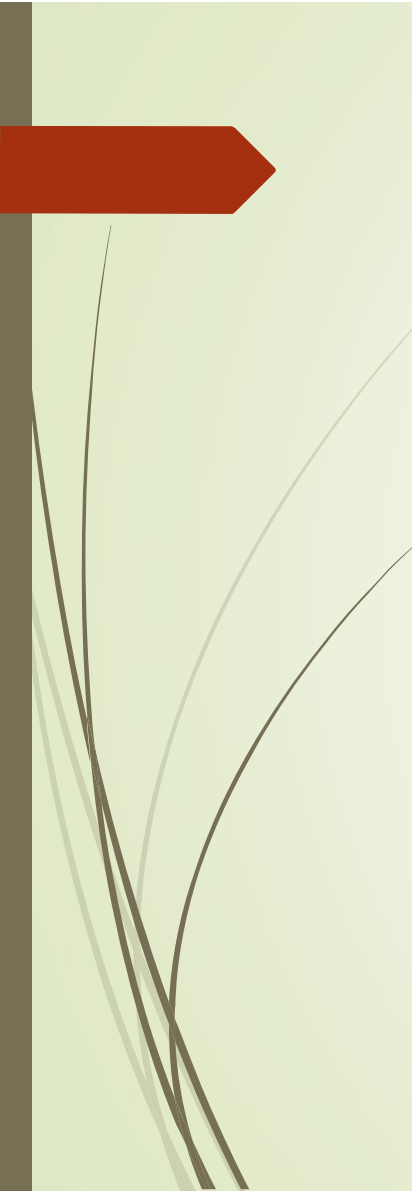


DIABETES



Overview

Practically no other disorder requires a greater degree of compliance with prescribed treatment than diabetes mellitus. That's because diabetic control and prevention of complications hinge on successful treatment. Many of our clients are dependant on others to undertake their care needs. Therefore, as care givers who will be following through with such treatments, it is important you understand the complexity of this disorder and recognize the benefits of following measures that control blood glucose levels.

Outline

- 1) What is Diabetes Mellitus? Type I and Type II
- 2) Complications from untreated or poorly controlled diabetes
- 3) What you need to know about blood glucose levels?
- 4) What is Hyperglycemia?
- 5) What is Hypoglycemia?
- 6) How to treat hypoglycaemia.
- 7) The Role of diet and exercise
- 8) How to prevent Diabetic complications
- 9) Administering Insulin – injection sites & changing pen needle

Outcome Objectives

On completion of reading this package the Care Giver will know the following learning objectives:

- What is diabetes & the complications when it is untreated or uncontrolled;
- Have a basic understanding about blood glucose levels & how to test levels;
- Role of Diet & Exercise;
- How to assist client in preventing diabetic complications;
- What is insulin & how to administer medication



What is Diabetes Mellitus (also known as sugar diabetes)?

Diabetes Mellitus is a chronic disorder in which the pancreas fails to produce enough insulin or the body cells fail to use the insulin produced efficiently. Insulin is made by a gland in the body called the *pancreas*. Normally insulin allows glucose (also known as sugar) to travel into cells, where the glucose is used for energy and stored for future use.

There are two types of diabetes:

1. *Type 1 diabetes-when* the body makes too little or no insulin. It is managed by administering insulin medication.
2. *Type 2 diabetes-when the* body either does not make enough insulin or can't use the insulin it makes. It is usually managed by a strict diabetic diet & occasionally oral medication.



Complications of untreated or poorly controlled diabetes

Acute (reversible) Complications:

- *Hyperglycemia or high blood glucose levels*- with little or no insulin, glucose builds up in the body instead of being used for energy.
- *Hypoglycaemia or low blood glucose levels* – related to diabetes treatment and occurs when there is too much circulating insulin in relation to circulating blood glucose.

Chronic (irreversible) Complications:

Over the long term left untreated abnormally high glucose levels can lead to:

- Nephropathy (kidney failure)
- Heart disease
- Impotence
- Retinopathy (blindness)
- Neuropathy (nerve damage in the extremities)

What you need to know about blood glucose levels?

Blood glucose (sugar) is the amount of glucose in the blood at a given time. It is important to check a person's blood glucose because it will:

- give you a quick measurement of the person's blood glucose level at that time
- Alert you if the person's blood glucose is too high or too low
- Show you how food, exercise, medication, illness & even stress is affecting blood glucose levels
- Help the healthcare team assist the person in making lifestyle changes and adjusting medication as needed to improve blood glucose management and long term health.

	Blood Glucose Level before eating	Blood Glucose Level 2 hours after eating
Target for most people with diabetes	4.0 – 7.0 mmol/L	5.0 – 10.0mmol/L

How to test blood glucose levels

Checking blood glucose requires a piece of equipment called a glucometer. One obtains a small drop of blood from the client's finger & placing it on a test strip which is inserted into the glucose meter. There are a number of different meters on the market it is important you become familiar with each type used by Arcus clients.

Remember: *Always refer to the client's careplan & diabetes management protocol for specific instructions of care.*

What is Hyperglycemia: A blood glucose level higher than a person's target range.

High glucose levels can happen if the person:

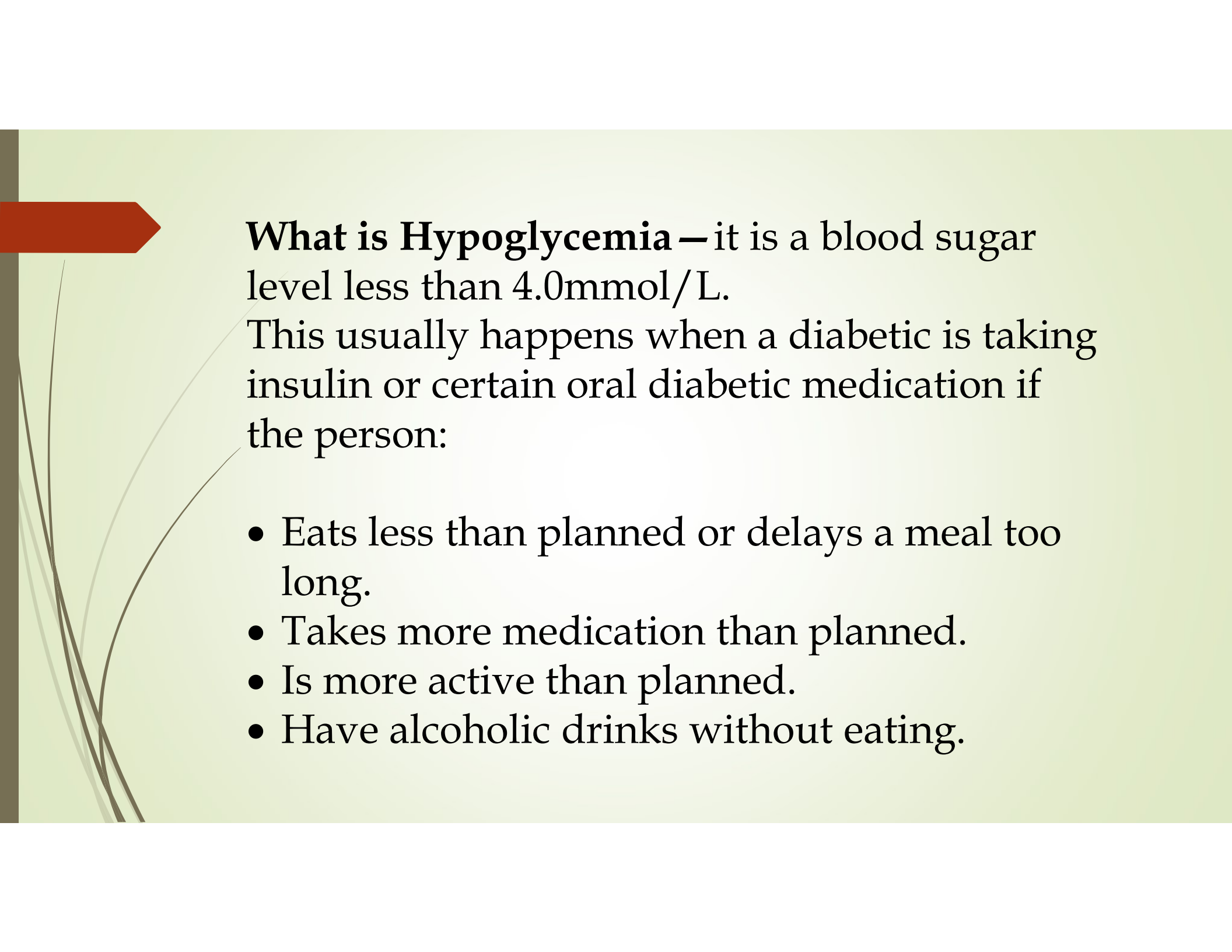
- fails to follow the prescribed diet, or
- is ill, or
- Has an infection, fever or emotional stress.

Signs & Symptoms include:

- Polydipsia (excessive thirst)
- Polyuria (frequent urination)
- Weakness, abdominal pains and generalized aches
- Deep, rapid breathing
- Anorexia, nausea and vomiting
- Tired
- Be hungry
- Be moody
- Have blurry vision
- Get infections

If this happens notify the on call nurse 604-341-7174 and follow directions.

Blood glucose levels and urine for ketones should be checked every 4 hours during a hyperglycaemic episode.



What is Hypoglycemia – it is a blood sugar level less than 4.0mmol/L.

This usually happens when a diabetic is taking insulin or certain oral diabetic medication if the person:

- Eats less than planned or delays a meal too long.
- Takes more medication than planned.
- Is more active than planned.
- Have alcoholic drinks without eating.

Signs and Symptoms:



Shaking



Fast Heartbeat



Sweating



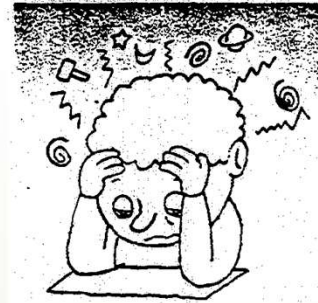
Hunger



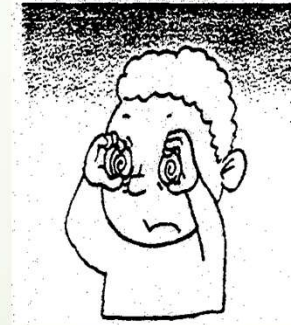
Anxiety



Nausea



Headache



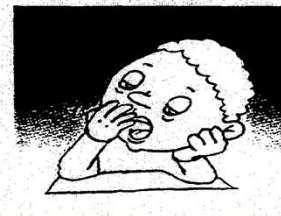
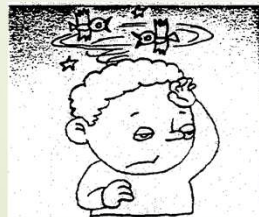
Impaired Vision


Dizziness

Irritability

**Drowsiness/
Fatigue**

Unconscious





**Different levels of low sugar
lead to different symptoms.
Test the person's blood sugar
to confirm they are low.
If testing is not possible,
TREAT first, then check their
sugar level.**

Procedures to Treat Hypoglycemia:

Mild and Moderate Lows

Give 15g of fast acting Carbohydrate

- 3 glucose tablets (5g each), or
 - $\frac{3}{4}$ cup regular pop, or
 - 3 tsps of sugar or honey, or
 - discuss other options with doctor.
-
- Check blood sugar again in 15 minutes. Treat again if blood glucose remains less than 4mmol/L

Severe Low:

If conscious give 20g fast acting carbohydrate:

- 4 glucose tablets (5g each), or
- 4 tsps of sugar or honey.
- Check blood sugar again in 15 minutes. Treat again if blood glucose remains less than 4 mmol/L
- Keep checking every 2 hours until stable.

If unconscious:

- Give glucagon injection (if trained to do) & follow protocol for follow up care
- OR CALL 911

Remember - Prolonged or severe hypoglycaemia will cause permanent brain damage and could be fatal.



The Role of Diet and Exercise

























Eating right and exercising is a simple prescription to staying healthy whether someone has diabetes or not.

Diet:

Healthy eating prevents rapid changes in blood glucose levels from occurring. This usually involves:

- Spreading small meals and snacks out evenly throughout the day
- Limiting sugars and sweets, these foods will increase blood glucose.
- Following recommendations by dietician in accordance with the Canadian Diabetes Association's meal planning guide
- Following *Canada's Guidelines for Healthy Eating*, which recommends eating a variety of food higher in fibre & lower in fat
- Limiting the amount of high fat food which can cause weight gain.
- Offering water (when person is thirsty) instead of regular pop or fruit juice, which will raise blood glucose level.

How Does Food Affect Blood Sugar?

<u>Raising Effect</u> (Carbohydrate)	<u>Slow or Stabilizing Effect</u> (Protein)	<u>Minimal or No Effect</u> ("Freebies")
Bread 	Fish (baked/poached) 	Leafy greens & other "free" vegetables 
Pasta 	Chicken (skinless) 	
Rice 	Meat (lean, trimmed) 	Water 
Cereal 	Eggs (poached/boiled) 	Tea 
Fruit 	Cheese (light, low fat) 	Coffee 
Potatoes, corn 	Beans & lentils 	Pop (Diet) 
Peas, carrots, squash 	Tofu 	
Milk or yogurt 	Peanut Butter (natural) 	
Sugar/desserts 	Nuts (dry roasted) 	(See reverse for more "free" foods)



ACTIVITY

Exercise has 3 major benefits:

- It burns calories
- It improves the body's responses to insulin
- It reduces risk factors for heart disease.

In the short term aerobic exercise such as running or walking lowers blood glucose levels. In the long term physical training makes the body more sensitive to insulin and helps overcome insulin resistance. Exercise can also decrease cholesterol levels, help in weight reduction/control and relieve stress.



PRECAUTIONS

- *Diabetics should never exercise alone.*
- *Eat a snack before exercising*
- *Wear comfortable, well fitting shoes and socks.*
- *Do not inject insulin into a part of the body that will be used during exercising*
- *Avoid exercise at the peak of insulin activity or before meals*
- *Stop exercise if feelings of weakness, dizziness, chest pains, dyspnea (shortness of breath), palpitations or nausea are felt.*
- *They should wear a medical identification tag and carry a source of simple carbohydrates in case of a hypoglycaemic episode while exercising*



How to Prevent Diabetic Complications

The best way to prevent diabetic complications is to help the client control his/her diabetes which means checking blood glucose levels daily, assisting with and encouraging the client to maintain the following healthy habits:

Heart Care

- Because diabetes raises the risk for heart disease, it is important that the client's weight is maintained by following the mealtime guidelines and exercise program prescribed for the client.

Eye Care

- Eyes should be regularly examined by an ophthalmologist at least once a year to detect any damage early on to prevent the onset of blindness.



Dental Care

- Brush after every meal and floss daily. Clean dentures thoroughly every day and make sure they fit properly.
- If bleeding, pain or soreness occurs in teeth or gums, report this to the nurse consultant so that a dental appointment can be made immediately.

Skin Care

- Breaks in the client's skin can increase the risk of infection. Do head to toe checks daily.
- Bathe daily with warm water and a mild soap and pat dry well, taking extra care between skin folds and between toes.
- Apply a lanolin-based lotion afterward to prevent dryness and skin breakdown.




Foot Care


The client's feet require special care because diabetes can reduce the blood supply and sensation to feet. Minor cuts, blisters and ingrown toenails can quickly lead to serious infection. They are also prone to getting burned or chilled due to the lack of sensation. To prevent foot problems, follow these instructions which should also be summarized in the client's care plan.

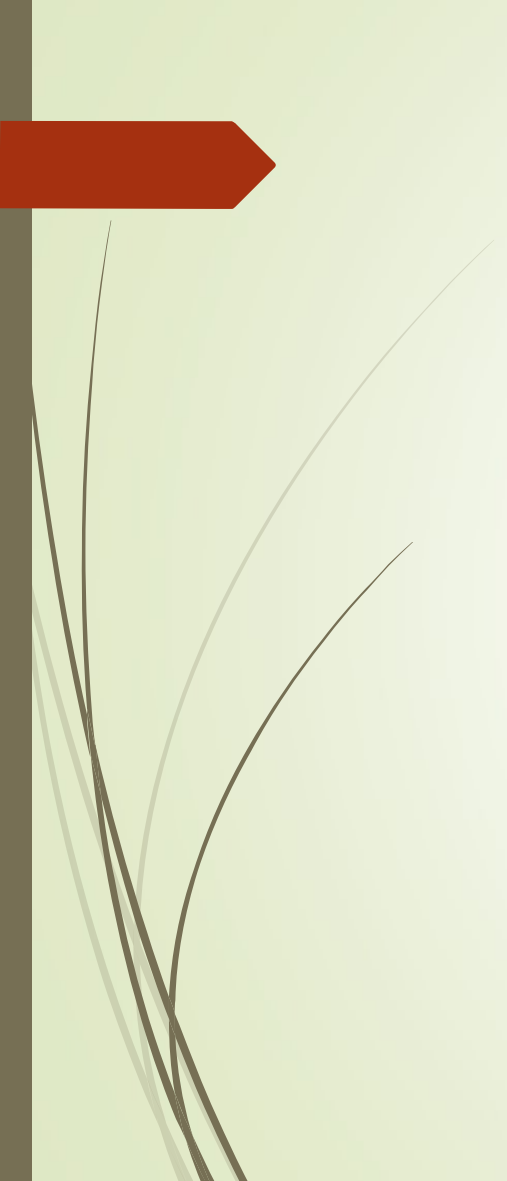
Routine:

- Wash and dry feet well everyday and apply lotion afterwards except in between toes.
- Do not soak feet in hot water and check the temperature of bath water to ensure it is warm.
- Use a mild foot powder if feet perspire heavily
- Consult with nurse regarding trimming of toenails. If they are thick or tough, the client should have his/her nails regularly cut by a podiatrist.
- Encourage the client to exercise his/her feet daily by moving them up, down and in a circular motion.



Special Precautions:

- Check feet daily for any injury or skin breakdown.
 - Make sure shoes fit properly and are leather which allows air flow.
 - Break in new shoes slowly and check worn ones for rough spot.
 - Wear clean cotton socks with no holes or irritating spots or seams.
 - Consult a podiatrist for the treatment of corns and calluses. Never use over the counter treatments that are not prescribed by the client's physician.
 - If feet are cold, use warm socks and blankets, never heating pads or hot water bottles which may cause burns.
- 

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- If there is a cut on the client's foot, no matter how slight, report to the nurse consultant immediately, meanwhile wash the cut thoroughly with normal saline and apply a mild antiseptic prescribed for the client.
 - Avoid tight fitting clothes that can decrease circulation, discourage sitting cross-legged, walking barefoot, and avoid applying adhesive tape to the skin of the client's feet.



Blood Glucose Monitoring for Insulin Dependent Clients

Blood glucose levels are checked:

- before meals
- before administration of insulin
- per physician's request
- during times of illness to ensure that the client's diabetes is well controlled.

GLUCOMETER READING (there are different types of glucometers available. Follow manufacturer's instructions.

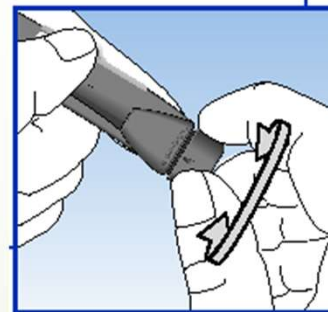
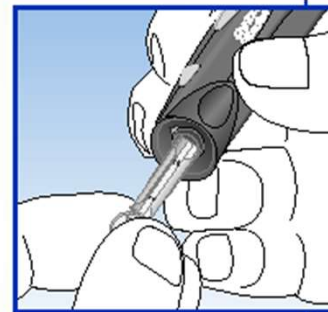
CAUTION: To reduce the chance of infection:

- Never share a lancet with anyone.
- Always use a new, sterile lancet. Lancets are for single use only.
- Avoid getting hand lotion, oils, dirt, or debris in or on the lancets.

General instructions in Getting a Drop of Blood

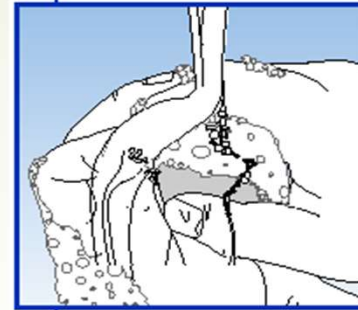
Step 1

Insert a lancet in the unit.



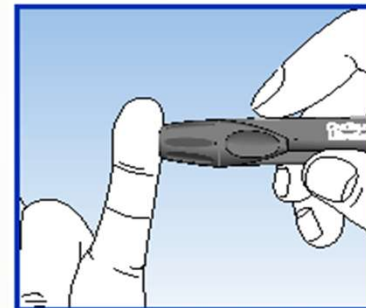
STEP 2

Wash Your Hands and the Puncture Site.
Use warm, soapy water. Rinse and dry thoroughly.



STEP 3

Select and Lance a Puncture Site on
fingertip.
Hold the Sampler firmly against the side of
finger. Press the release button.





Place drop of blood on the strip test.

A very small blood drop is all that is required to perform a test. Choose a different spot each time you test. Repeated punctures in the same spot may cause soreness and calluses.



USING A TEST STRIP

STEP 1

Insert the test strip, contact bars end first and facing up, into the test port. The bars must be all the way into the meter to avoid an inaccurate result. The meter will turn on automatically.

STEP 2


Apply Sample

Obtain a rounded drop of blood as directed.

Hold the blood drop to the TOP EDGE of the test strip .

STEP 3

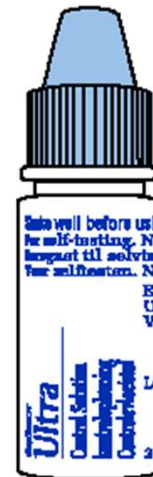
Obtain reading on meter and record.



NOTE: If you do not apply a blood sample within two minutes, the meter will turn itself off. You must remove the test strip and insert it back into the meter to restart the test procedure

Checking the Control Solution (follow manufacturer's instructions)

Control Solution is used to check that the meter and the test strips are working together as a system and that you are performing the test correctly. It is very important that you do this simple check routinely to make sure you get accurate results.





Do a control solution test:

- When you begin using a new vial of test strips.
- At least once a week.
- Whenever you suspect that the meter or test strips are not working properly.
- When your blood glucose test results are not consistent with how you feel, or when you think results are not accurate.
- If you drop the meter.

The control solution test is similar to a blood test except that you use Control Solution instead of a drop of blood.



If test results fall outside the range printed on the test strip vial, repeat the test.

Out-of-range results may be caused by one or more of the following:

- **Error in performing the test.**
- **Failure to shake the control solution vial vigorously.**
- **Expired or contaminated control solution.**
- **Control solution that is too warm or too cold.**
- **Failure to discard the first drop of control solution and wipe the dispenser tip clean.**
- **Improper coding of the meter.**
- **Test strip deterioration.**
- **Meter malfunction**

CAUTION: If you continue to get control solution test results that fall outside of the range printed on the vial, the system may not be working properly. Do Not use the system to test your blood if you continue to get test results that fall outside of the range.



Administering Insulin

Insulin medication helps control blood glucose levels but is not meant to replace a proper diet. There are three types of insulin available:


Rapid-acting: Onset is usually from ½-1 hour; peak effect is between 2-4 hours and lasts 6-8 hours. Examples of preparations are, Humulin R, Novolin R, Regular insulin.

Intermediate-acting: Onset is usually from 1-2 hours; peak effect is between 4/6-12 hours and lasts 18-26 hours.

Examples of preparations are, NPH Insulin, Humulin N, 30/70 insulin (which is a mixture of NPH and Regular insulin).

Long-acting: Onset is usually from 4-8 hours; peak effect is between 14-24 hours and lasts 28-36 hours. Examples of preparations are; Ultralente purified beef insulin, Protamine Zinc & Iletin

- The doctor may prescribe any of these types of insulin or a mixture of both.



Drawing up the prescribed insulin dosage to be administered

- 1. Primary staff checks insulin dosage prescribed on MAR, sliding scale and/or Health Care Plan
- 2. Primary staff drawing the insulin is responsible to have the dosage drawn checked by a second staff. If second staff is not available, OCN is texted a picture of the syringe/dosage drawn
- 3. Second staff is responsible to ensure the dosage of insulin drawn is accurate by checking the MAR, sliding scale and/or HCP. Once accuracy is confirmed both staff sign/co-sign on the MAR. If OCN is called to confirm dosage, primary staff will sign own initial/OCN on MAR
- 4. Medication error is deemed if:
 - A) primary staff fails to get dosage checked by second staff/OCN
 - B) primary staff fails to sign on MAR
 - C) second staff fails to co-sign the MAR
 - D) primary staff is also responsible if second staff fails to sign MAR



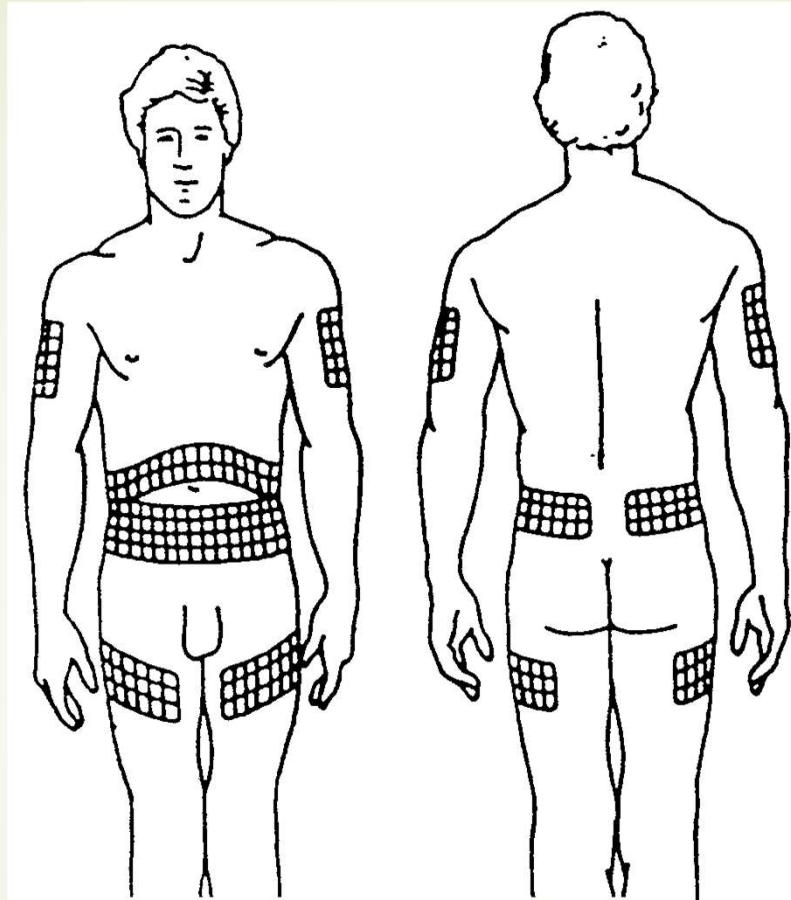
Insulin Injection Sites

Refer to the individual client's Health Care Plan for specific instructions on where to inject and how to rotate sites, but you may use the following as an appropriate guide:

- The outer part of both upper arms
- The right and left stomach, just above and below the waist (except about 2 inches around the naval)
- Your right and left back below the waist, just behind your hip bone
- The front and outsides of both thighs, from 4 inches below the top of your thigh to 4 inches above your knee
- Don't inject into the same spot or in spots where you can't easily grasp fatty tissue
- Inject into the same body area for 1 to 2 weeks, depending on the number of injections you need daily. For example if you need four injections a day, use one area for only about 5 days

*****Keep in mind that different parts of the body absorb insulin at different rates. The stomach absorbs insulin best, then the upper arm, and last the thighs.***

*****Don't inject into the same spot or in spots where you can't easily grasp fatty tissue.***



****Notify your nurse consultant if the injection site looks swollen or appears painful for the client**

