



OPTIMISING CARDIAC CARE

*A reference guide for
investigative cardiac
testing in general practice*

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 ($\geq 10\%$)
- Intermediate (5% to $<10\%$)
- Low ($<5\%$)

Resting 12-lead electrocardiograph (ECG)

Despite the vast improvements in cardiological investigations, the resting 12-lead ECG remains the first cardiology investigation performed during a consultation or hospital visit.

In recent years, indications for the 12-lead ECG have expanded. These now include:

- Heart health
- Pre-operative evaluation
- Palpitations/skipped beats
- Bradycardia
- Chest pain
- Dizziness and syncope
- Familial sudden death syndromes, including athletes
- Hypertension
- Cardiomyopathy
- Dyspnoea
- Stroke
- Pacemaker evaluation

12-Lead resting ECG with Clinical Labs

- Report available within 24 hours after the patient's test at the Clinical Labs collection centre
- 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, access to a cardiologist is available for additional support if needed



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.



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5-lead Holter monitoring with Clinical Labs

- Report available 2-3 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



myPatch Multi-day Holter monitoring

Attached in under 30 seconds, the lightweight, showerproof myPatch Holter provides patients with the freedom to continue their daily routines while delivering greater clarity and superior results. With no need for battery recharging or patch changes during testing, myPatch is easy and comfortable for patients.

Benefits of multi-day monitoring

Data shows that longer monitoring periods increase the likelihood of detecting first occurrences of various significant arrhythmias. With increasing evidence of atrial fibrillation's contribution to stroke, a multi-day Holter can detect more subtle arrhythmias. It also provides peace of mind, as arrhythmias are less likely to go unnoticed compared to shorter studies.

Enhanced detection of arrhythmias

Data from a sample of 7-day patient studies* showed that the most serious arrhythmias were first detected after 24 hours.

MyPatch Multi-Day Holter monitoring with Clinical Labs

- Showerproof, lightweight and improved patient comfort
- Select from 24-hour (1-day), 72-hour (3-day) or 168-hour (7-day) study lengths
- Report available within 5 business days of the patient's return of 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

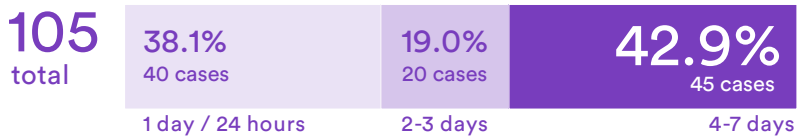
**PARTIAL
MEDICARE
REBATE
Available**



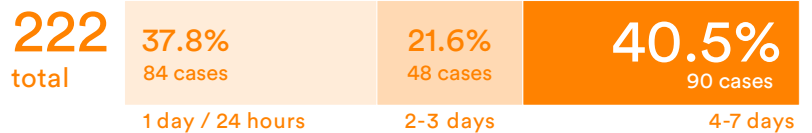
Only with
**CLINICAL
LABS**

Split by day of first occurrence

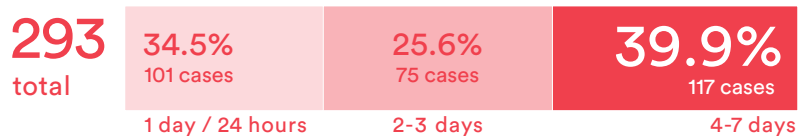
Pauses (4.0 seconds or longer)



Paroxysmal/sustained atrial fibrillation



Ventricular tachycardia (6 beats or more)



**Data from abstract published in the European Heart Journal, Volume 44, Supplements, February 2023 - "Seven-day holter monitoring detects more significant arrhythmias than 24-hour and 3-day monitoring"*

Holter Comparison

	Traditional Holter	Patch Holter
Water resistance	No, must not get wet	Showerproof (no submersion)
Recording length	24 hours	24/72/168 hours
Event alert	Press silver button	Double tap
Compliance	Wires can cause artifacts	Minimal interference
Comfort	5 individual electrodes and leads	Single point of contact



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 $\geq 140/90$ 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 2-3 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 cvccheck.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

Arrhythmias and Palpitations

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

Hypertension

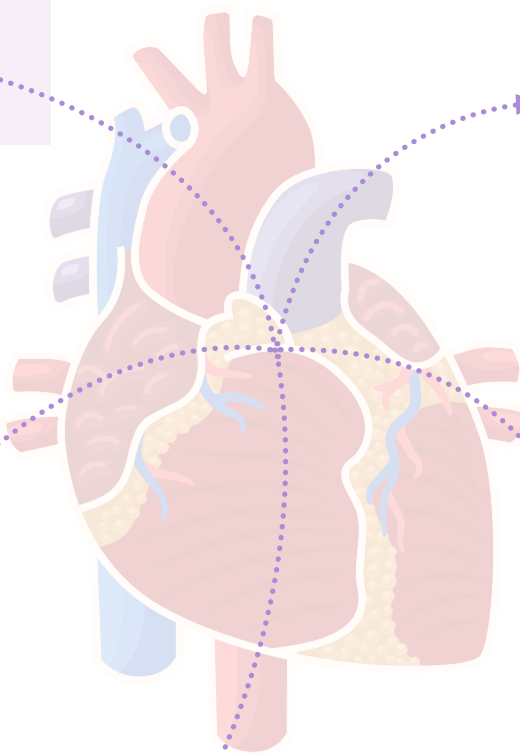
- Ambulatory blood pressure (ABP) monitoring
- Investigations for secondary causes (ideally before treatment):
 - Adrenal: Hyperaldosteronism (renin-aldosterone ratio), pheochromocytoma (urine catecholamines or metabolites), Cushing's syndrome (cortisol)
 - Liver disease: Liver function tests
 - Renal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

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)



How to Order Cardiac Testing with Clinical Labs

Service	How to Request on General Pathology Request Form	Bookings
ECG	ECG	Walk-in service - no booking required
24-hour ABPM	24-hour ABPM	Call or visit a Clinical Labs Collection Centre to book
5-lead Holter (24 Hours)	Holter Monitor 24 hour	Call or visit a Clinical Labs Collection Centre to book
myPatch Multi-Day Holter	myPatch Holter (followed by the study length - 1, 3 or 7 days)	Patient to pay and book online: pay.clinicallabs.com.au/mypatch

Include relevant biochemistry tests on the request form based on the patient's symptoms, and ensure clinical notes are provided to support Medicare rebate eligibility.

For locations, visit: clinicallabs.com.au/location.

For pricing and turnaround times: clinicallabs.com.au/cardiactestingservices.

Payment:

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.

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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Founder and Medical Director CardioScan Pty Ltd

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.

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