



# TYPE 2 DIABETES MANAGEMENT GUIDE FOR PHARMACY STAFF



With the support of the



WORLD **DIABETES** FOUNDATION



## What is Diabetes?

The World Health Organisation (WHO) defines diabetes as: A chronic metabolic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin that it produces. It is characterized by elevated levels of blood glucose.

The complications of undetected and untreated diabetes are serious and cause huge human suffering and possible disability. Diabetes is one of the leading causes of blindness, renal failure and lower limb amputation and it also triggers cardiovascular disease.

## Types of Diabetes

### Type 1 Diabetes

- Body does not produce enough insulin
- Cause Unknown
- Not preventable
- Affects people under 20 years of age
- Affects approximately 10% of diabetic patients

### Type 2 Diabetes

- Ineffective use of insulin by the body to regulate blood sugar.
- Largely the result of excess body weight and physical inactivity
- Most prevalent form of diabetes with approximately 90% of all diabetes cases being Type 2

### Gestational Diabetes

- Gestational diabetes is when blood glucose values are above normal during pregnancy. It is a temporary condition that occurs in pregnancy and carries long-term risk of Type 2 diabetes.

Patient Education & Counselling are important for the management of Diabetes. Pharmacists have a great role to play in patient counselling!

# Diabetes Risk Factors

Modifiable	Non-Modifiable
Overweight and obesity	Age >40 years
Unhealthy diet and Physical Inactivity	Family History- First degree relative with Diabetes
Alcohol Abuse & Tobacco Use	Previous Gestational Diabetes
Dyslipidaemia-abnormal amount of lipids (e.g. triglycerides, cholesterol and/or fat phospholipids) in the blood	Hypertension
	Ethnicity

Controlled Diabetes		Uncontrolled Diabetes	
Fasting Blood Glucose	< 6 mmol/L	Fasting Blood Glucose	> 8 mmol/L
2 Hour Post meal	< 8 mmol/L	2 Hour Post meal	> 10 mmol/L
HbA 1C	< 7 %	HbA 1C	> 8 %

## Symptoms of Type 2 Diabetes

- Blurred vision
- Frequent urination (Polyuria)
- Increased hunger
- Increased thirst (Polydipsia)
- Weight loss
- Susceptibility to infections e.g. genitourinary infections
- Foot ulcers
- Fatigue
- Tingling or numbness in hands and feet.
- Slow healing wounds

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# Diabetes Complications

## Chronic Complications

Poor glucose control is associated with increased risk

### Microvascular

#### Retinopathy and blindness

After 15 years:

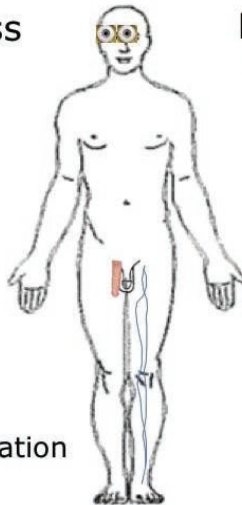
- ~40% develop retinopathy
- 2% become blind

#### Erectile dysfunction

- Up to 75% of male patients

#### Diabetic foot disease

- 15-40 times more likely to require lower limb amputation



#### Kidney disease (nephropathy)

- Up to ~1/3 of patients

#### Neuropathy

- Up to 50% of patients

IDF Diabetes Atlas 5<sup>th</sup> Ed. 2011

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# Chronic Complications

Poor glucose control is associated with increased risk

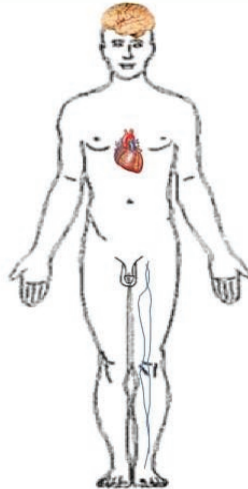
## Macrovascular

### Stroke

- Occur twice as often

### Coronary heart disease

- 2-4 times more likely



### Peripheral vascular disease

- ~1/3 of patients

IDF Diabetes Atlas 5<sup>th</sup> Ed. 2011

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A woman with long braids is shown in profile, drinking water from a clear plastic bottle. She is wearing a white t-shirt and a green backpack. The background is a bright, hazy sunset over a landscape. The overall mood is healthy and active.

## Type 2 Diabetes Treatment

Diet and Exercise are the mainstay in the treatment of Type 2 Diabetes. This should be tried first in all patients except those with very high glucose levels and those who are severely symptomatic.

Those who fail to respond to diet and exercise can then move on to taking medicine.

Oral Anti-diabetic medicines are used in management of Type 2 Diabetes.

Therapy should be combined with lifestyle changes e.g. diet, exercise and cessation of smoking.

If it is not possible to manage the condition with orals, insulin may be used.

Oral anti-diabetics must not be used in pregnancy.

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## Oral Anti-Diabetics- (Adapted from the Zimbabwe EDLIZ 2015)

EDLIZ 2015

• *Do not use metformin if renal failure, severe heart failure or liver failure (increased risk of lactic acidosis)*

### Obese Type 2 diabetic:

	Medicine	Codes	Adult dose	Frequency	Duration
	<b>metformin po</b>	<b>B V</b>	500mg to 1000mg [max 2g/ day]	2 times a day	gradual increase
▪	if poorly controlled with strict adherence to diet, <b>add:</b>				
	Medicine	Codes	Adult dose	Frequency	Duration
add	<b>glibenclamide po</b>	<b>B V</b>	5mg-10mg	Once to twice a day	-
or	<b>Gliclazide po</b>	<b>B E</b>	80-160	Once to twice daily	

**\*if poorly controlled despite diet: change to insulin or add a daily dose of intermediate acting insulin to the oral hypoglycaemics. Please discontinue sulphonylureas (glibenclamide and gliclazide) before adding insulin.**

## Oral Anti-Diabetics Cont.- (Adapted from the Zimbabwe EDLIZ 2015)

### Normal weight Type 2 diabetes:

Medicine	Codes	Adult dose	Frequency	Duration
metformin po	B V	500-850mg	2-3 times a days	indefinitely
glibenclamide po	B V	2.5mg	once to twice a day	Indefinitely
increase to a max of 10mg twice a day				

- if poorly controlled despite diet and oral hypoglycaemics, **change to insulin or add insulin to current therapy.**

### Blood pressure control:

- Good BP control is essential and is more effective at preventing complications than good glycaemic control. Use combinations of medicines, preferably including an ACEI, target BP <140/80

### Aspirin and diabetes

- To all diabetics with hypertension and any with documented vascular disease, add:

Medicine	Codes	Adult dose	Frequency	Duration
Aspirin po	C E	75mg	Once a day	

For those that are allergic to Aspirin or have an intolerance:

Medicine	Codes	Adult dose	Frequency	Duration
Clopidogrel po	B E	75mg	Once a day	



## Insulin

Many Type 2 Diabetes patients in whom oral diabetes medicines are ineffective will eventually need to be on insulin. 40% of Type 2 diabetes patients will eventually require insulin treatment. Weight reduction is crucial.

## Action of Insulin

- It stimulates the absorption of glucose into the muscle.
- It stimulates the storage of glucose in the liver as glycogen.
- Storage of glucose in the fat tissue as triglycerides.
- Storage of amino acids in the muscle as proteins.
- Insulin may be used alone or added on if the combination of sulphonylurea and biguanide fails to achieve adequate control of blood sugar.
- It is important to note that variability in absorption within the same individual and between two individuals can happen.
- Insulin doses should be calculated and determined on an individual patient basis, gradually increasing the dosage until the patient stabilises.
- Care should be taken not to cause hypoglycaemia.
- If diabetes control is poor on diet, exercise and oral drugs, starting insulin should not be delayed.
- Withdrawal of oral (sulphonylureas & biguanides) drugs should be commenced only after the insulin therapy has been initiated. In some patients, metformin and insulin combination can be given.

## How to Administer Insulin

- The injection sites most commonly used are the abdomen, the thigh, and the buttock.
- The upper arm though difficult to access is also a suitable injection site
- The rate of absorption is fastest on the abdomen.
- The thigh should be avoided as an injection site when exercise is going to be done as this will increase the rate of absorption of the insulin.
- One area should be used for an injection at a particular time of day, e.g. if the abdomen is the site for the morning injection, and the thigh should be the site for the evening injection.
- Within these areas, the injection site is to be alternated to avoid formation of a hard scar( seen as a lump)

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## Types of Insulin-Adapted From Zimbabwe EDLIZ 2015

Type of Insulin (Table adapted from (www.uptodate.com))

	Insulin type	Onset	Peak activity (hrs)	Duration (hrs)	Type of insulin e.g
Bolus Insulin (Rapid and Short acting insulins)	Rapid Acting	5-15 min	1-1.5	2-4	Aspat, Lispro Glulisine
	Short Acting	30 mins	2 - 4	5-8	Actrapid
Basal Insulin (Intermediate and long-acting insulins)	Isophane Insulin	2-4 hrs	4 - 12	12-24	Protaphane
	Human Insulin Analogue	2 hrs	3 - 9	6-24	Detemir
	Human Insulin Analogue		None	20-24	Glargine
	Biphasic		2-12	+ 24	Soluble (30%)/ Isophane (70%) e.g. Actraphane



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# Insulin Storage

Why is it important to store insulin under required temperature conditions?

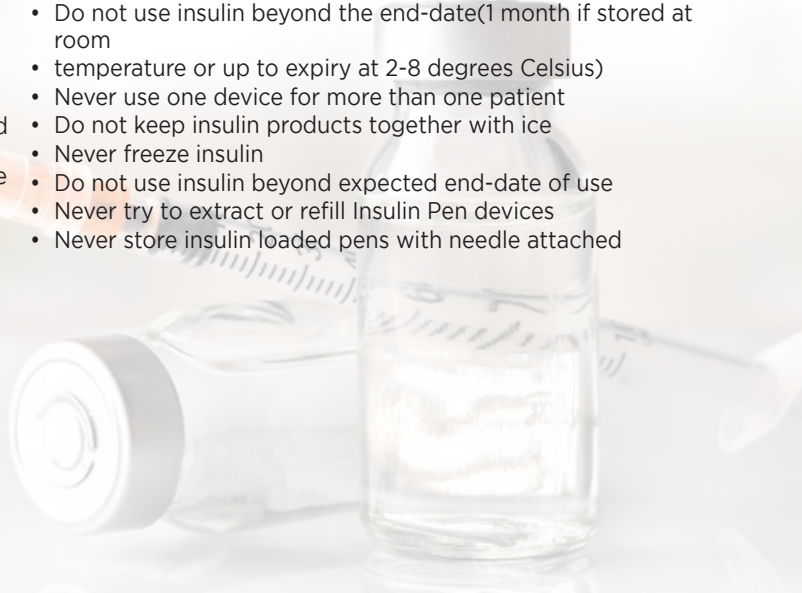
- To ensure fitness for use by patient
- To ensure stability of insulin
- To avoid denaturing or spoiling of the insulin
- For effective control of blood glucose levels

## Do's

- Safeguard the quality and efficacy of insulin during handling and storage
- Protect Insulin Products from rain or possible precipitation while in the refrigerator
- Protect Insulin from direct sunlight or intense artificial light
- When stored under room temperature, may be used for up to 1 month
- Should be stored under refrigeration, temperature ranging 2-8 degrees Celsius
- Fridge / Cold Room Temperatures should be monitored and recorded twice daily
- Strictly adhere to handling and storage requirements on the package label
- Product Storage should facilitate First to Expire, First Out (FEFO)
- Expired and products unfit for sale to be isolated in an identified area.
- Indicate the start date and the expected end-date of using up the insulin pack
- Observe caution when discarding any unused insulin at the end-date
- Carry insulin in pen with you under room temperature conditions
- Keep insulin in a cooler box or vacuum flask during transportation
- Practice correct patient counselling to safeguard the potency and effectiveness of insulin at home

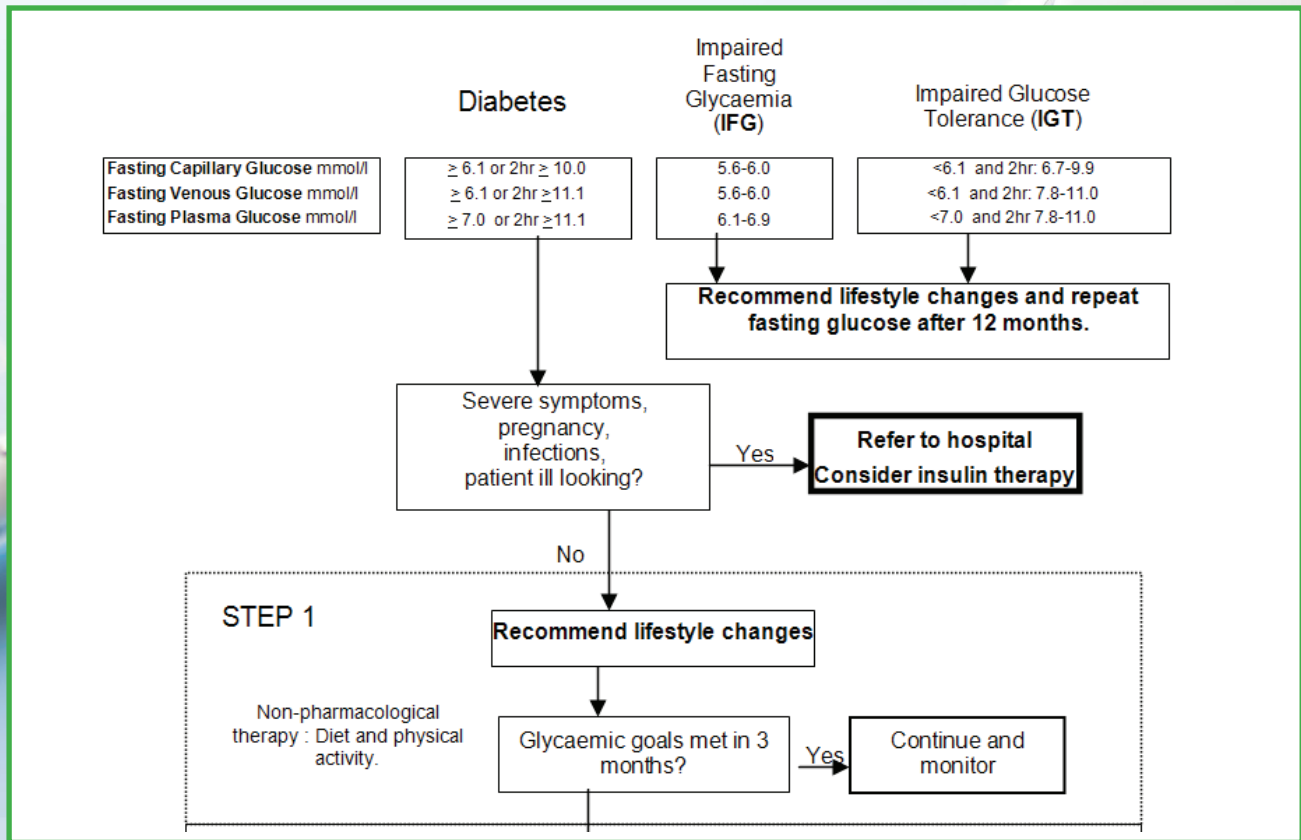
## Don'ts

- Do not place insulin in freezer or fridge door component
- Do not expose insulin to heat / direct sunlight
- Do not carry insulin with you if outdoors for a prolonged period
- Do not use insulin beyond the end-date(1 month if stored at room temperature or up to expiry at 2-8 degrees Celsius)
- Never use one device for more than one patient
- Do not keep insulin products together with ice
- Never freeze insulin
- Do not use insulin beyond expected end-date of use
- Never try to extract or refill Insulin Pen devices
- Never store insulin loaded pens with needle attached



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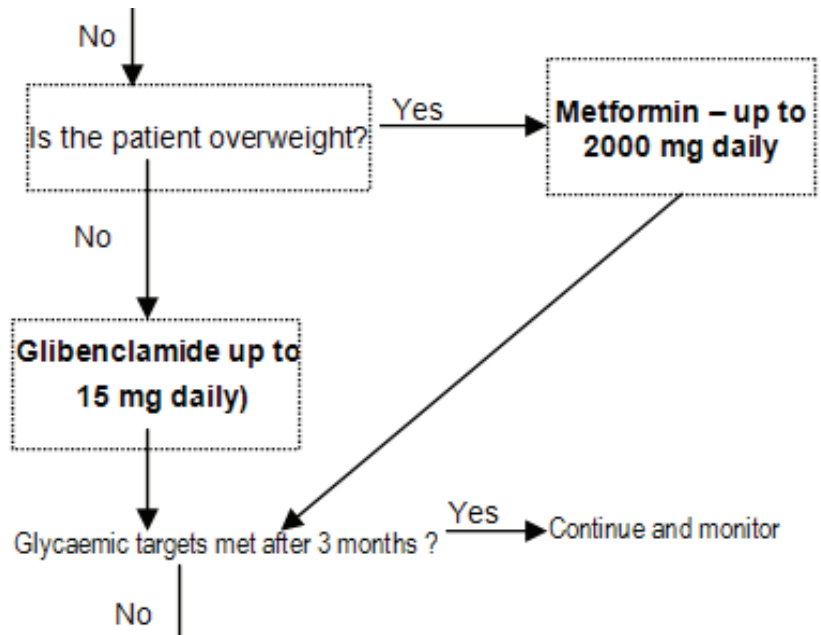
# Zimbabwe Diabetes Guidelines- Adapted from Zimbabwe 7th Essential Medicines List and Standard Treatment Guidelines for Zimbabwe (EDLIZ 2015)



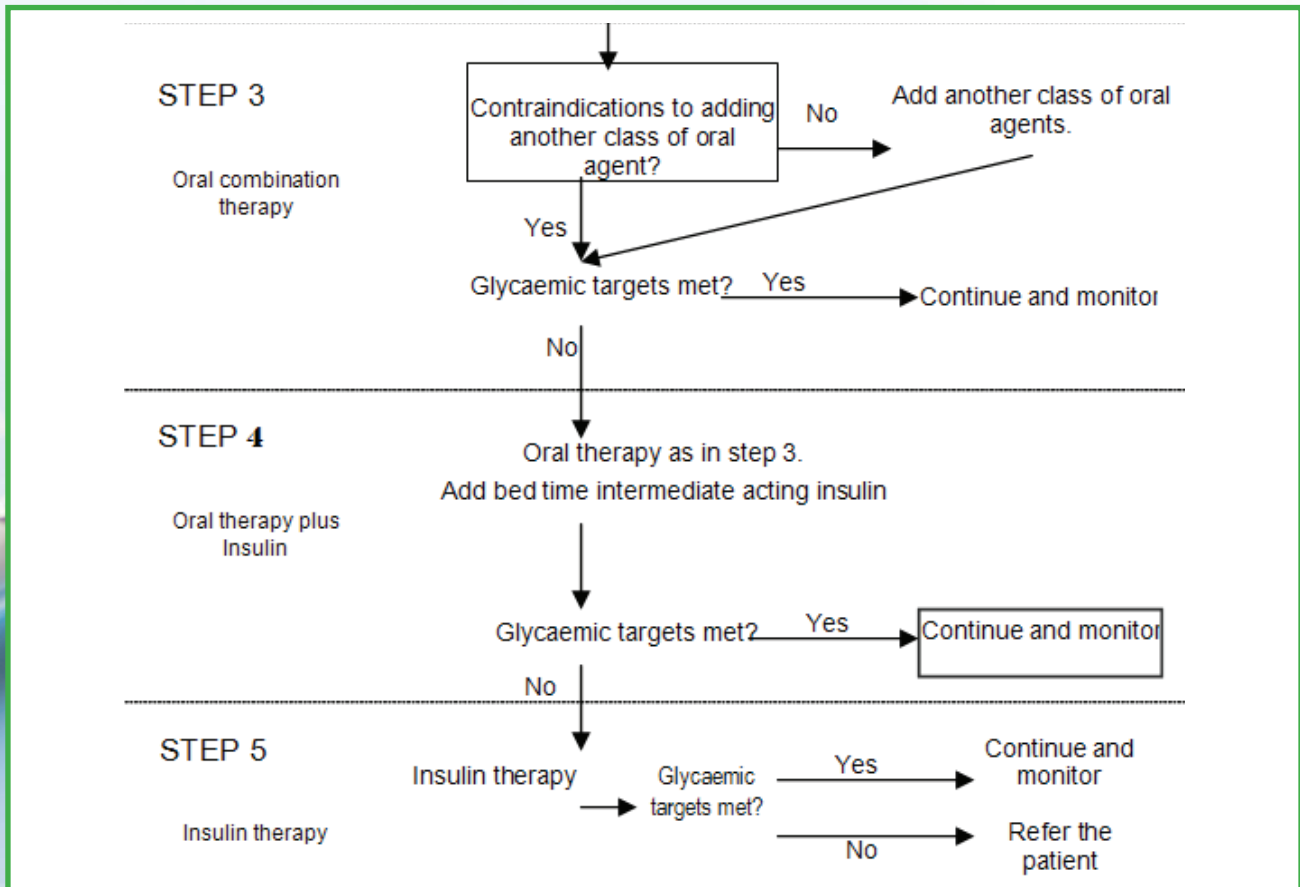
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## STEP 2

Pharmacological therapy



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# Diet



## Role of Diet in Diabetes Management.

- People living with diabetes suffer from impaired insulin production and/or action, they need to pay special attention to their diets to maintain a stable blood glucose level and prevent diabetes complications.
- Diet should be individualized, based on traditional eating patterns, be palatable and affordable

## What to do?

- Eat at regular intervals and not skip meals (Have three balanced main meals every day)
- Caloric restrictions should be moderate yet provide a balanced nutrition
- Planning meals - choosing what, how much, and when to eat is important (Where practical consult a nutritionist/dietician)

## What sort of food is good?

- Whole grains cereals
- Increase fiber intake (fresh fruit and vegetables are the best sources)
- Use sugar and fats sparingly
- Limit the salt intake
- Prepare most foods e.g. meats, chicken without fat. Grilling, boiling, steaming, and baking are the best cooking methods
- Drink clean and safe water (8 glasses per day)
- Snack smart – avoid junk foods e.g. squashes and sodas, chips, crisps, chocolates etc

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## Exercise

- Regular physical activity is beneficial in the management of type 2 diabetes
- A detailed physical evaluation of cardiovascular, renal, eye and foot status (including neurological) should be performed before starting an exercise programme as the presence of chronic complications may preclude certain forms of exercises. While exercise generally improves metabolic control, it can also precipitate acute complications like hypoglycaemia and hyperglycaemia.

### What to do?

- Be physically active
- Do anything you enjoy like Skipping, Brisk Walking, Running, Digging, Housework
- Drink enough fluids during and after exercises.
- Wear proper footwear for comfort and to avoid injuries to your feet.
- Avoid exercising in extreme temperatures (heat or cold).
- Inspect your feet after exercises

### Benefits

- Exercise Improves the functioning of the heart
- Reduces the risk of developing hypertension and high cholesterol in the blood.
- Contributes to the flexibility, endurance, and muscle strength.
- Improves glucose control in diabetes.
- Increases insulin sensitivity and thus reduces the total dose required over a period of time.
- In addition to meal planning, exercise helps in maintaining a healthy body weight
- Gives the individual a sense of well being and a better quality of life.

### How often?

- The physical activity should be regular -Aim for 20-30 minutes per day at least 3 times a week
- Start slowly 5 to 10 minutes at a time and increase the intensity and duration of your exercises slowly



GLUCOSE MONITORING



INSULIN INJECTION



SPORT AND FITNESS



HEALTHY FOOD

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## *Lifestyle Changes*

- Avoid Smoking & Alcohol
- Avoid excess weight gain
- Check blood glucose regularly
- Take medications, as doctor prescribes
- Strictly follow medical advice
- Check your blood pressure and cholesterol levels regularly
- Carry glucose tablets / drinks in case of hypoglycemia (low blood glucose)
- Wear well-fitted, comfortable shoes or trainers
- Avoid extreme heat and do not put your feet near open fire
- Always keep feet clean and dry especially between toes
- Check and inspect feet regularly
- Never cut or use sharp objects on your feet
- Avoid walking barefoot
- Avoid wearing long boots, high heels and tight socks

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# How to manage Acute Symptoms of Diabetes Hypoglycemia and Hyperglycemia

## Hyperglycemia (High Blood Sugar)

Symptoms	How to Avoid Hyperglycemia
<ul style="list-style-type: none"><li>• Extreme Thirst</li><li>• Extreme Hunger</li><li>• Urine Frequency</li><li>• Blurred Vision</li><li>• Dizziness</li><li>• Loss of Weight</li><li>• Stress</li></ul>	<ul style="list-style-type: none"><li>• Follow qualified healthcare giver's advice on dose of medication, nutrition and exercise</li><li>• Skipping of medication dose is not recommended</li><li>• Eat food in the appropriate carbohydrate, protein and vitamin portions advised by healthcare giver</li><li>• Inform the healthcare giver of other medicines or supplements in use together with diabetes medication</li><li>• Sugary and sugar-based foods are not recommended</li></ul>

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## Tips for Avoiding Hypoglycemia and Hyperglycemia

- Measure your blood sugar regularly
- Learn to identify one's symptoms during low and high blood sugar levels
- Follow a regular diet, exercise and medication routine as advised by healthcare giver

### Hypoglycemia (Low Blood Sugar)

#### Manifests in 3 Stages

- Early Phase: Irritability, loss of concentration, hunger, headache, dizziness
- Mild Phase: Palpitation, Sweating, shaking, tingling sensation around the mouth.
- Late Phase: Coma/  
unconsciousness

#### How to Avoid Hyperglycemia

- Strictly follow qualified healthcare giver's advice on dose of medication, nutrition and exercise
- Follow meal and snack times consistently
- When traveling or outdoors, always carry snacks as recommended by caregiver
- Eat food in the appropriate carbohydrate, protein and vitamin portions advised by healthcare giver
- Inform the healthcare giver if other medicines or supplements are in use together with diabetes medication
- Snacks recommended before exercise

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## Good Pharmacy Practice

### Have you checked completeness and correctness of the prescription? Check for:

- Physician Details
- Patient Details
- Name of Product
- Dosage form
- Strength/Potency
- Total amount to be dispensed
- Frequency & dosage
- Direction for use

### Have you told the patient this?

- What the medicine is for?
- At what times to take each medicine and quantity?
- Before or after food?
- Specific precautions to be taken with certain medicines
- Side Effects to expect
- Storage Conditions

### Patient Counseling Checklist

	Patient Told	
	Yes	No
Dietary Habits		
Physical Activity & Weight Loss		
Avoidance of Smoking & Alcohol		
Strict adherence to medication dose and medical advice		
Insulin Storage Conditions		

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