70 mg/dl or you aren't able to check it with a glucometer, get your client a source of glucose (or sugar) immediately.
- Follow your client's individualized plan for low blood sugar as instructed by your delegating RN

OR

- Follow The Rule of 15 if your client does not have an individualized plan:
 - ✓ Give the person 15 grams of glucose. There are 15 grams of glucose in:
 - 4-6 ounces of fruit juice or regular soda (not sugar-free soda).
 - 3-4 glucose tablets.
 - 5-7 lifesavers or hard candy.
 - ✓ Have the person rest and re-check blood sugar in 15 minutes.
 - ✓ Repeat the steps above as needed if the person's blood sugar is still low or if the person is still having symptoms of low blood sugar.
- After your client's low blood sugar has been raised:
 - ✓ Observe your client for the return of low blood sugar symptoms.
 - ✓ Re-check your client's blood sugar if symptoms return.
 - ✓ Have your client eat meals and snacks as planned to keep blood sugar up.
- Call 911 immediately** if your client is:
 - ✓ Non-responsive or unconscious.
 - ✓ Unable to swallow or use a source of glucose safely by mouth. For example, when:
 - His or her speech is very slurred.
 - He or she is sleepy or not alert enough to follow directions.

Notify your delegating RN as soon as possible after your client has received emergency help.
- Low blood sugar is a serious problem. The role you play in recognizing and responding to it is important.

In Module 2, you learned that insulin types are divided into four broad categories: **Rapid-Acting, Short-Acting, Intermediate-Acting, and Long-Acting**. You also learned that the four categories of insulin differ mainly in terms of their **Action Times** or when they are working to lower a person’s blood sugar.

You and your delegating RN can use the table and example below as a resource to help you understand insulin categories and action times and *your client’s* insulin(s), specifically.

Insulin Table: Categories and Action Times

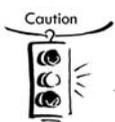
Insulin Category	Onset of Action (How soon it starts to work)	Peak of Action (When it is working the hardest)	Duration of Action (How long before it stops working)
Rapid-Acting	15 min.	30-90 min.	3-4 hrs.
Short-Acting	30-60 min.	2-3 hrs.	3-6 hrs.
Intermediate-Acting	2-4 hrs.	4-10 hrs.	10-18 hrs.
Long-Acting*	1-2 hrs.	2-12 hrs.	24 hrs.

*Glargine or Lantus is a brand of Long-Acting insulin with no peak; its action is steady for 24 hrs. after a 1 hr. onset.

Let’s use the Insulin Table to consider an example. If your client gets an injection of Short-Acting insulin at noon, then you know the insulin will:

- Start to lower your client’s blood sugar between 12:30-1pm.
- Be working its hardest to lower blood sugar between 2-3pm.
- Stop lowering your client’s blood sugar between 3-6pm.

In this example, you know your client’s insulin will be working between 12:30-6pm and to observe for symptoms of insulin-related low blood sugar during this time. You also know that your client is at **greatest risk** for insulin-related low blood sugar between 2-3pm. Now you can be sure to observe most carefully for symptoms of low blood sugar during this time.



Knowing the category and action time of the insulin(s) you use is a basic safety step that will help you to recognize and respond to low blood sugar before it becomes a medical emergency.

Note: Some types of insulin come as a mixture of more than one category-type and are not listed in this table. Your delegating RN will teach you about pre-mixed insulin if it is used by your client.



Appendix C

Module 3 Resources

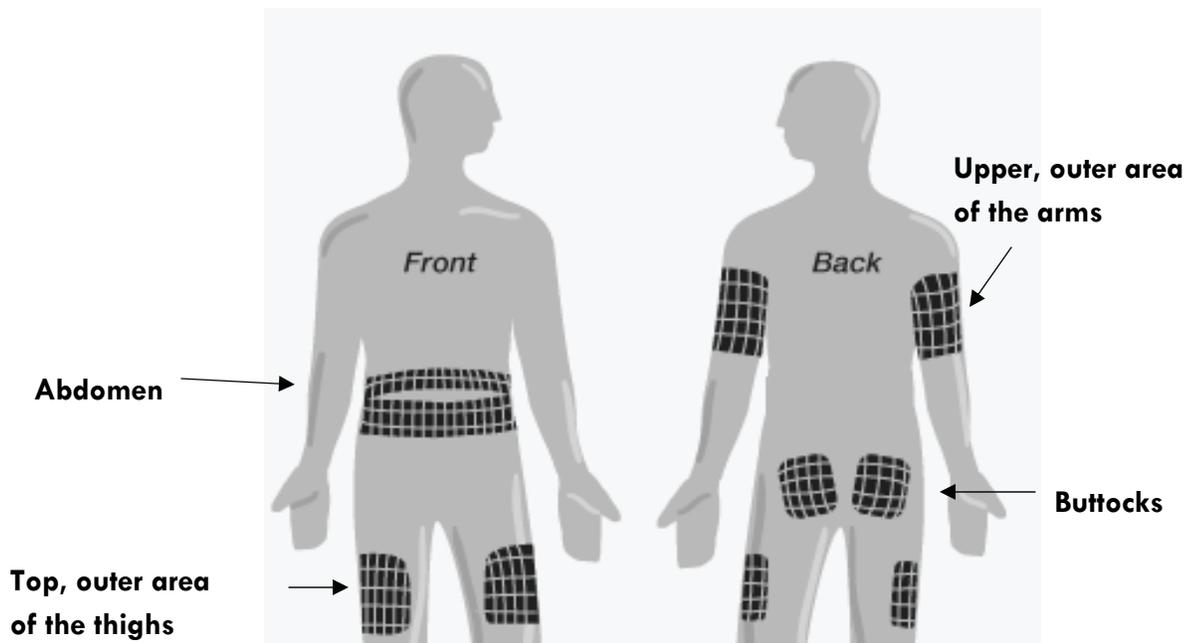
Injection Sites
(and Guidelines for Injection Sites)

Skill Checklist
(Administering a Single Type of Insulin in a Syringe)

Sliding Scales
(Description and Practice)

Insulin Pens
(General Information)

Mixing Two Types of Insulin in One Syringe
(Information and Steps)



Additional Guidelines for Injection Sites

Do	Don't
<ul style="list-style-type: none"> • Do choose an area on the skin that is intact and free of irregularities such as scars, bruises, cuts, rashes, moles, etc. • Do observe skin in response to insulin injections. • Do report any skin changes or concerns to your delegating RN. 	<ul style="list-style-type: none"> • Don't inject insulin within two inches of the naval or belly button. • Don't do the following as they may increase the rate that the body uses the insulin. Specifically: <ul style="list-style-type: none"> ✓ Don't choose an area of the body that will be exercised (the thigh before a brisk walk). ✓ Don't inject insulin just before a bath, shower, hot tub use (or any activity that brings heat to the area). ✓ Don't rub or massage skin after an insulin injection.

Job Aid—Checklist For Administering a Single Type of Insulin in a Syringe

Step 1: Evaluate the Client

Step 2: Set up the Medication



- 1 Check the 5 Rights of Medication Administration.
- 2 Gather your supplies on a clean surface near your client.
- 3 Inform your client of what you are doing.
- 4 Wash your hands.



- 5 Inspect the insulin vial and re-check the 5 Rights of Medication Administration.
- 6 Clean the top of the vial with a sterile alcohol wipe.
- 7 If the insulin is the cloudy type, mix by rolling the vial gently between the palms of your hands.
- 8 Uncap the needle of the syringe.
- 9 Pull the syringe plunger back to the # of units of insulin that you need to administer.
- 10 Inject the drawn-up air into the vial.
- 11 With the needle of the syringe still in the vial, turn the insulin vial and syringe upside-down.
- 12 Pull the plunger back to the correct # of insulin units.
- 13 Check the syringe for air bubbles and remove them.
- 14 Remove the needle from the vial and put the syringe down.

Job Aid—Checklist For Administering a Single Type of Insulin in a Syringe

Step 3: Administer the Medication



- 1 Inform the client about what you are doing.
- 2 Re-check the 5 Rights of Medication Administration.
- 3 Put on your gloves.
- 4 Clean the skin of the injection site with a sterile alcohol wipe.
- 5 Hold a fold of skin between your fingers.
- 6 Give the insulin injection.
 - 6a Hold the syringe like a pencil and quickly poke the needle straight into the fold of skin at a 90° angle.
 - 6b While holding the syringe in place, release the fold of skin.
 - 6c While still holding the syringe in place, push the syringe plunger all the way down using a firm and smooth motion.
 - 6d Pull the needle straight out at the same angle that it was inserted.
- 7 Drop the used syringe into the sharps container.
- 8 If bleeding occurs, gently press the site with a cotton ball or gauze.
- 9 Inform the client the injection is complete.
- 10 Remove gloves.
- 11 Wash your hands.
- 12 Put supplies away and clean your work area.

Step 4: Document the Medication Administration

Step 5: Observe Client for Side Effects

Usually, an insulin prescription calls for a certain number of units of insulin to be administered at certain times of the day. However, some insulin prescriptions call for extra units of insulin to be administered when a person's blood sugar gets high.

This type of prescription is called a **SLIDING SCALE** because the amount of insulin to be administered changes or "slides" up or down based on the person's blood sugar.

For some people, sliding scale insulin adds extra insulin to their usual insulin dose. For other people, sliding scale insulin may be the only insulin they use.

Healthcare providers individualize sliding scales to their patients, so each one is different. However, they all work in basically the same way.



Your delegating RN can:

- Use Mr. X's sliding scale prescription and orders on the next page as an example to teach you about sliding scales.
- Then, teach you about *your client's* sliding scale and how to use it correctly and safely.



MD Order for Mr. X



Monitor blood sugar 2x/day—9am and 5pm

Administer Regular Insulin for blood sugar above 200 mg/dl at 9am and 5pm according to the sliding scale below:

Sliding Scale for Mr. X

Blood Sugar (mg/dl)	Regular Insulin
Below 70 = Follow Rule of 15 and notify MD	
201-250	4 units subcutaneously
251-300	6 units subcutaneously
301-350	8 units subcutaneously
Above 350	Call MD

To figure out whether Mr. X is supposed to have sliding scale insulin for a certain blood sugar, you need to look in the column on the left side of the table to find the range where Mr. X's blood sugar is included. For example, a blood sugar of 210 mg/dl is found in the 201-250 range.

Next, you need to look directly across the row to the right side of the table to see how many units of insulin to administer for that blood sugar range. In this case, 4 units of Regular insulin would be administered subcutaneously for a blood sugar of 210 mg/dl.

Let's practice with more examples. Use the sliding scale table to follow along so you are sure to understand the answers.

According to this scale, if Mr. X's blood sugar at 9am on Monday is 225 mg/dl, then Mr. X should get 4 units of Regular insulin injected subcutaneously.

If Mr. X's blood sugar at 5pm on Monday is 300 mg/dl, then he should get 6 units of Regular insulin injected subcutaneously.

On Tuesday, If Mr. X's blood sugar at 9am is 175 mg/dl, then he should get no units of sliding scale Regular insulin. Mr. X is only supposed to get sliding scale insulin for blood sugars above 200 mg/dl.

Some people don't use an insulin syringe to take their insulin. Instead, they use an insulin pen.

Insulin pens look a lot like writing pens except they contain insulin instead of ink, and they use a needle instead of a pen tip.



Disposable insulin pen without needle attached

There are many different types of insulin pens and each type comes with its own special instructions.



If your client uses an insulin pen, your delegating RN will:

- Give you instructions about using it correctly and safely.

General Information About Insulin Pens

Some insulin pens come pre-filled with insulin. These pens are disposable and thrown away when empty. Some insulin pens are re-useable and come with insulin cartridges that you load into the pen and unload when empty.

Insulin pens or their cartridges may contain one single type of insulin or they may contain two types of insulin pre-mixed together.

No matter what type(s) of insulin an insulin pen contains, the insulin comes with a prescription label and an additional medication label on the pen cartridge.

The process of checking for expiration dates and verifying the 5 Rights of Medication Administration is the same for insulin pens as it is for vials.





In fact, many of the rules and concepts you learned about insulin and insulin administration with a syringe are the same whether you are using a pen or a vial. For example, you are already familiar with all of these rules and concepts:

- Insulin in pens will be either clear or cloudy.
- For cloudy insulin in pens, you need to roll the pen gently between your palms 15-20 times to mix it before use.
- Once used, an insulin pen should be used for a maximum of 28 days or until it expires, whichever comes first.
- Insulin pens should not be stored in the freezer, and they should be discarded if frosted.
- Insulin pens should not be exposed to direct heat or light.
- You should have an extra insulin pen or cartridge available in case the one being used gets lost or damaged.
- Insulin units that are measured on an insulin pen match the units for standard U-100 insulin and U-100 syringes.



Insulin pens, however, also have some unique features that you need to know about:

- New or unused pens need to be stored in the refrigerator. Once in use, pens must be stored at room temperature. Insulin pens in use must **NOT** be stored in the refrigerator.
- Insulin pens do not have needles attached to them the way syringes do. Instead, the pen has a protective cap that comes off so you can attach a new, sterile needle each time you inject insulin.
- Disposable needles for insulin pens come in plastic containers so that they remain sterile until use.

New or unused pens need to be stored in the refrigerator.

*Insulin pens in use must **NOT** be stored in the refrigerator.*



Insulin pen with its cap on



Sterile needles in plastic containers for an insulin pen



Insulin pen with its cap off

- With a pen, there is no rubber vial top to clean. Instead, there is a rubber seal on the end of the pen. The rubber seal must be cleaned with a sterile alcohol wipe before a new needle is attached.

Clean the rubber seal with a sterile alcohol wipe before attaching a new needle.



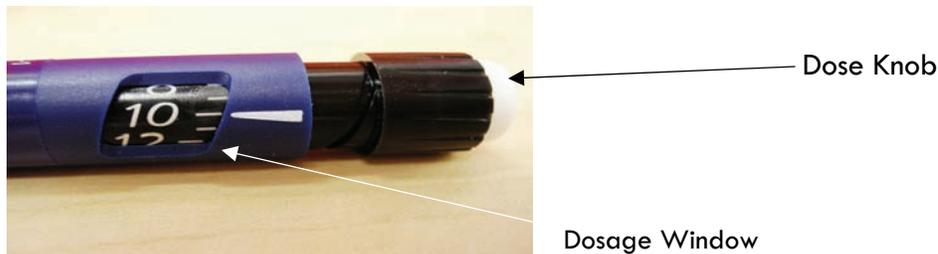
Rubber seal of an insulin pen

- Insulin pens must be primed before they can be used. **PRIMING** means testing the pen by injecting a small sample of insulin into the air—usually two units. Priming has two purposes:
 - ✓ It tells you that the pen is working (insulin comes out when you push the injection button).
 - ✓ It removes air that may be in the cartridge and needle.



To avoid giving a wrong dose, pens must be primed before they are used.

- Instead of using a plunger, insulin pens use a **DOSE KNOB** that you turn to prepare a dose of insulin. The dose usually appears as a number—such as “10”—in a **DOSAGE WINDOW** to indicate how many units of insulin will be injected.



An insulin pen set to give 10 units of insulin

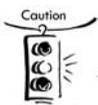
- Many types of insulin pens instruct you to push the injection knob in and hold for five seconds when you are injecting insulin.
- Insulin pens are not stored with a needle attached. Needles must be removed and placed in a sharps container immediately after use. Leaving a needle attached to a pen may cause insulin to leak out or clog the needle or create air bubbles in the cartridge.

MIXING TWO TYPES OF INSULIN IN ONE SYRINGE

You have learned the steps for drawing up a single type of insulin into a syringe and injecting it. Did you know that some people need to take two types of insulin together in one syringe?

Yes, sometimes two types of insulin are used together in a **MIXED DOSE**. Usually, a mixed dose uses one faster-acting insulin with one slower-acting insulin.

Sometimes mixed doses come pre-mixed in a vial or insulin pen cartridge. Pre-mixed insulin can be drawn up using the standard steps you have already learned.



However, when mixed doses are not pre-mixed, they need to be mixed manually in one syringe. Mixing insulins manually requires extra steps that must be completed in a specific order.

When mixed doses are not already pre-mixed, they need to be mixed manually in one syringe.

The main difference between administering a single type of insulin and a mixed dose of insulin is how you prepare the syringe. Once the syringe is prepared, the steps for giving the injection are the same for a single type of insulin or a mixed dose.

As a general example, let's say that you need to mix:

5 units of a faster-acting insulin

WITH

25 units of a slower-acting insulin

Together, you can see that 5 units of one type of insulin mixed with 25 units of another type will give you a total of 30 units of mixed insulin in the syringe. More simply, $5 \text{ units} + 25 \text{ units} = 30 \text{ units}$.

5 units + 25 units
Faster-acting insulin Slower-acting insulin



= 30 total units

The steps below show how to prepare the syringe differently with two types of insulin instead of one. Follow the other steps of the insulin administration process as you have already learned them.

- 1 When you are mixing two types of insulin, you need to inject air into two vials instead of one.



- 2  You **always** inject air into the vial of the slower-acting insulin first.



- 3 Pull the plunger of the syringe back to the # of units of slower-acting insulin needed (in this case, 25 units).



- 4 Inject the air into the vial of slower-acting insulin.



- 5 Then, instead of turning the vial upside down and drawing out insulin, just pull the needle out of the vial.



6

Now pull the plunger of the syringe back to the # of units of faster-acting insulin needed (in this case, 5 units).



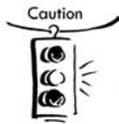
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Inject the air into the vial of faster-acting insulin and turn the vial upside down to draw the faster-acting insulin into the syringe, as usual (in this case, 5 units).



8

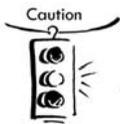
Insert the needle into the vial of slower-acting insulin and draw the slower-acting insulin into the syringe (in this case, 25 more units for a total of 30 mixed-dose units in the syringe).



Be careful when you draw the slower-acting insulin out of the second vial because you can not push the mixture back into the vial if you get air bubbles in the syringe or draw out too much insulin. Instead, you will have to start over with a new syringe.

9

You now have a mixed dose of insulin in one syringe and can proceed with the standard steps for injection, documentation, and observation of side effects.



The steps for mixed doses must be followed in the correct order. Specifically, air must be injected into the vial of the slower-acting insulin first and the faster-acting insulin must be drawn into the syringe first.

ADDITIONAL RESOURCES

The following websites include a variety of information on such topics as starting and maintaining a physical activity program, nutrition, and diabetes research. Phone numbers are also included if you (or your client) would prefer to talk with someone. Several sites also let you email questions about managing diabetes. Many of these websites also include information in Spanish.

American Diabetes Association (ADA)

National Service Center
1701 North Beauregard Street
Alexandria, VA 22311-1742
Phone: 1-800-DIABETES (342-2383)
Email: AskADA@diabetes.org
Internet: www.diabetes.org



Check out ADA's interactive program on diabetes and cardiovascular disease at: <http://web.diabetes.org/link/>

National Diabetes Information Clearinghouse

1 Information Way
Bethesda, MD 20892-3560
Phone: 1-800-860-8747
Fax: 703-738-4929
Email: ndic@info.niddk.nih.gov
Internet: <http://www.diabetes.niddk.nih.gov/>

National Diabetes Education Program

1 Diabetes Way
Bethesda, MD 20892-3560
Phone: 1-800-438-5383
Fax: 703-738-4929
Email: ndep@mail.nih.gov
Internet: www.ndep.nih.gov

National Center for Chronic Disease Prevention and Health Promotion

Phone: 1-800-CDC-INFO
1-888-232-6348 TTY
Internet: www.cdc.gov/diabetes/

Juvenile Diabetes Research Foundation International

120 Wall Street
New York, NY 10005-4001
Phone: 1-800-533-CURE (2873)
Fax: 212-785-9595
Email: info@jdrf.org
Internet: www.jdrf.org

