PICSA

# CLINICAL PRACTICE GUIDELINES
# Adult & Paediatric Ambulatory Blood Pressure Monitoring

**PiCSA would like to acknowledge the work performed by QLD Department of Health in the development of the original Guideline from which this document has been adapted and modified**

## 1. Purpose

This Guideline provides recommendations regarding best practice to support high quality ambulatory blood pressure monitoring (ABPM) throughout Queensland public health facilities.

## 2. Scope

This guideline provides information for all health practitioners who perform ABPM as part of their clinical duties.
Staff at central facilities will utilise this guideline in its entirety, whereas staff in regional areas will be constrained by local technical capability and should use elements of this guideline and processes, developed in consultation with the central receiving facility.
These guidelines do not relate to in-home devices such as automated blood pressure monitoring systems.
This guideline provides the minimum requirements to ensure consistency of service provision and quality control.
These guidelines encompass validated[1] devices that have met criteria for TGA approval by Clinical Resources and been safety tested by the Biomedical Technology Services at the Hospital and Health Service.
The following relates to ABPM devices that use the arterial pressures of the arm such as auscultation and cuff oscillometry.

## 3. Related documents

**Authorising Policy and Standard/s:**

• Nil

**Procedures, Guidelines, Protocols**

• Queensland Health Guide to Informed Decision-making in Healthcare 2
• Australian Guidelines for the prevention and control of infection in healthcare (CD33:2010) 3

**Forms and templates**

• Nil

## 4. Guideline for performing adult ambulatory blood pressure monitoring (ABPM)

### 4.1. Emergency Protocol

• Follow relevant Hospital and Health Service protocols or procedures in the event of an emergency.

### 4.2. Infection Control Procedures

• Australian Guidelines for the prevention and control of infection in healthcare (CD33:2010) [3]

### 4.3. Gaining Consent

• Gain consent using the Queensland Health Informed Decision-making in Healthcare document [2].
• Offer the patient an option of who performs the test if gender preference is considered an issue, or requested by the patient.
Implied consent is obtained (and adequate) if the following has occurred:
• the medical officer has discussed the need for the procedure with the patient
• the written letter of appointment outlines the procedure to be performed
• the patient self presents for treatment and after an explanation has been given by the scientist, agrees to undergo the procedure.

### 4.4. Identifying Indications and Contraindications for performing ABPM

ABPM's are intended for use as an aid or adjunct to diagnosis and treatment.
*Indications for performing ABPM* [4-7]
ABPM has a variety of uses, including:
• excluding "white coat" hypertension in patients with newly discovered hypertension with no evidence of end-organ damage
• borderline or labile hypertension
• assisting with blood pressure management in patients whose blood pressure is apparently poorly controlled, despite using appropriate antihypertensive therapy
• worsening end-organ damage, despite adequate blood pressure control on office blood pressure measurements
• hypotensive symptoms while taking antihypertensive medications
• assessing adequacy of blood pressure control over 24 hours in patients at particularly high risk of cardiovascular events, in whom rigorous control of blood pressure is essential (e.g. diabetes, past stroke)
• deciding on treatment for elderly patients with hypertension
• suspected syncope or orthostatic hypotension
• symptoms or evidence of episodic hypertension

• suspected masked hypertension
• hypertension in pregnancy
• autonomic dysfunction
• non-dipper status or nocturnal hypertension
• suspected or confirmed sleep apnoea.

*Contraindications* [6, 8]

• ABPM is not recommended for the evaluation of patients with uncomplicated hypertension or to screen for hypertension.
• Oscillometric monitoring should be avoided in patients with non-compressible arteries, as this can produce pseudo hypertension.

## 4.5. Facilities and equipment

*Standard Equipment*

• computer with hardware and software suitable to analyse data obtained from the ABPM
• data obtained from the ABPM is subject to the organisation's local health information management policies and laws applicable to the organisation[9, 10]
• serial interface data cable
• ABPM software
• ambulatory blood pressure monitor calibrated as per manufactures instructions [11 12]
• pressure cuff, various sizes and shapes [7]
• cuff anchor pad (ECG electrodes) to secure cuff
• batteries as per manufacture instructions
• permanent marker to mark brachial artery
• pouch with shoulder strap or belt
• manual blood pressure device such as the cuff/stethoscope auscultation
• patient information and diary sheet (See appendix 3 for an example diary sheet).

*Equipment Preparation*

• Ensure the room is clean and tidy, with the appropriate equipment and patient furniture.
• Ensure the room meets Workplace Health and Safety Standards.
• Ensure all ABPM equipment is present and ready to use.
• Initialise the monitor with patient details and program the monitor with specific parameters based on the referring physicians' clinical indication for performing the test.
• Inflation frequency should be set between 15-30 minutes during daytime, 15-60 minutes nocturnally[13].
• Before calling the patient into the room ensure to wash your hands as per the Queensland Health hand washing guidelines.

## 4.6. Training requirements

• Training in basic life support and cardiopulmonary resuscitation as per the relevant Hospital and Health Service protocols and procedures.
• Ensure a suitably qualified medical officer reviews the results and approves the generated report.

## 4.7. Test Procedure

4.7.1. Preparing the monitor and verification of proper function
• Verify proper function: ensure the monitor is on and perform at least one ABPM reading.
• Ensure consistency of BP measurements: compare the average values of the ABPM to the manual device and the readings should not differ by more than +/- 5mmHg [5].
• If these measurements differ, perform a maintenance check consisting of: inspecting the monitor, battery check, hoses/connections and cuff for any signs of damage.
• Device calibration may need to be performed according to manufacturer instructions.
4.7.2. Patient Preparation
Cuff selection for manual BP measurement and ABPM:
• Proper cuff size selection is critical to accurate measurement. Follow manufacturer's specifications for cuff size selection.
• Fit the cuff securely to manufacturer's specifications with the arterial marker aligned with the brachial artery[14].
• Measure the blood pressure in both arms. If the systolic blood pressure differs by greater than 10mmHg the arm with the higher pressure should be used [6].
Record baseline blood pressure using a manual sphygmomanometer
• Allow the patient to be quiet and comfortably seated for at least five minutes[4] before performing a blood pressure reading. Ensure their back and arms are supported, legs are uncrossed and upper arms are at the level of the right atrium
• Blood pressure measurement in a recumbent (supine) position is acceptable also. The diastolic blood pressure can be about 5mmHg higher in the sitting position [8].
• Obtain three blood pressure measurements, performed at least one minute apart [4, 5, 7,14].
4.7.3. ABPM fitting
• Use a permanent marker to mark the brachial artery position on the patient's non-dominant arm with a cross.
• Some ABPM cuffs come with an anchor strap attached to the cuff. If the cuff to be used has an anchor strap then secure the anchor strap to the patients arm using an ECG electrode.
• Connect the hoses from the cuff to the monitor.
• Position the hose comfortably on the patient ensuring the hose is not kinked. Drape the hose over the patient's shoulders, across the back of the neck and over to the contralateral side of the body. See figure 1.
• Put monitor into its pouch. Attach the pouch to the patient using a shoulder strap or belt.

Figure 1. Taken from American Family Physician (2003)[15]

4.7.4. Patient instructions and information
• Give the patient an appropriate information and diary sheet. (See appendix 3 for an example diary sheet)
Provide a verbal explanation of this information which includes:
• monitor operation – inflation frequency, repeat attempts for readings starting/stopping a measurement
• avoiding movement during cuff inflation – the patient should let the cuffed arm hang loose, no flexing of the elbow or moving the hand and fingers
• cuff position - the arterial marker on the cuff should align with the brachial artery indicator (drawn cross)
• monitor care – avoid getting the monitor wet (ensure the patient is instructed to avoid having a shower/bath whilst wearing the monitor), avoid twisting/kinking hose, avoid powders/other substances, do not drop monitor
• how to remove the cuff and put the cuff back on correctly
• turning the monitor off – if the monitor causes extreme pain or the patient wishes to discontinue the test, they may turn off the monitor and remove the cuff
• filling out the patient diary with the time, and brief summary of activities performed during cuff inflations as well as retiring and waking times
• a contact phone number provided for problems or queries.
4.7.5. Data retrieval and reporting
• Refer to device instructions to download the data.
• Enter any patient diary comments and altered parameters such as the time the patient went to sleep and awoke.
• Review the study data.
• Create a customised report (with consideration of – nocturnal dip, BP load, classification values) (see Appendix 1 for further considerations) and print the report.
• Obtain confirmation of the results by a medical officer.
4.7.6. Alternate protocols
• Workplace instructions for each facility will be necessary to complement this procedure, dependent on the equipment in use and its clinical functionality.
• Appendix 2 outlines paediatric variations.

## 4.8. Quality Control Procedures

• Cuff size/fitting – Errors in readings are generally worse in cuffs that are too small vs those that are too large [8]. If a cuff is too small, BP readings may be falsely high; if a cuff is too large, they may be falsely low [8].

## 5. Review

This Guideline is due for review on: 07/12/2016
**Date of Last Review:** New Document
**Supersedes:** Nil

## 6. Business Area Contact

Dane Enkera - Statewide Clinical Measurements Network (Chair)

## 7. Definitions of terms used in the policy and supporting documents

| Term | Definition / Explanation / Details | Source |
|---|---|---|
| ABPM | Ambulatory Blood Pressure Monitoring | McGrath, P. (2002). *Ambulatory blood pressure monitoring*, The Medical Journal of Australia, 176 (12), 588-592. |
| Office blood pressure | Blood pressure taken at a clinical or doctor's office | McGrath, P. (2002). *Ambulatory blood pressure monitoring*, The Medical Journal of Australia, 176 (12), 588-592. |