

Biomedical Monitoring: Clinical Protocol and Procedure Summary

Blood pressure

Blood pressure readings are taken using a calibrated blood pressure sphygmomanometer. Blood pressure is the force pushing blood through the blood vessels.

It is recorded as the **systolic blood pressure**, the pressure when the heart is contracting, and **diastolic pressure**, the pressure when the heart is relaxed.

- > High blood pressure (hypertension) is defined as systolic blood pressure greater than or equal to 140mmHg and/or diastolic blood pressure greater than or equal to 90 mmHg¹.
- > It is necessary to measure and record the upper arm circumference in cm to determine the appropriate cuff size.
- > After the person has been rested for five minutes, two blood pressure measurements are taken five to ten minutes apart while the participant remains relaxed and seated or laid down. During this time, the clinician has the opportunity to talk with the person about relevant aspects of their care or their concerns.
- > It will be necessary to record two readings to obtain a mean blood pressure reading.
- > If completing a lying and standing blood pressure reading three readings are to be taken
 - The first after the person has been seated or laid down for five minutes
 - The second within the first minute of the person standing up
 - The third reading after the person has been stood for three minutes.
- > A positive result is:
 - A drop in systolic BP of 20mmHg or more with or without symptoms
 - A drop below 90mmHg on standing even if the drop is less than 20 mmHg, with or without symptoms
 - A drop in diastolic BP of 10mmHg with symptoms (less clinically significant)

Height measurements

Participants will have their standing height recorded using a wall mounted stadiometer where possible or a hard tape measure.

1. Participants will where possible remove their shoes, sunglasses and any hair accessories. Clinicians should ask the person to stand in an upright position, with their head facing forward with a level gaze and heels back against the base.
2. The top plate of the height measure (or ruler if using a hard tape measure) is brought down to rest on the head (not just sitting on top of the hair). Where there is a curvature of the spine, resulting in stooped posture, the position is as described but an extension to the top plate outwards to allow for the non-contact of the plate with the head.
3. Height is a single measure recorded in metres (m) to the nearest 0.5 centimetre.



Weight measurement

Body weight will be recorded on calibrated scales.

1. Check that the scales are reset to zero before use.
2. Participants will remove shoes and any heavy garments (e.g. keys) before stepping onto the scales.
3. Body weight will be measured and recorded by a single reading in kilograms (kg) to the nearest 0.1 kilogram.
4. Where possible scales should have a 200 – 250kg limit. If the person is heavier than the clinic scales, alternative scales will need to be sourced.

Body Mass Index (BMI)

Body mass index (BMI) is calculated from your weight and height using the formula: weight (kg) divided by height² (m²).

On a calculator this can be obtained by weight in kg, divided by height in meters, divided by height in meters.

$$\text{BMI} = W(\text{kg}) \div H(\text{m}) \div H(\text{m})$$

The criteria for classifying BMI are as follows:

- > <18.5 = underweight
- > 18.5 – 25 = healthy weight range
- > 25 – 30 = overweight
- > 30 – 35 = obese stage 1
- > 35 - 39.9 = obesity stage 2
- > 40+ = obesity stage 3 (morbid obesity)

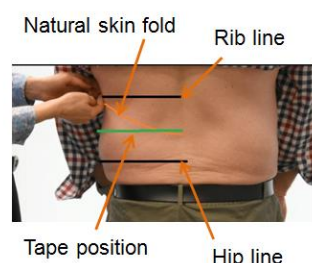
BMI is a guide only. Identifying the BMI provides opportunity for targeted education and intervention.

Waist measurement

Three measurements of the waist are taken with the mean recorded in centimetres (cm) using an inelastic tape, maintained in a horizontal plane, to the nearest 0.1 centimetre.

Waist circumference – 3 methods

1. Have the consumer locate the top of their hip bones and the bottom of their ribs – the waist is centre of these two points.
2. Place hand midway between the persons hips and ribs get the person to bend to squeeze the hand, maintaining the hand position get the person to stand up. The hand should be locating the waist.
3. Follow the natural crease of the skin that starts at the ribs beneath the armpit and goes around the body to the mid-point in the back. Placing the tape measure horizontal from this point locates the midpoint between the hips and ribs.



Staff members should ensure that the measuring tape is even, firm but never tight and that clothing is not interfering with the measurement.

There is an indication of android obesity, if the waist measurement is greater than:

- > ≥ 94 cm male or ≥ 80 cm female for European/North America/ Middle East/ Mediterranean and Sub-Saharan African
- > ≥ 90 cm male or ≥ 80 cm female for South Asian / South-East Asian / Central and South American
- > Values of 102cm Male and 88cm Female are used for clinical purposes in the USA

An android or centralised pattern of fat distribution, where excess body fat is distributed in the abdominal region rather than on the hips and thighs, plays an important role in determining risk of cardiovascular disease and diabetes, particularly in men.

ⁱ National Heart Foundation of Australia. *Risk Factor Prevalence Study*. Survey No 3, 1989.

For more information

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