



## First Responder Accreditation

### Blood glucose measurement

This resource has been developed to support you in completing your First Responder Accreditation.

### Acknowledgements

St John Ambulance Australia would like to thank Darryl Clare and Alison Reardon for their contribution to this topic.

## Contents

Introduction .....	3
Definition .....	3
The production and function of insulin.....	3
Blood Sugar .....	3
Hypoglycaemia (low blood sugar) .....	4
Hyperglycaemia (high blood sugar) .....	5
When does it occur? .....	5
Signs & Symptoms:.....	5
Management of a conscious patient .....	5
Management of an unconscious patient .....	5
Measuring blood glucose level.....	6
When do we measure blood sugar levels?.....	6
What to do with the reading .....	7

## Introduction

Blood glucose measurement is the reading of sugar levels in a person's blood. This is particularly important for diabetic patients. This module is designed to give you a greater understanding about diabetes and how to measure and interpret blood glucose readings.

### Definition

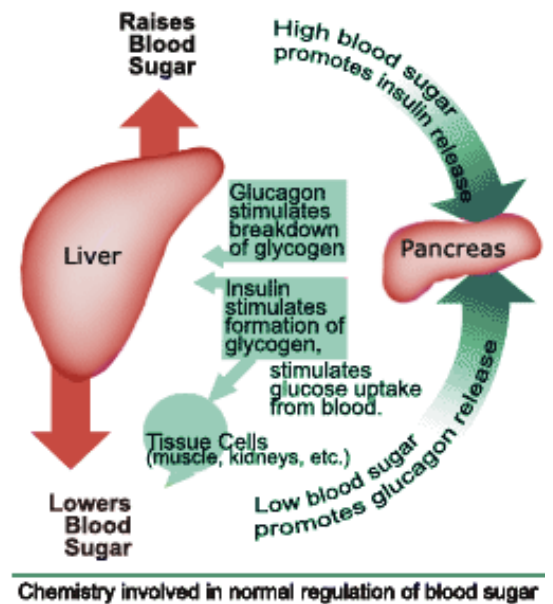
A medical condition where there is a lack of insulin available for use by the body.

### The production and function of insulin

- Insulin is a hormone produced by the pancreas
- It regulates the amount of glucose in the blood stream
- Insulin is required to allow for movement of glucose from the blood stream into the cell
- Without adequate amounts of insulin, the cell cannot access its normal fuel supply (glucose)

### Blood Sugar

- The blood glucose level is the amount of glucose (sugar) present in the blood.
- Normal levels are between 4 and 7 mmol/L (i.e. millimoles/litre)
- Blood sugar levels outside the normal range may be an indicator of a medical condition.
- A persistently high level is referred to as hyperglycaemia and low levels are referred to as hypoglycaemia.



## Types of emergencies

### Hypoglycaemia (low blood sugar)

#### When does it occur?

- Too much insulin
- Inadequate food intake
- Excessive exercise
- Blood glucose level (BGL)  $\leq$  4 mmol/L
- Illness or infection

Be aware of the patient who might appear “drunk”. Hypoglycaemia will lead to coma and irreversible brain damage if left untreated.

#### Signs & Symptoms:

- Rapid onset (within minutes)
- Patient has pale skin and a rapid pulse
- Patient is sweating profusely
- Patient appears confused or aggressive
- Unconscious
- Pulse, respirations and blood pressure are unremarkable

#### Management of a conscious patient

1. DRSABCD
2. Administer sweet drinks **or**  
Administer sugar gel and repeat after 15 minutes if required
3. Call an ambulance if not improving after 30 minutes or patient gets worse
4. Consider oxygen administration, treat other conditions if present (hypo/hyperthermia)
5. Monitor vital signs regularly
6. Document on patient record

#### Management of an unconscious patient

1. DRSABCD
2. Recovery position
3. Call for an ambulance
4. Nil by mouth
5. Monitor vital signs regularly
6. Document management on a patient record

# Hyperglycaemia (high blood sugar)

## When does it occur?

- Blood glucose level > 8mmol/L
- Patient forgetting to take insulin

## Signs & Symptoms:

- Slow onset (hours to days)
- Excessive thirst (polydipsia)
- Excessive urine output (polyuria)
- Dry skin
- Rapid, weak pulse
- Rapid, deep respirations
- Breath smells of acetone
- Restless and/or drowsy behaviour

High sugar levels can often lead to dehydration as the body tries to dilute the sugar level in the blood. Water is drawn from the body into the blood stream

## Management of a conscious patient

1. Allow patient to self-administer insulin
2. Give sugar free liquids to drink if help delayed
3. Oxygen therapy ( if needed)
4. Call 000 if BGL is > 17 and person compromised
5. Monitor vital signs & BGL regularly
6. Document on patient record

*No first aiders no matter what level are to administer insulin but can assist if required (patient must know the dose and inform first aider).*

## Management of an unconscious patient

1. DRSABCD
2. Place the patient in the recovery position
3. Call an ambulance
4. Nil by mouth (do not give the patient any food)
5. Monitor vital signs regularly
6. Document management on a patient record

## Measuring blood glucose level

Measuring blood glucose levels can be done at any time using a portable device called a glucometer.

When do we measure blood sugar levels?

When medically indicated, for example:

- The patient is unconscious
- You know the patient is diabetic
- The patient has heat related injuries (heat stroke and exhaustion)
- The patient is severely fatigued or drowsy

**Note:** you will need to find out what type of glucometer you will be using and ask your mentor/divisional trainer to show you how to use it.

*The following information is a guide only.*

Before using the glucometer you will need to ensure that it is calibrated for the electrodes that you will be using. Majority of machines require you to use a calibration stick, this is done by inserting the stick where you would normally insert the electrodes.

### Safety

- Always protect yourself and wear gloves
- Place all sharps straight into the bin
- Be careful not to splash or flick the blood
- Use only allocated lancets

### Taking blood sugar level

1. Prepare all your equipment
  - Blood sugar monitor
  - Blood sugar strip
  - Lancet
  - Adhesive strips
  - Alcohol wipe
  - Sharps bin
  - Gauze swab
  - Gloves



2. Choosing the site:
  - The pad at the end of a finger contains many nerve endings so puncturing the tip can be very painful for the patient
  - Ensure fingers are warm
  - Select a finger and aim at the side edge
  - Clean the side of the finger with a water wipe or saline, then let it dry
3. Using the lancet (*check how your lancets work*)
  - Select the needle depth on the side of the lancet
  - Twist the purple end to select
  - Remove the safety pin on the lancet, twist and pull to remove.
  - Hold the lancet at the side of the finger
  - Depress the lancet
  - Place into the sharps bin



4. Collecting the Sample
  - Encourage the finger to bleed by lowering the tip of the finger down
  - Do not squeeze the finger
  - Place the strip against the side of the finger, the strip will draw up the blood
  - Be careful not to flick the strip containing blood as it may splash
5. Post collection procedures
  - Ask the patient to apply pressure with gauze
  - Apply an adhesive strip
  - Record result on the patient record



## What to do with the reading

Reading	Action
Over 7.5 mmol/L	Refer to their GP
Over 15 mmol/L	Seek urgent medical aid
Below 4 mmol/L conscious	Give sugar to eat/drink
Below 4 mmol/L alter conscious state	Consider glucagon and refer to urgent medical aid