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ARTICLE

Assessing, communicating and managing cardiovascular disease risk: a practical summary of the 2023 guideline

SUMMARY

The outdated cardiovascular disease risk calculator has been reported to overestimate cardiovascular disease risk for a contemporary Australian population, and does not include relevant variables, such as socioeconomic disadvantage, which has been shown to increase the incidence of both heart attack and stroke.

The 2023 Australian Guideline for Assessing and Managing Cardiovascular Disease Risk marks a major milestone as the first update to Australia's cardiovascular disease prevention guideline in over a decade. The new guideline may help to refine and recategorise risk estimates, hence improving the discriminatory and predictive value of the new calculator.

The new Australian Cardiovascular Disease Risk Calculator expresses risk scores as a percentage estimate of a person's probability of dying or being hospitalised due to cardiovascular disease within the next 5 years. The new calculator expresses risk scores as low (less than 5%), intermediate (5% to less than 10%), or high (10% or higher) risk over 5 years.

Reclassification factors built into the new calculator are designed to help clinicians individualise risk estimates. These factors include ethnicity (e.g. First Nations status), family history of premature cardiovascular disease, severe mental illness, kidney disease and coronary artery calcium score.

The new calculator also uses optional diabetes-specific variables (supporting a more granular cardiovascular disease risk assessment of people with type 2 diabetes).

People who meet the clinically determined high-risk criteria (chronic kidney disease, familial hypercholesterolaemia) should not progress through the Australian Cardiovascular Disease risk calculator, but move straight to management.

For a person with a cardiovascular disease risk score recorded from the outdated calculator, clinicians may want to reassess their risk using the new calculator the next time the person attends.

Garry Jennings
Chief Medical Advisor, National Heart Foundation of Australia, Melbourne

Natalie Raffoul
Healthcare Programs Manager, National Heart Foundation of Australia, Sydney

Mark Nelson
Chair of General Practice, University of Tasmania, Hobart

On behalf of the Expert Steering Group for the 2023 Australian Guideline for Assessing and Managing Cardiovascular Disease Risk (Refer to Appendix 1 of 2023 Australian Guideline for Assessing and Managing Cardiovascular Disease Risk Appendices)

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cardiovascular disease, cardiovascular disease risk calculator, coronary heart disease, primary prevention

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Introduction

Cardiovascular disease (CVD) is responsible for significant morbidity and premature mortality in Australia.[1] In 2023, the Australian Institute of Health and Welfare reported an increase in age-adjusted coronary heart disease mortality rates for the first time in decades.[2]

An individual's CVD risk depends on the combined effect of multiple factors, and therefore a holistic, risk-based approach to assessment and management of risk is recommended.[3-5] In Australia, general practitioners (GPs) have been using a multivariable CVD risk calculator, based on the Framingham Risk Equation. This equation was derived from a predominantly white US cohort using data collected from the 1960s to 1980s. The outdated calculator has been reported to overestimate CVD risk for a contemporary Australian population,[6] and does not include relevant variables, such as socioeconomic disadvantage, which has been shown to increase the incidence of both heart attack and stroke.[7]

On behalf of the Australian Chronic Disease Prevention Alliance,* the National Heart Foundation of Australia (NHFA) led the development of the 2023 Australian Guideline for Assessing and Managing Cardiovascular Disease Risk with a new calculator. This marks a major milestone as the first update to Australia's CVD prevention guideline in over a decade.[8] The new Australian CVD Risk Calculator now uses the contemporary New Zealand PREDICT risk equation, modified and recalibrated for the Australian population and healthcare system. The PREDICT equation was

* Represented by the National Heart Foundation of Australia, Stroke Foundation, Diabetes Australia and Kidney Health Australia in this project.

selected among existing international CVD risk equations against a set of criteria.[9] Age- and sex-specific rate ratios were used as multipliers to adjust for the differences in CVD death rates between Australia and New Zealand and to predict CVD risks more accurately. This statistical adjustment occurs at the back end of the calculator, presenting a single risk score to the patient.[10]

The key practice points from the guideline, relevant to primary care clinicians, are summarised in Box 1.

Approach to assessing and communicating CVD risk

The 2023 Australian Guideline for Assessing and Managing CVD Risk outlines 5 steps for the assessment and management of CVD risk:[8]

- identifying people for risk assessment
- using the Australian CVD Risk Calculator to assess a person's risk
- identifying which risk category they fit into (including use of reclassification factors)
- communicating their risk to them
- managing risk with lifestyle modifications, with or without pharmacotherapy.

This article focuses on the assessment of CVD risk using the Australian CVD Risk Calculator, identifying risk category and communicating risk to patients. Refer to the full guideline for details on managing CVD risk.

Box 1 Key practice points for primary care clinicians from the 2023 Australian Guideline for Assessing and Managing Cardiovascular Disease Risk[8,9,11]

Assessing CVD risk holistically allows intensive risk-factor management strategies to be directed at people at high risk and diverts unnecessary interventions away from people at low risk.

The new Australian CVD Risk Calculator includes different variables than the Framingham-based equation (e.g. social disadvantage, diabetes-specific risk markers, atrial fibrillation, cardiovascular medicines).

Built-in reclassification factors are designed to help clinicians individualise risk estimates. These include ethnicity (e.g. First Nations status), family history of premature CVD, severe mental illness, kidney disease and coronary artery calcium score.

CVD risk categories have been redefined in line with the new Australian CVD Risk Calculator, and help guide treatment.

Although pharmacotherapy is recommended at a lower threshold (i.e. 10% risk or higher over 5 years) than the earlier (2012) guideline, the new high-risk category is probably comparable with the previous 15% risk threshold (accounting for overestimation of risk in the Framingham-based risk equation).

Effective communication of CVD risk scores, and shared decision-making with patients, should underpin the approach to management. Decision-support tools and resources to explain risk are embedded in the guideline.

Healthy lifestyle modification is the mainstay of management, and blood pressure–lowering and lipid-modifying pharmacotherapies are recommended for high-risk groups.

CVD = cardiovascular disease

1. Identify people for CVD risk assessment

Assessing CVD risk holistically allows intensive risk-factor management strategies to be directed toward people at high risk and diverts unnecessary interventions away from people at low risk.

CVD risk assessment should be targeted toward people in age groups most likely to experience a CVD-related event such as:[8]

- acute myocardial infarction, angina, other coronary heart disease
- stroke, transient ischaemic attack
- peripheral vascular disease
- congestive heart failure.

The new guideline recommends assessment for a slightly broader range of people, without known CVD, than the 2012 guideline, including:[8]

- all people aged 45 to 79 years
- people with diabetes aged 35 to 79 years.

First Nations people without known CVD are advised to have their CVD risk assessed using the Australian CVD Risk Calculator earlier than their non–First Nations peers (see below).[11-13]

The Australian CVD Risk Calculator is not validated for people 80 years or older, and clinical decision-making should guide the assessment and management of CVD risk in these people.

2. Use the Australian CVD Risk Calculator

The Australian CVD Risk Calculator produces a CVD risk score, expressed as a percentage, which represents a person's probability of dying or being hospitalised due to a CVD-related event within the next 5 years.

Before using the new Australian CVD Risk Calculator, assess whether the person meets the clinically determined high-risk criteria, including:[8]

- moderate to severe chronic kidney disease (defined as sustained estimated glomerular filtration rate [eGFR] less than 45 mL/min/1.73m^2 and/or persistent urine albumin–creatinine ratio [uACR] more than 25 mg/mmol [male] and more than 35 mg/mmol [female])
- confirmed diagnosis of familial hypercholesterolaemia.

People who meet the clinically determined high-risk criteria above should not progress to assessment using the Australian CVD Risk Calculator, but progress straight to management.

The Australian CVD Risk Calculator uses traditional variables such as age, sex, smoking status, diabetes, blood pressure (BP), and lipid concentrations

(Table 1), as well as other optional and relatively easily measured variables, such as postcode (a marker of area-level deprivation) or diagnosis of atrial fibrillation. It also uses optional diabetes-specific variables (supporting more granular CVD risk assessment of people with type 2 diabetes); however, the CVD risk equation has not been validated for people with type 1 diabetes and their results should be interpreted with caution.[8]

For people who have a recorded CVD risk score using the old calculator, clinicians should consider using the new Australian CVD Risk Calculator at their next scheduled reassessment if warranted.

3. Identify the CVD risk category

Based on the score produced by the Australian CVD Risk Calculator, people can be categorised into one of three estimated 5-year CVD risk categories, including:[8]

- low (lower than 5%) risk
- intermediate (5% to less than 10%) risk
- high (10% or higher) risk.

Table 1 Variables used in the Australian CVD Risk Calculator and their application[8]

Variable	Values applied to the risk calculator	Comment
For all adults having the risk assessment		
age	• 30 to 79 years	• the calculator is only validated for adults
sex	• male or female	• there is insufficient data to stratify risk for intersex or non-binary people
smoking status	• never smoked • previously smoked • currently smokes	
BP	• systolic BP (mmHg)	• use average of last 2 seated, in-clinic measurements • convert home and ambulatory BP measurements to in-clinic equivalents
cholesterol	• ratio of total cholesterol to HDL-C	• most recent measurements (fasting or non-fasting)
CVD medicines used within the last 6 months	• lipid-modifying medicines [NB1] • BP-lowering medicines [NB2] • antithrombotic medicines [NB3]	• the relationship between CVD risk and CVD medicines is associative, not causative
medical history of AF, including paroxysmal or persistent AF	• yes • no	• known AF must have been confirmed on 12-lead ECG
postcode to calculate Socio-Economic Indexes for Areas (SEIFA) ranking	• patient's postcode	• at the clinician's discretion; the clinician can manually adjust the risk to better reflect an individual's socioeconomic status
type 2 diabetes status	• yes • no	
Additional diabetes-specific variables (when indicated)		
time since diagnosis of type 2 diabetes	• time in years	
HbA1c	• single non-fasting HbA1c (mmol/mol or %)	
uACR	• uACR (mg/mmol)	
eGFR	• eGFR (mL/min/1.73m^2)	if needed, calculate based on the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation using the most recent serum creatinine concentration
body mass index	• weight (kg) and height (m)	
insulin	• use of insulin within 6 months of risk assessment	

AF = atrial fibrillation; BP = blood pressure; CVD = cardiovascular disease; ECG = electrocardiogram; eGFR = estimated glomerular filtration rate; HbA1c = glycated haemoglobin; HDL-C = high-density lipoprotein cholesterol; uACR = urine albumin–creatinine ratio

NB1: Lipid-modifying medicines include statins, ezetimibe, fibrates and nicotinic acid.

NB2: BP-lowering medicines include angiotensin converting enzyme inhibitors, angiotensin II receptor blockers, beta blockers, calcium channel blockers and thiazide diuretics.

NB3: Antithrombotic medicines include anticoagulant and antiplatelet medicines.

Adapted from reference 8

People at low or intermediate risk are advised to have a reassessment using the Australian CVD Risk Calculator after 5 years or 2 years, respectively. Reassess earlier if the most recent risk assessment was close to the upper risk threshold, if risk factors worsen, or if new risk factors are identified.

Formal risk reassessment is generally not recommended for people at high risk, as management should be guided by clinical context.

Consider reclassification factors

In addition to the variables included in the Australian CVD Risk Calculator (Table 1), reclassification factors may help to refine individual risk categorisation, especially for people whose risk lies close to a risk threshold.

Reclassification factors were identified through the evidence review, based on their likelihood to improve risk estimation beyond traditional equations used to predict CVD risk.

The decision to reclassify a person's CVD risk depends on their primary care clinician's clinical judgement after considering the individual circumstances.

Ethnicity

Certain ethnicities can affect an individual's estimated CVD risk classification, especially if the estimation is close to the threshold for a risk category.[8] Consider reclassifying people into a higher risk category if they are Māori, Pacific Islander, or of South Asian descent (i.e. Indian, Pakistani, Bangladeshi, Sri Lankan, Nepali, Bhutanese, Maldivian). Consider reclassifying people to a lower risk category if they are of East Asian descent (i.e. Chinese, Japanese, Korean, Taiwanese, Mongolian).

Coronary artery calcium testing

Coronary artery calcium (CAC) testing uses computed tomography to measure the amount of calcified plaque in each coronary artery and generate a CAC score. When used in conjunction with clinical assessment, the CAC score may improve precision of a risk assessment, and has a strong negative predictive value (e.g. if the CVD risk is intermediate, a CAC score of 0 could reclassify someone to a lower risk category).[8] Table 2 details the clinical implications of CAC testing within the Australian CVD Risk Calculator.

Family history of premature CVD

People with a positive family history of premature CVD may have their risk reclassified to a higher risk category. Positive family history is defined as coronary heart disease or stroke in a first-degree female relative younger than 65 years, or first-degree male relative younger than 55 years.[8]

Chronic kidney disease

People with moderate to severe chronic kidney disease (CKD) are at clinically determined high risk. This should be considered before using the Australian CVD Risk calculator (see step 2 above).

Severe mental illness

People with severe mental illness may be reclassified to a higher risk category. Severe mental illness is defined as current or recent mental illness requiring specialist treatment (whether received or not) in the 5 years prior to the CVD risk assessment.[8,14]

Other CVD risk considerations

Some clinical conditions (e.g. chronic inflammatory conditions such as rheumatoid arthritis or systemic lupus erythematosus), examination findings (e.g. ankle-brachial index) or investigations (e.g. high-sensitivity C-reactive protein concentration) may be associated with an increased CVD risk; however, they provide little discriminatory or predictive value beyond the calculator's assessment. In population terms, CVD risk prediction is not improved by incorporating extra emphasis into the calculation (e.g. by the presence of

Table 2 Clinical implications of coronary artery calcium testing within the Australian CVD Risk Calculator[8]

Individual's clinical risk situation	Recommendation for CAC testing	Clinical implication or limitation
known CVD	not recommended	would not alter management; preventive treatment indicated
high CVD risk in the next 5 years	not recommended	would not alter management; preventive treatment indicated
low or intermediate CVD risk plus one or more additional risk factors	consider CAC testing if it is available or affordable	may be useful to assist in reclassifying an individual's CVD risk up or down

CAC = coronary artery calcium; CVD = cardiovascular disease
Adapted from reference 8

these conditions or biomarkers). Depending on the clinical context, GPs may choose to acknowledge, monitor or treat these risk factors and reclassify CVD risk on an individual basis.[8]

4. Communicate CVD risk

Effectively communicating CVD risk to a patient, and establishing a commitment to ongoing follow-up, may lead to behavioural changes that can improve predicted CVD risk.[15,16] The guideline recommends communicating risk in a variety of formats, depending on the person's health literacy, learning style and needs. One example is to communicate risk as a percentage or by using a 100-person chart (Figure 1). The Australian CVD Risk Calculator includes an interactive interface with visual tools clinicians can use to optimise a person's understanding of their CVD risk.[8,16,17] It promotes joint decision-making between clinicians and patients and provides readily accessible, downloadable and printable resources.

The following figure is for general information and education purposes only. Cardiovascular disease risk assessment is a complex process that should only be done in consultation with and by qualified health professionals. This figure can only be accurately interpreted in the context of the full 2023 Australian Guideline for Assessing and Managing CVD Risk.

The guideline recommends combining risk communication tools with behavioural strategies (e.g. motivational interviewing, personalised goal setting, health coaching), repeated over time, to reduce overall CVD risk. Emphasising the benefits of healthy lifestyle modifications and pharmacotherapy may be more effective than focusing on negative health outcomes.

Communication with people, whose culture or language is different from your own, should be undertaken in a culturally safe way. Where appropriate, engage the person's family members, carers, other members of their community, or professional interpreters, to help communicate risk information effectively and safely.

Consider and communicate the need for referral to other health professionals if required.

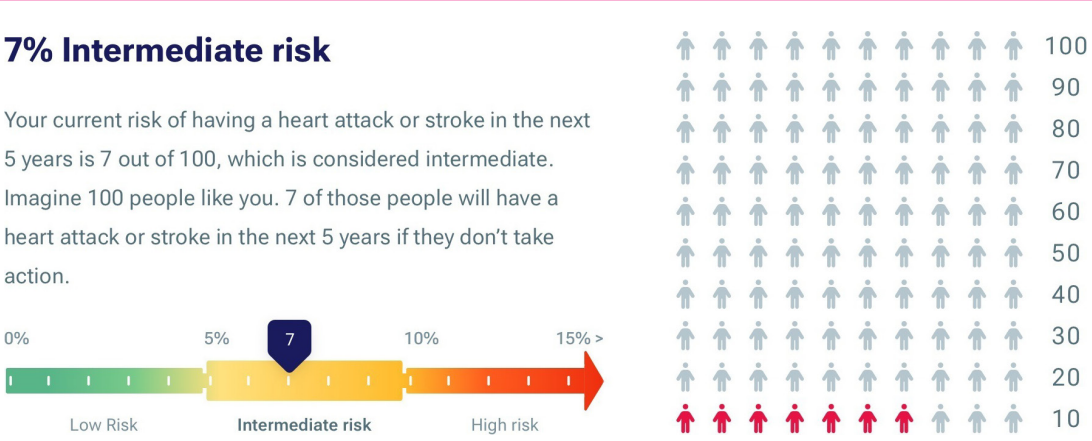
5. Manage CVD risk

The primary focus of managing CVD risk is to encourage and support people to make healthy lifestyle choices, with or without starting pharmacotherapy.

Pharmacotherapy should be prescribed based on a person's overall CVD risk, rather than individual risk factors in isolation. However, very high BP (e.g. above 160/100 mmHg) or very high cholesterol concentration (e.g. total cholesterol concentration above 7.5 mmol/L) warrant preventive pharmacotherapy, irrespective of the risk determined by the calculator.

The new guideline recommends starting both BP-lowering and lipid-modifying medicines in people with a high CVD risk (10% or higher). Current evidence states the benefits of BP-lowering and lipid-modifying therapies outweigh the risks of drug-related harms in people at high risk. Pharmacotherapy should be considered for people at intermediate risk (5% to less than 10%).

Figure 1 Example of a risk communication tool (100-person chart) to help clinicians explain risk to patients [8]



For more information on the management of CVD risk, refer to the full guideline.[8]

Considerations for First Nations people

The substantial burden of CVD within some First Nations families and communities has led to perceptions that developing CVD is inevitable. It is important to effectively communicate CVD risk to individuals and how they can address the risk. It is helpful for First Nations people to have a positive, trusting relationship with their primary care clinicians and local health service when undergoing risk assessment and management. Enhancing conversations about risk may help identify and support positive actions.[18-20]

First Nations communities experience earlier morbidity and mortality from CVD, in people who are, on average, 10 to 20 years younger than their non–First Nations peers.[12,19] It is important to consider CVD risk factors that are more prevalent in First Nations people, such as CKD and severe mental illness. An individual's risk may need reclassification to a higher category according to their First Nations ethnicity.

First Nations people without known CVD are advised to:[8]

- have their individual risk factors assessed between 18 and 29 years
- have their risk assessed using the Australian CVD Risk Calculator between 30 and 79 years.

It is reasonable for primary care clinicians to screen First Nations people, 18 years and older, for other health risk factors, including smoking status, BP, HbA1c, eGFR, uACR, lipid concentrations, and familial hypercholesterolaemia.

The recommended frequency of CVD risk assessment differs from the general population in that First Nations people are advised to be assessed:

- annually, as part of a complete health check or at least every 2 years
- opportunistically, if they attend health care infrequently.

Consider reclassifying the estimated CVD risk to a higher risk category after assessing clinical, psychological and socioeconomic circumstances, and the CVD prevalence in the community.

Conclusion

The 2023 Australian Guideline for Assessing and Managing CVD Risk reflects the latest evidence on assessing, communicating and managing CVD risk. For some time, clinicians have struggled to incorporate additional risk factors into CVD risk estimation (e.g. family history of premature CVD). The reclassification factors introduced in the 2023 guideline may help to refine and recategorise risk estimates, hence improving the discriminatory and predictive value of the calculator.

The impact of the new guideline and calculator can only be realised if recommendations are broadly implemented and embraced by primary care clinicians throughout Australia. For now, the new calculator cannot be autopopulated with patient data and must be entered manually. This may be viewed as a barrier to changing clinician preference (from the old calculator).

The National Heart Foundation of Australia is supporting implementation of the guideline and calculator through nationwide awareness campaigns and educational activities for health professionals. It is also working with the developers of GP management software to integrate the 2023 Australian CVD Risk Calculator into their software.

Resources

The National Heart Foundation of Australia has developed free resources for both health professionals and the public to help them understand the changes to the guideline. For health professionals these include:

- Guideline summary
- Summary of recommendations
- What is new in this guideline?
- On-demand clinical webinars:
  - CVD risk redefined: unveiling Australia's new CVD risk guideline and calculator
  - Prediction in practice: applying the new Australian CVD Risk Calculator

A useful resource for the general public is:

- New advice for Heart Health Checks: what does it mean for you? <

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Editor of Hypertension, a journal of the American Heart Association. He is on the Advisory Board of SiSu Health, and is a past Member of the Global Vaccine Advisory Board, Sanofi Pasteur.

Natalie Raffoul is the Healthcare Programs Manager of the NHFA; NHFA, on behalf of the Australian Chronic Disease Prevention Alliance, received funding from the Australian Government Department of Health and Aged Care to develop the 2023 Australian Guideline for Assessing and Managing Cardiovascular Disease Risk and the Australian CVD Risk Calculator and led its implementation in general practice). She received speaker fees for presentation at educational events sponsored by Amgen and Novartis.

Mark Nelson is a Senior Member of the Menzies Institute for Medical Research, University of Tasmania, and Adjunct Professor at the Department of Epidemiology and Preventive Medicine, Monash University. He is the Deputy-Chair of the Research Advisory Committee for the Stroke Foundation and was a member of Novartis's Inclisiran Advisory Board, for which he received payments prior to membership of the guideline committee.

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