The why, who and how of CHD prevention

Absolute risk of coronary heart disease (CHD) is determined using all the major CHD risk factors, including age and gender, and is a better indicator than relative risk of those patients in whom intervention is appropriate. Various risk calculation tools exist to aid the accurate assessment of absolute risk.

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Coronary heart disease (CHD) is the single largest health problem for Australia, the cause of 18% of all deaths.[1] Although both genetic and environmental factors contribute to its development, it is now thought that environmental factors are most important and that CHD is largely preventable.

Preventing CHD

We have long managed our patients for the prevention of CHD events, such as myocardial infarction (MI) and angina, by dividing them into those who have manifest disease (secondary prevention) and those who do not (primary prevention). Those with manifest disease are at high to very high risk of subsequent CHD events and warrant aggressive therapy. In those without manifest disease, the risk varies from low in those without CHD risk factors to very high in adults with preclinical disease.

The identification of individuals at risk of CHD is very important and has traditionally been based on relative risk – that is, the risk of an individual having a CHD event compared to others of his or her age and gender. Relative risk therefore excludes the two most important drivers of CHD risk, age and gender. Risk is better quantified using all the major CHD risk factors. This is called absolute risk, defined as the risk of CHD events (expressed as a percentage) over a specified period of time, usually five or 10 years. Thus, identifying those patients in whom to intervene is determined by the individual's risk factor profile and absolute risk (Table 1). It is difficult to estimate absolute risk without the use of tables or a calculator.[2] Appropriate tools for this are described later.

Interventions in the general low risk population are based on the following lifestyle factors: smoking, nutrition, alcohol and physical activity (SNAP).[3] The various approaches all have a behavioural change basis (Table 2).[4] An approach may be based on a single risk factor (for example, smoking cessation should always be the priority in a smoker) or involve multiple measures (for example, high blood pressure can be reduced by increasing physical activity, achieving weight loss and moderation of high alcohol and salt intake).[5] Patients at high risk or with overt disease

IN SUMMARY

- **Identify all patients who have established vascular disease.**
- **Use a tool to calculate the absolute risk of CHD in patients without established vascular disease, i.e. the risk of a patient having a vascular event over the ensuing five years.**
- **Intervene with lifestyle advice based on smoking, nutrition, alcohol and physical activity (SNAP) in all patients, when appropriate.**
- **Intervene with drugs and other therapies in addition to lifestyle advice for patients at high absolute risk, including those with established vascular disease.**

Table 1. Risk factors for coronary heart disease

Specific CHD risk factors

Increasing age
Male gender
Smoking
Increasing total or LDL cholesterol
Diabetes
Elevated blood pressure (see Table 3)
Family history of premature cardiovascular disease

Other risk factors

Lower HDL cholesterol
Microalbuminuria, especially in diabetes
Impaired glucose tolerance
Overweight and obesity
Physical inactivity
Social, ethnic and cultural (e.g. Aboriginal ethnicity), and geographical factors
Raised fibrinogen
Raised homocysteine
Raised C-reactive protein

Disease states

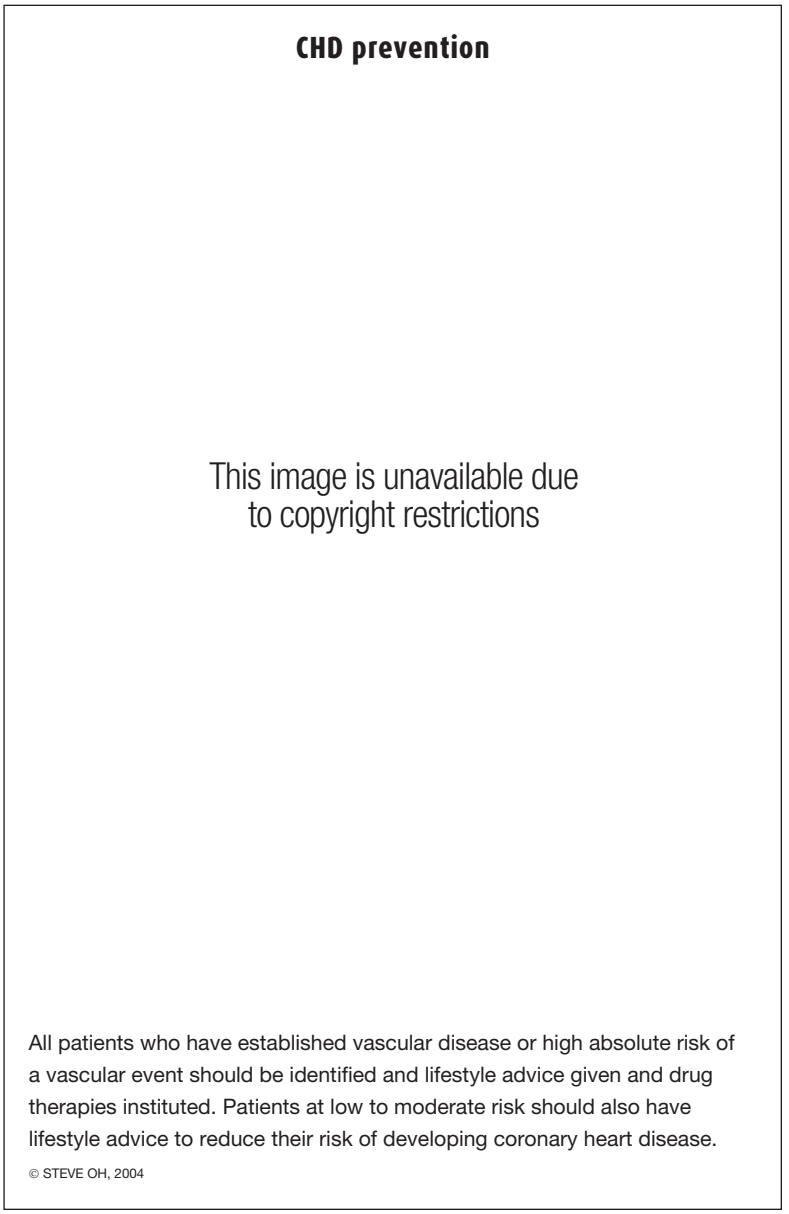
Target organ damage

Left ventricular hypertrophy
Proteinuria +/- impaired renal function
Demonstrated atherosclerotic plaque

Associated clinical conditions

Heart disease: acute myocardial infarction, angina, heart failure, coronary revascularisation
Cerebrovascular disease: previous stroke, transient ischaemic attack
Vascular disease: aortic aneurysm, symptomatic arterial disease

CHD prevention



All patients who have established vascular disease or high absolute risk of a vascular event should be identified and lifestyle advice given and drug therapies instituted. Patients at low to moderate risk should also have lifestyle advice to reduce their risk of developing coronary heart disease.

need drug therapy in addition to lifestyle changes (Table 3).[4-6]

Assessing absolute risk

Absolute risk in individuals who have not had a previous clinical manifestation of CHD can range from very low to very high. The risk can be estimated by assessing all an individual's CHD risk factors and the use of a tool such as the New Zealand Cardiovascular Risk Calculator (see the boxes on pages 20 and 21).[7] Computer-based absolute risk tools such as *AbsoluteRisk* are also available.[8] These tools are based on data from the Framingham Study; an Australian tool is being developed based on local population studies.

As can be seen from the New Zealand Risk Calculator, type 2 diabetes is a major driver of absolute risk of CHD. Risk is at least doubled in people with diabetes, particularly so in women.[9] Some doctors consider that patients with diabetes and no manifest vascular disease should be regarded as having equivalent risk to patients

continued

Table 2. CHD prevention: management options for lifestyle/behavioural risk factors*

Risk factor	Goal	Management options within general practice	Management options outside general practice
Smoking	• Complete cessation • Avoidance of passive smoking	• Strongly encourage the patient and family to stop smoking – even 3 to 5 minutes of encouragement can increase cessation rates. Give advice tailored to the individual's readiness to stop and his or her circumstances; provide education material • If the patient smokes >10 cigarettes a day, consider drug therapy. Nicotine replacement therapy (NRT) is the first line choice for patients with less severe cardiovascular disease (CVD) but is not recommended in the presence of a recent CVD event. Consider bupropion therapy in stable CVD. Combination NRT and bupropion should be considered in a specialist setting only	• Quitline (131 848) • Smoking cessation program
Nutrition	• Healthy eating – i.e. saturated and trans fatty acid intake no more than 8% total intake	• Promote plant-based food (fruit, vegetable, legume and grain) consumption, and moderation in lean meats, poultry, fish, low-fat dairy and poly/monounsaturated fats • Provide education material. If the patient does not prepare his or her own food, consider also the education or referral of the person doing this	• Dietitian
Alcohol	• Low risk consumption	• Assess medications for potential interaction with alcohol • Encourage patients with hypertension who drink alcohol to limit their intake to ≤20 g per day • It is not recommended that abstainers take up drinking or that drinkers increase their alcohol intake	• Alcohol services
Physical activity	• 30 minutes of moderate intensity physical activity five or more times per week. Can be accumulated in bouts of 10 minutes duration	• Assess habits, whether CHD present and severity, and significant comorbidity. Conditions requiring clinical assessment and supervision include unstable angina, uncontrolled hypertension, complicated acute MI (within 3 months), untreated heart failure or cardiomyopathy, symptoms such as chest discomfort or shortness of breath on low exertion, or resting heart rate >100 bpm • Measure physical activity and recommend an appropriate graduated exercise regimen with initial low intensity. Useful tools include *Physical Activity Module* and *Active Script* (both available on clinical software) • Vigorous exercise is not recommended for those with coronary heart disease. Moderate exercise (e.g. brisk walking, low paced swimming, gentle aerobics, lawn mowing) will cause a slight increase in breathing and heart rate, and may cause sweating	• Cardiac rehabilitation services (especially in the post-acute event period) • Regional exercise groups, gym facilities etc. Identify these through your local council or Division of General Practice
Weight management	• Waist measurement:† males ≤94 cm, females ≤80 cm • BMI <25 kg/m^2	• Assess and monitor • Set intermediate achievable goals • Encourage healthy eating and physical activity	• Dietitian • Regional exercise groups, gym facilities etc.

*Adapted from reference 4.

†Based on evidence of increased risk of death in European populations. May not be appropriate for all age and ethnic groups.

with CHD. The approach to be recommended in Australia is currently under discussion. However, whatever approach is decided upon, the risk in people with diabetes is high.

There is a caveat to the use of absolute risk tables for clinical decision making. Absolute risk may be said to be democratic but inequitable; this is because it treats all adverse events the same. For example, a fatal myocardial infarction in a 45-year-old father of four children is not comparable with a fatal myocardial infarction in a demented 85-year-old man. Clinical judgement remains important.

Table 3. CHD prevention: management options for biomedical risk factors

Risk factor	Goal	Management options within general practice	Management options outside general practice
Lipids	• LDL-C <2.5 mmol/L • Total cholesterol <4.0 mmol/L • HDL-C >1.0 mmol/L • TG <2.0 mmol/L	• Lifestyle: provide healthy eating advice • Consider statins for all patients with CHD or at high risk. Note that benefit of treatment in high risk groups (e.g. diabetes and other CVD) has been confirmed • Statins are agent of choice for LDL-C lowering • Fibrates are agent of choice for triglyceride lowering and HDL-C raising • Combination therapy is potentially hazardous (seek specialist opinion)	• Dietitian • Heartline (1300 362 787) • Cardiologist
Blood pressure	• Aged ≥65 years (unless diabetes and renal insufficiency): <140/90 mmHg • All others: <130/85 mmHg unless proteinuria 0.25-1 g/day, then <130/80 mmHg, or proteinuria >1 g/day, then <125/75 mmHg	• Lifestyle: encourage weight loss (where appropriate) and physical activity (e.g. *Active Script, Physical Activity Module*); limit alcohol to ≤20 g/day; encourage healthy eating, including salt restriction (most salt in our diet is in processed food so teach patients to read nutrition labels) • Drug therapy: in established disease and diabetes, ACE inhibitor based (angiotensin II receptor antagonist [ARA] if ACE inhibitor not tolerated). Most patients will require combination therapy to reach the goal. Combination therapy is effective and minimises side effects. Avoid the combinations of ACE inhibitor or ARA + potassium sparing diuretic, and beta blocker + verapamil or diltiazem • If 'white coat' hypertension is suspected, base management on ambulatory or home-based readings	• Dietitian • Heartline (1300 362 787) • Cardiologist • Exercise groups
Diabetes	• Optimise blood glucose control (HBA_{1c} ≤7%), and blood pressure control (as appropriate) • Assess and manage CVD risk factors	• Screen patients with CHD • Lifestyle: first line management is behavioural–weight loss (where appropriate); encourage physical activity and healthy eating • Drug therapy: metformin is the initial drug of choice in overweight patients unless contraindicated. Sulfonylureas reduce the risk of microvascular complications. Regarding newer agents, await study outcomes to clarify their role • Treat other risk factors • Consider tight glucose control with insulin for 3 or more months in patients with diabetes with acute coronary syndromes	• Dietitian • Diabetes educators • Diabetes Australia Help line (1300 136 588) • Endocrinologist • Exercise groups

continued

Addressing risk factors in patients with CHD

Therapeutic intervention

Except in isolated rural settings the patient who presents for CHD secondary prevention management at a general practice clinic will have been managed at some time in a specialist environment and should have been initiated on evidence-based drug therapy in addition to lifestyle measures. The appropriate drug therapy may be remembered as ABAS:

- A for antiplatelet agent (aspirin 75 to 150 mg per day and/or clopidogrel [Iscover, Plavix] 75 mg per day where aspirin is contraindicated or not tolerated, or where the patient has had a recurrent ischaemic event) and/or anticoagulant (warfarin [Coumadin, Marevan] for post-acute MI atrial fibrillation and cardiac failure)
- B for beta blocker
- A for ACE inhibitor or angiotensin II receptor antagonist (ARA) where ACE inhibitor is not tolerated
- S for statin.

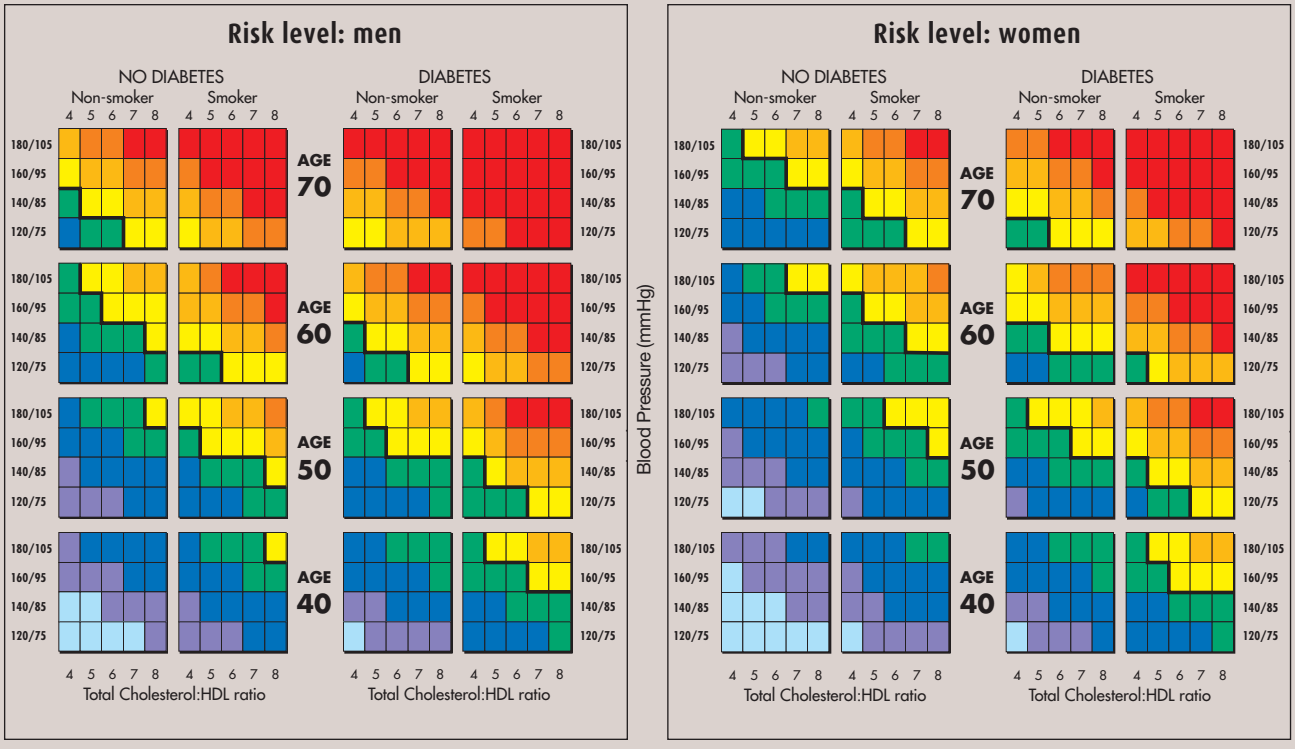
It is particularly important that if the patient has manifest disease, it is this rather than their blood pressure or cholesterol level that dictates the indication for the beta blocker, ACE inhibitor and statin, respectively.

The management issues for GPs are, firstly, to identify those patients who may have failed to have ABAS therapy initiated or who have 'drifted off' appropriate therapy and, secondly, to maintain therapy through their communication skills. If a patient is not on ABAS, it is imperative to establish if there is a contraindication

The New Zealand Cardiovascular Risk Calculator: estimating absolute CVD risk*

The New Zealand Cardiovascular Risk Calculator is a series of colour charts that enable the estimation of the absolute risk of a cardiovascular disease (CVD) event over the ensuing five years for men and women without known cardiovascular disease. CVD events include newly diagnosed angina, myocardial infarction, coronary heart disease-related death, stroke and transient ischaemic attack. Note that patients with manifest CVD, genetic lipid disorders, diabetic nephropathy or diabetes with other renal disease are assumed already to have a CVD risk >20% over five years.

To use these charts, identify the colour cell that best relates to the patient's gender, age, smoking status, diabetes status, blood pressure (mean of two readings on two occasions; where systolic and diastolic values fall at different risk levels, the higher category applies) and total



to such therapy and, if not, to initiate it. With the exception of aspirin, for which the therapeutic response does not increase above 150 mg per day but the side effects do, such medication often needs to be increased over time to ensure therapeutic targets are attained and maintained.[4]

Patients with known CHD should also have a short acting nitrate (sublingual glyceryl trinitrate [Anginine, Lycinate, Nitrolingual Pumpspray]) on hand and a written action plan (see the box on page 22). With these patients, the imperative to act during episodes of chest discomfort not responding to nitrates should be stressed. The risk of ventricular fibrillation and sudden death is much higher in the first hour after onset of acute myocardial infarction, and the benefit of reperfusion therapy much greater the earlier it occurs. Additional therapy is required for patients who develop complications such as heart failure (which is beyond the scope of this article).

Whereas anxiety and job stress have not been shown conclusively to be significant risk factors for CHD, depression, social isolation and lack of quality social support have. Depression is frequently a significant comorbidity in patients with CHD and is amenable to cognitive behavioural therapy and drug therapy. SSRIs are safe but may interact with warfarin.

Behavioural modification

As previously mentioned, therapeutic intervention is always based on behavioural modification. Strategies to improve those behaviours that add directly or indirectly to CHD risk should be at the

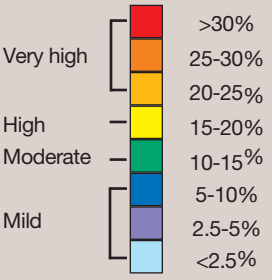
cholesterol/HDL cholesterol ratio. For example, the lower left cell contains all nonsmokers without diabetes who are less than 45 years of age and have a total cholesterol:HDL ratio below 4.5 and a blood pressure below 130/80 mmHg. When values fall exactly on a threshold between cells, the higher category applies.

Compare the cell colour with the risk level column below and categorise the patient's risk to aid treatment decisions. Estimated benefits are given in the table below. The following patients should be moved up one risk category: Aboriginal and Torres Strait Islanders, Pacific Islander and Indian subcontinent patients, patients with both diabetes and microalbuminuria, type 2 diabetes patients of 10 years or more or with a HbA_{1c} consistently >8%, and patients with the metabolic syndrome. Patients with a blood pressure consistently >170/100 mmHg or total cholesterol >8 mmol/L or total cholesterol:HDL >8 are also assumed to have a cardiovascular risk >15%.

Tell your patient his or her risk and decide on a course of action. Drug treatment (particularly a statin) is usually warranted for individuals at a 10 to 15% or greater risk of CVD events over five years.

Risk level

5-year CVD risk (nonfatal and fatal)



Benefits[†]

Risk level: 5-year CVD risk (nonfatal and fatal)	Number needed to treat for 5 years to prevent one event (CVD events prevented per 100 people treated for 5 years)		
	1 intervention [25% risk reduction]	2 interventions [45% risk reduction]	3 interventions [55% risk reduction]
30%	13 (7.5 per 100)	7 (14 per 100)	6 (16 per 100)
25%	16 (6.25 per 100)	9 (11.25 per 100)	7 (13.75 per 100)
20%	20 (5 per 100)	11 (9 per 100)	9 (11 per 100)
15%	27 (4 per 100)	15 (7 per 100)	12 (8 per 100)
10%	40 (2.5 per 100)	22 (4.5 per 100)	18 (5.5 per 100)
5%	80 (1.25 per 100)	44 (2.25 per 100)	36 (3 per 100)

[†] Based on the conservative estimate that each intervention – aspirin, blood pressure treatment (lowering systolic blood pressure by 10 mmHg) or lipid modification (lowering LDL cholesterol by 20%) – reduces cardiovascular risk by about 25% over 5 years.

* Charts, key and benefits table reproduced with the permission of the New Zealand Guidelines Group. These materials and further notes are available online at http://www.nzgg.org.nz/guidelines/0035/CVD_Risk_Chart.pdf

Using the New Zealand Cardiovascular Risk Calculator

Mr B., aged 55 years, smokes 20 cigarettes per day, has no history of heart or other vascular disease, is not diabetic, and has a blood pressure of 140/85 mmHg, a total cholesterol of 6.0 mmol/L and HDL cholesterol of 1.0 mmol/L. Using the New Zealand Risk Calculator charts:

1. How likely is Mr B. to develop or die from heart or other vascular disease in the next five years?
2. How many events would be prevented if 100 patients like Mr B. were treated with aspirin, statins and antihypertensives for five years?
3. How many patients like Mr B. would need to be treated with aspirin, statins and antihypertensives for five years to prevent one vascular event?
4. Should Mr B. receive drug therapy?

Answers at the end of the article.

Action plan for chest pain/discomfort

Patient name ……..

Issued by Dr …… Date……..

1. Rest and take <insert short acting nitrate> under your tongue.
2. Take a <insert half or whole> aspirin tablet.
3. Call an ambulance (Dial 000) if the chest pain/discomfort is not completely relieved in 10 to 15 minutes.

For areas where ready access to an ambulance service is unavailable replace 'Call an ambulance (Dial 000)' with 'Call <insert hospital or clinic name> on <insert number >.

forefront of management. Smoking cessation, exercise, weight loss where appropriate, alcohol moderation and dietary modification all reduce the risk of CHD (Table 2). Such strategies are underpinned by motivational interviewing and behavioural change assessment and by appropriate referral to allied health professionals, specialists and community facilities such as walking clubs and telephone support services.

Patient education material is particularly useful for reinforcing educational messages from GPs.

Conclusion

Individuals with CHD or a high risk of developing it should be identified and behavioural change and drug therapy instituted. Patients below the threshold of risk for drug therapy should have lifestyle advice in which healthy behaviours should be reinforced and unhealthy behaviours discouraged. If disease is not evident then high risk patients can be differentiated from those at low or moderate risk by measuring their risk factors and entering these into a risk calculator. MT

References

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DECLARATION OF INTEREST: None.

Answers

1. Mr B. has a 20 to 25% risk of an event in the next five years, which is very high and suggests aggressive treatment is warranted.
2. Approximately 14 events if treated with lipid and blood pressure lowering agents and aspirin.
3. 7 patients treated with lipid and blood pressure lowering agents and aspirin.
4. Mr B. is likely to benefit from drug treatment.