



Coronary artery calcium scoring in asymptomatic people

For GPs

The use of coronary artery calcium scoring for screening and risk reclassification in asymptomatic patients.

RACGP position

The efficacy of coronary artery calcium (CAC) scoring in reducing the risk of cardiovascular disease in asymptomatic people has yet to be determined.

Evidence for reclassification of risk in the Australian population has yet to be determined. CAC scoring may have important clinical benefits in some settings, but this has yet to be well demonstrated in clinical trials. In addition, it may have little overall impact on patient health outcomes.¹

Traffic lights

Red – Do not take this action

- ⊗ Do not use CAC scoring in patients who are already at high risk of cardiovascular disease (CVD) or have established CVD (such as a history of myocardial infarction or revascularisation, or known coronary heart disease).²
- ⊗ Do not use CAC scoring for generalised population screening for CVD risk.²
- ⊗ Do not use CAC scoring to investigate patients with chest pain or other symptoms suggestive of coronary artery disease. Other cardiac investigations (eg stress testing or angiography) are more appropriate in symptomatic patients.

Orange – Under specified circumstances, take this action

- ⚠ Consider CAC for a person at moderate risk of CVD for whom the risk may be underestimated, and where the findings are likely to influence intensity of management.²

Green – Take this action

- ✔ Use a shared decision-making approach to discuss the potential benefits and risks of the test. For example, before ordering the test, discuss with the patient whether a high or low result on this test will change your clinical management.²



- ✔ For patients at high risk of CVD or with established CVD, begin treatment to reduce risk, regardless of CAC result.²

Patient harms and risks

- Incidental findings of uncertain significance
- Incorrect reclassification as high or low risk²
- Oversimplification of CVD risk assessment and management^{2,3}
- Significant out-of-pocket cost for the test
- Potential harms from radiation

Overview

The CAC scoring

The CAC can be measured by a computed tomography (CT) scan of the heart. Calcium is deposited in the coronary arteries during the formation of the atherosclerotic plaques, and the CAC score indicates the amount of atherosclerosis in the patient's coronary vessels.

Scoring is based on volume and density of calcium deposits, with absolute value ranges of:

- 0 (very low risk)
- 1–100 (low risk)
- 100–400 (moderate risk) and
- >400 (high risk).

There is also a percentile score based on age, sex and ethnicity, with >75th percentile being considered high risk.⁴

Correlation between CAC scores and cardiovascular events

In two large cohort studies with up to 10 years of follow-up:

- a higher CAC score was associated with more cardiovascular events
- a score of 0 was associated with a lower rate of cardiovascular events.^{4,5}

The value of a CAC score

In the AusCVDRisk guideline 2023, variables used to generate a risk score include age, sex, smoking status, systolic blood pressure, total cholesterol to high-density lipoprotein ratio, diabetes, use of CVD medications, postcode and history of atrial fibrillation.² CAC score is included as a possible reclassification factor with the caveat that there are too few well-designed clinical trials to determine its value in guiding management in adults without known CVD.

In practice, the CAC scoring is most useful if the patient is at moderate risk or traditional risk calculators are thought to be inadequate. In these cases, the result of the CAC scoring is likely to influence treatment decisions – for example, when the patient has a strong family history of CVD but otherwise has a low/moderate risk score on the Australian CVD calculator, and you are considering preventive pharmacotherapy.

Limitations of the CT scan

The CT scan is a non-contrast CT, so it does not measure the lumen size of the coronary arteries (unlike angiography) and so cannot detect stenosis.

Red flags

- Individuals with symptoms suggestive of coronary artery disease should undergo formal cardiac investigations (eg stress testing or angiography).
- CAC is not an appropriate test to investigate chest pain² or suspected coronary artery disease.

Alternatives: What can I do for the patient?

Assess CVD risk using known risk factors and/or CVD calculator, available at the [Australian guideline and calculator for assessing and managing cardiovascular disease risk](#).

Provide all patients with lifestyle advice relating to diet, physical activity and weight management. Refer to the RACGP's [Guidelines for preventive activities in general practice \(Red Book\)](#), ninth edition (updated), and [National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people](#), third edition, for more information.

Encourage all patients who smoke to quit, and provide them with advice and support. Refer to the RACGP's [Supporting smoking cessation: A guide for health professionals](#), second edition, for more information.

Address all modifiable risk factors (including blood pressure and lipid levels) and implement appropriate management strategies in accordance with the [Australian guideline and calculator for assessing and managing cardiovascular disease risk](#).

For patients who have a previous CAC score

The test should be repeated only if the patient's CVD risk status or management decisions are uncertain. Do not repeat the test if the score would not alter how you manage the patient.²

Resources and information for patients

AusCVDRisk, [Resources: For the general public](#)

National Heart Foundation of Australia, [Coronary artery calcium scoring](#)

National Heart Foundation of Australia, [Are you at risk of heart disease?](#)

The Royal Australian College of General Practitioners, First do no harm: Coronary artery calcium scoring in people without symptoms – Information for patients

Shared decision making with patients

Resources for GPs

Australian Chronic Disease Prevention Alliance, [Australian guideline and calculator for assessing and managing cardiovascular disease risk](#)

Jennings GLR, Audehm R, Bishop W, et al. **National Heart Foundation of Australia: Position statement on coronary artery calcium scoring for the primary prevention of cardiovascular disease in Australia.** *Med J Aust* 2021;214(9):434-39. doi: 10.5694/mja2.51039.

National Aboriginal Community Controlled Health Organisation and The Royal Australian College of General Practitioners, *National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people*, 3rd edn

The Royal Australian College of General Practitioners, **Guidelines for preventive activities in general practice** (Red Book), 9th edn, updated

The Royal Australian College of General Practitioners, **Smoking, nutrition, alcohol, physical activity (SNAP): A population health guide to behavioural risk factors in general practice**, 2nd edn

The Royal Australian College of General Practitioners, **Supporting smoking cessation: A guide for health professionals**, 2nd edn

References

1. Bell KJL, White S, Hassan O, et al. Evaluation of the incremental value of a coronary artery calcium score beyond traditional cardiovascular risk assessment: A systematic review and meta-analysis. *JAMA Intern Med* 2022;182(6):634–42. doi: 10.1001/jamainternmed.2022.1262.
2. Australian Chronic Disease Prevention Alliance. Australian guideline and calculator for assessing and managing cardiovascular disease risk. South Melbourne, Vic: ACDPA, 2023. Available at www.cvdcheck.org.au [Accessed 9 August 2023].
3. Hayen A, Glasziou PP, Doust JA. Coronary artery calcium scoring in cardiovascular risk assessment of people with family histories of early onset coronary artery disease. *Med J Aust* 2021;214:9;440. doi: 10.5694/mja2.51037.
4. Chua A, Blankstein R, Ko B. Coronary artery calcium in primary prevention. *Aust J Gen Pract* 2020;49(8):464–69. doi: 10.31128/AJGP-03-20-5277.
5. Jennings GLR, Audehm R, Bishop W, et al. National Heart Foundation of Australia: Position statement on coronary artery calcium scoring for the primary prevention of cardiovascular disease in Australia. *Med J Aust* 2021;214:434–39. doi: 10.5694/mja2.51039.