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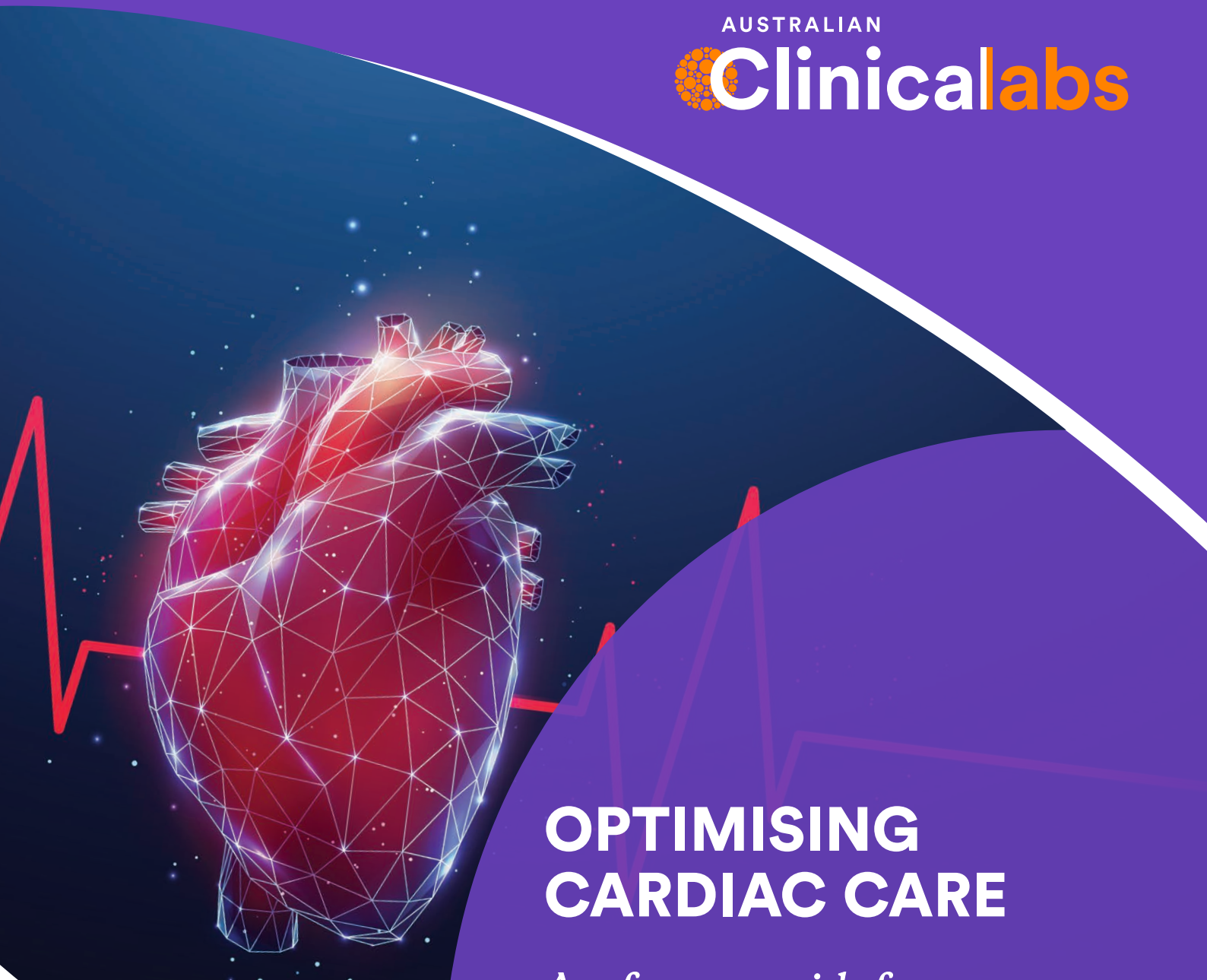

OPTIMISING CARDIAC CARE

A reference guide for investigative cardiac testing in general practice

Optimising Cardiac Care

General practitioners are pivotal in the early detection and risk stratification of cardiac disease. As the initial point of contact for patients presenting with potential cardiovascular symptoms, including palpitations, dizziness or uncontrolled hypertension, GPs are uniquely positioned to initiate targeted investigations. This proactive approach facilitates timely risk assessment, expedites specialist referral pathways and optimises patient management while awaiting cardiology consultation.

In this brochure, we provide information about key investigative tests that GPs can order for patients presenting with cardiac symptoms in general practice.

Assessing overall cardiovascular disease (CVD) risk

Assessing CVD risk using the Australian guideline and calculator (cvdcheck.org.au) is a useful first step when investigating or reviewing patients for a possible increased risk of heart disease (see Figure 1 on page 7). This approach is appropriate for people without known CVD aged 45–79 years, diabetic patients 35-79 years and First Nations people aged 30–79 years.

The tool provides an estimated 5-year CVD risk ranking of:

- High (≥10%)
- Intermediate (5% to <10%)
- Low (<5%)

CARDIAC SERVICES available *with* Clinical Labs QLD

Holter monitoring (ambulatory ECG monitoring)

For patients with intermittent palpitations and dizziness, Holter monitors are the undisputed, the simplest and the best investigation tool we have. With advancements in 24-hour and multi-day monitoring, our understanding of arrhythmias has significantly improved, resulting in an expanded list of indications for ambulatory ECG monitoring, as outlined in Table 1. The most commonly used device is the 5-lead, 3-channel, 24-hour Holter monitor. Modern models are compact, lightweight, battery-operated and include a patient-activated event button.

Table 1. Indications and recommended duration for Holter monitoring

Indications	Recommendations
Cardiac palpitations	24-hour monitoring as the initial monitoring investigation
Unexplained syncope or dizziness	24-hour monitoring for frequent symptoms. Multi-day monitoring for infrequent symptoms.
Suspected slow heart rhythms	24-hour monitoring for symptomatic patients being assessed for pacemaker implantation
Hereditary "electrical" abnormalities	Either 24-hour or multi-day monitoring to record arrhythmias, particularly in symptomatic patients. Example - Wolff-Parkinson-White syndrome.
Evaluating an abnormal ECG with ectopy and heart block	24-hour monitoring
Cryptogenic stroke evaluation to document paroxysmal atrial fibrillation	Multi-day monitoring
Evaluation of success of either antiarrhythmic or ablative therapy	Either 24-hour or multi-day monitoring
Paediatric ambulatory monitoring	Multi-day monitoring may be needed, especially if symptoms can't be documented. Use paediatric equipment if available.
Following acute myocardial infarction	Multi-day monitoring may be required for patients who experienced atrial and ventricular arrhythmias or atrio-ventricular block
Potentially lethal arrhythmias with congestive and hypertrophic cardiomyopathy	Either 24-hour or multi-day monitoring to determine if antiarrhythmic or interventional therapy is necessary
Monitoring cardiac implantable electronic device therapy	24-hour monitoring as initial investigation in symptomatic patients where there is no documented telemetered abnormality
Chest pain or dyspnoea thought to be associated with arrhythmias or ST changes	24-hour monitoring as initial investigation

The Essential Role of Holter Monitoring in Interventional Cardiology for GPs

Cardiologists generally prefer that patients presenting with common warning signs undergo Holter monitoring through their GP before being referred. This approach allows the patient to complete the monitoring and assessment period while waiting for their cardiology appointment. By the time the cardiologist sees the patient, the Holter data is already available, streamlining the diagnostic process and enabling a more informed clinical judgment from the outset.

We begin by explaining to the patient that Holter monitoring is painless and non-invasive. While wearing the device, patients can continue with most of their routine daily activities, including sleep.

Clinicians typically ask patients to keep a diary of their activities during the monitoring period, noting the start time and duration of each activity. The more detailed the information provided, the better the clinician can interpret the Holter results.

Dr Christopher Goods
MBBS, FRACP

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5-lead Holter monitoring with Clinical Labs

- Report available 3 business days after the patient returns the device to the Clinical Labs collection centre
- The report summarises the study, highlights any significant events and provides a conclusion
- Results analysed by specialist reporting software and a cardiac physiologist, with report sign-off and recommendations by a cardiologist
- For complex cases requiring specialist review, a cardiologist is available to explain the results if needed

Ambulatory blood pressure monitoring

Every doctor understands the importance of detecting and treating occult hypertension at all ages. In recent years, ambulatory blood pressure monitoring (ABPM) has become a recognised and reliable method for confirming hypertension. The National Heart Foundation of Australia, in its summary of recommendations, states that "ABPM be offered to patients with a blood pressure ≥ 140/90 in order to confirm the blood pressure level".[1] Guidelines from the United States, Britain and Europe recommend ABPM as a cost-effective diagnostic tool for all patients with suspected hypertension.

Monitoring hardware and utility

Sophisticated, automated, 24-hour ambulatory blood pressure monitors are now available, and like all investigations, the results depend on the quality of the recordings and their interpretation in the clinical setting. ABPM should cover close to a 24-hour period, with >70% of recordings being valid. Recordings are usually performed every 30 minutes during the day and at least hourly overnight. It is recommended that at least 14 recordings be performed during the daytime period.[1]

Interpreting results

The interpretation of results requires a clinical assessment, taking into consideration well-established risk factors for cardiac disease. Consequently, the referring doctor can modify the report conclusions to suit the patient's individual circumstances, such as a young diabetic with renal disease who requires optimal control. The referring doctor, and not the reporting physician, should review the patient diary with the patient.

Table 2: Accepted normal limits for ambulatory blood pressure recordings.

Ambulatory Blood Pressure	Systolic (mmHg)	Diastolic (mmHg)
Over 24 hours	≥ 130	≥ 80
Awake (daytime)	≥ 135	≥ 85
Asleep (night-time)	≥ 120	≥ 70
% allowed above limit	< 25%	< 25%

Table 3: Guidelines on severity of recorded pressures (Clinical and not 24-hour ambulatory recordings).[1]

Diagnostic Category	Systolic mmHg	Diastolic mmHg
Optimal	< 120	< 80
Normal	120-129	80-84
High normal	130-139	85-89
Isolated systolic	> 140	< 90
Grade 1: Mild	140-159	90-99
Grade 2: Moderate	160-179	100-109
Grade 3: Severe	≥ 180	≥ 110
Emergency	> 220	> 140

ABPM with Clinical Labs

- Report available 3 business days after the patient returns the device to the Clinical Labs collection centre
- Results analysed by specialist reporting software, with report sign-off and recommendations by a cardiologist
- For complex cases requiring specialist review, a cardiologist is available to explain the results if needed

MEDICARE REBATEABLE *for Eligible Patients*

1. National Heart Foundation of Australia. Guideline for the diagnosis and management of hypertension in adults - 2016. Melbourne: National Heart Foundation of Australia 2016.

Biochemical Investigations

A wide range of biochemical tests can be useful in the assessment and treatment of heart disease. Some of these have been summarised in Figure 1.

Chest Pain

Investigating chest pain is best done in a setting where resuscitation facilities are available. Initial investigations include a troponin measurement and a 12-lead resting electrocardiograph (ECG). These tests are usually then repeated after a period of several hours, depending on local protocols.

Hypertension (BP)

Besides repeated blood pressure measurements or a 24-hour ambulatory recording, investigations for secondary causes of hypertension can also be appropriate. These are best done before the patient commences treatment. Typical tests include investigations for:

- Adrenal causes
  - Hyperaldosteronism (renin-aldosterone ratio)
  - Pheochromocytoma (urine catecholamine or metabolites)
  - Cushing's syndrome (cortisol)
- Liver disease (liver function tests)
- Renal disease (urea and electrolytes)
- Thyroid disorders (thyroid function tests)

Heart Failure

Patients with suspected or known heart failure can now be investigated with a B-type natriuretic peptide (BNP) measurement. B-type natriuretic peptides (BNP) are primarily synthesised and released by the heart's ventricles in response to ventricular stretch and pressure overload, reflecting myocardial wall tension. This makes BNP an important biomarker for the diagnosis, evaluation and management of heart failure. It is particularly useful for distinguishing heart failure from other causes of dyspnoea.

Two forms of the test are available: BNP and N-terminal proBNP (NT-proBNP). The precursor protein, ProBNP, is cleaved into BNP and the inactive NT-proBNP. Elevated levels of BNP or NT-proBNP correlate with the severity of heart failure and may indicate the need for further diagnostic evaluation. NT-proBNP is stable for 3 days in serum and is typically analysed in central laboratories. In contrast, BNP is often used as a point-of-care test. In our laboratories, an NT-proBNP level of less than 125 ng/L makes a diagnosis of congestive heart failure unlikely.

See below for details on the new Medicare items for NT-proBNP and BNP testing.

Cardiac Arrhythmias and Palpitations

The initial investigation for arrhythmias and palpitations is a resting 12-lead ECG, followed by 24-hour ambulatory ECG monitoring (Holter study). Biochemical testing for electrolyte imbalances (potassium, calcium, magnesium), digoxin levels and thyroid disorders can also be useful.

Atherosclerosis

Serum lipids (cholesterol, triglycerides, HDL cholesterol, LDL cholesterol and non-HDL cholesterol) have an important association with atherosclerosis and measuring levels is useful in diagnosing and managing lipid disorders. Some more specialised investigations, such as apolipoprotein (a) and high-sensitivity C-reactive protein (hs-CRP), can be helpful in selected patients.

BNP Testing and the MBS

A new MBS item for NT-proBNP or BNP testing, item 66829, was added to the Medicare Benefits Schedule on 1 November 2024. This new item broadens the range of clinical situations in which NT-proBNP or BNP testing can be ordered.

MBS Items

- 66829: Quantitation of BNP or NT-proBNP for the exclusion of a diagnosis of heart failure in a patient presenting in a non-hospital setting to assist in decision-making regarding the clinical necessity of an echocardiogram, where heart failure is suspected based on signs and symptoms but diagnosis is uncertain. Applicable once in any 12-month period.

Several other MBS items are available for BNP or NT-proBNP testing in the diagnosis of heart failure, each with specific restrictions:

- 66830: Quantitation of BNP or NT-proBNP for the diagnosis of heart failure in patients presenting with dyspnoea to a hospital Emergency Department. This test is available up to six times within a 12-month period.
- 66585: Quantification of laboratory-based BNP or NT-proBNP testing in a patient with systemic sclerosis (scleroderma) to assess the risk of pulmonary arterial hypertension, with a maximum of two tests in a 12-month period.
- 66586: Quantification of BNP or NT-proBNP testing in a patient with diagnosed pulmonary arterial hypertension to monitor for disease progression, applicable up to four times in any 12-month period.

Figure 1. Biochemical investigations for diagnosing and managing heart disease

The suggested investigations below are not exhaustive and should be considered within the clinical context.

Assessing and Managing Cardiovascular Disease Risk

(Australian guideline and calculator) See cvdcheck.org.au

Factors in risk assessment:

- Age, sex
- Smoking status
- Systolic blood pressure (BP)
- Total cholesterol to high-density lipoprotein (HDL) cholesterol ratio (TC:HDL-C ratio)
- Diabetes status
- Cardiovascular disease (CVD) medicines
- History of atrial fibrillation (AF)

If diabetic, include:

- HbA1c
- Time since diagnosis of diabetes
- Urine albumin-creatinine ratio (uACR)
- Estimated glomerular filtration rate (eGFR)
- Body mass index (BMI)
- Insulin treatment

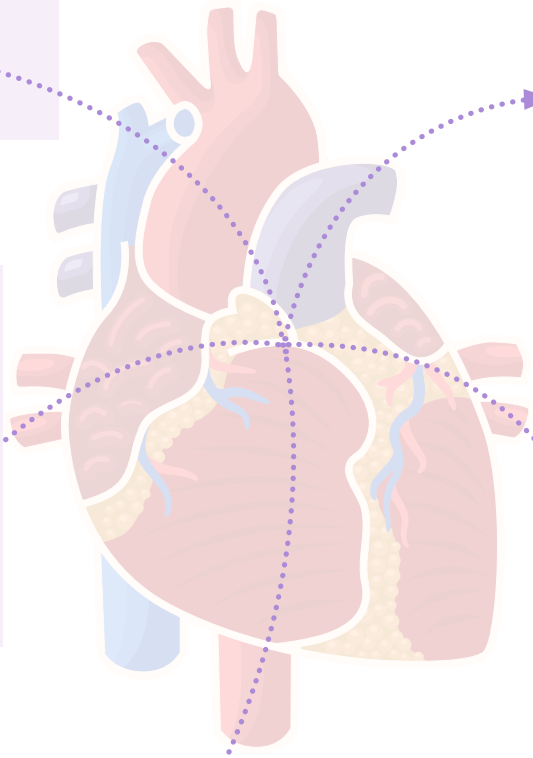
Chest Pain

- ECG
- Troponin

Preferable in an Emergency Department setting

Hypertension

- Ambulatory blood pressure (ABP) monitoring
- Investigations for secondary causes (ideally before treatment):
  - Adrenal: Hyperaldosteronism (renin-aldosterone ratio), pheochromocytoma (urine catecholamines or metabolites), Cushing's syndrome (cortisol)
  - Liver disease: Liver function tests
  - Renal disease: Urea and electrolytes
  - Thyroid disorders: Thyroid function tests



Arrhythmias and Palpitations

- ECG
- Holter monitoring
- Urea and electrolytes (U&E), calcium, magnesium
- Thyroid function tests (TFT)
- Digoxin levels

Heart Failure

- B-type natriuretic peptides (BNP) or N-terminal pro B-type natriuretic peptide (NT-proBNP)
- ECG
- Imaging and echocardiogram

Atherosclerosis

- Serum lipids
  - Cholesterol
  - Triglycerides
  - HDL (high-density lipoprotein) cholesterol
  - LDL (low-density lipoprotein) cholesterol
  - Non-HDL cholesterol
- Apolipoprotein (a)
- High-sensitivity C-Reactive Protein (hs-CRP)

This figure was created by Dr David Deam, Clinical Labs Chemical Pathologist.

How to Order Cardiac Testing with Clinical Labs

What to Write on the Request Form:

The Clinical Labs general pathology request form can be used to request Cardiac Testing Services (24-hour 5-lead Holter monitor and 24-hour ABPM) as well as biochemistry tests based on the patient's symptoms.

Patient Information:

- Cardiac Testing services are available at select Clinical Labs collection centres. To find the nearest location, visit clinicallabs.com.au/location and select the service (Holter or BP Monitor) from the drop-down menu. For blood tests only, patients can attend any of our 1,300+ Clinical Labs collection centres.
- Patients are required to pay for their cardiac testing in full using our online payment portal when having their device fitted at the Clinical Labs collection centre. Assistance from our collector is available if required. Patients who are eligible for a Medicare rebate will receive the reimbursement directly from Medicare in the weeks after their cardiac test results are issued.
- For **5-lead Holter** and **ABPM** services, patients in QLD will need to call a Clinical Labs collection centre offering the service to book a time for collection and fitting of their device.

Test Pricing:

For current pricing for our cardiac testing services, visit clinicallabs.com.au/cardiactestingservices. Most blood tests are bulk-billed, subject to Medicare eligibility criteria.

Results:

Patient results for all Cardiac Services are available as digital reports via Clinical Labs' eResults platform. To log in or create an account, please visit: results.clinicallabs.com.au.

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Dr Harry Mond is an Associate Professor at both Melbourne and Monash Universities and has been practicing as a Cardiologist in Melbourne since 1975. He is a pioneer in cardiac pacing with extensive experience in pacemaker implantation and follow-up. Dr Mond is currently involved in ECG teaching and has completed a textbook on the subject.

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Dr Deam graduated with Honours in Medicine from Monash University in 1978 and obtained his FRCPA in 1985, following postgraduate training in Biochemistry at the Royal Melbourne Hospital. After several posts in Chemical Pathology at the Royal Melbourne Hospital and the Royal Women's Hospital, he was appointed Head of Chemical Pathology at the Royal Melbourne in 1996. He joined Gribbles Pathology (now Australian Clinical Labs) in 1998. Dr Deam has played an active role in teaching scientific, nursing and medical staff at both undergraduate and postgraduate levels and has been an examiner for the Australasian Association of Clinical Biochemists as well as the Royal College of Pathologists of Australasia. Dr Deam's research interests and publications include work on thyroid function testing, various aspects of diagnostic protein measurement and the rational use of biochemical tests.