Cardiovascular disease primary prevention: new guidelines, technologies and therapies

Prof Mark Nelson and Dr Robert Grenfell
Cardiovascular disease primary prevention: New guidelines, technologies and therapies

MR Nelson, R Grenfell
• “Primary prevention: Guidelines and new therapies”.
• “emphasise key recent advances and any controversies in management”

• hotly contested move from individual cardiovascular risk factors to an absolute risk based approach
• legacy effects of ‘failing to act early’
• practical implications such as how an absolute approach can be taken within the PBS
• the reawakening of ‘old’ technologies such as renal artery ablation
• controversies such as bariatric surgery
• Medication is best initiated in those most likely to benefit from it and thus have a favourable risk to benefit ratio

• Individual risk factors ‘hypertension’ ‘hypercholesterolaemia’
  – Fits with the disease model
  – Easy cut points for diagnosis

• Absolute risk
  – Probability of a CVD event over a 5 year period
  – Recognises that BP and lipid levels represent a continuum of risk
  – More cost effective
  – Avoids medicalisation of the low risk population
  – Identifies those most likely to have covert CVD avoiding costly additional investigations
  – Drugs can be initiated at a level above the ideal rather than at an arbitrary cut point
  – Attention is paid to CVD risk which otherwise might be subsumed within a particular chronic disease management strategy (e.g. diabetes)
• Joe is a 64 year old smoker without diabetes or known cardiovascular disease. He has a blood pressure of 136/82 mmHg, total cholesterol of 5.4 mmol/L and HDL-c 1.0 mmol/L.

• Jane is a 46 year old non-smoker without diabetes or known cardiovascular disease. She has a blood pressure of 142/82 mmHg, total cholesterol of 6.5 mmol/L and HDL-c 1.4 mmol/L.
• Joe is a 64 year old smoker without diabetes or known cardiovascular disease. He has a blood pressure of 136/82 mmHg, total cholesterol of 5.4 mmol/L and HDL-c 1.0 mmol/L.

• Jane is a 46 year old non-smoker without diabetes or known cardiovascular disease. She has a blood pressure of 142/82 mmHg, total cholesterol of 6.5 mmol/L and HDL-c 1.4 mmol/L.
Australian absolute cardiovascular disease risk calculator

Enter patient information below:

Sex  ○ Male  ○ Female
Age  [ ] years (35-74)
Systolic blood pressure  [ ] [75-250 mm/Hg]
Smoking status  ○ Yes  ○ No  i
Total Cholesterol  [ ] [2-30 mmol/L]
HDL Cholesterol  [ ] [0.2-10 mmol/L]
Diabetes  ○ Yes  ○ No  i
ECG LVH  ○ Yes  ○ No  ○ Unknown

An initiative of the National Vascular Disease Prevention Alliance

http://www.cvdcheck.org.au/
Australian absolute cardiovascular disease risk calculator

Enter patient information below:

- Sex: Male ☐, Female ☐
- Age: 64 years (35-74)
- Systolic blood pressure: 136 (75-250 mm/Hg)
- Smoking status: Yes ☐, No ☐
- Total Cholesterol: 5.4 (2-30 mmol/L)
- HDL Cholesterol: 1.0 (0.2-10 mmol/L)
- Diabetes: Yes ☐, No ☐
- ECG LVH: Yes ☐, No ☐, Unknown

RESET ☐ GO ☐

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View Guidelines and Resources

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Australian absolute cardiovascular disease risk calculator

Enter patient information below:

- **Sex**: Male
- **Age**: 46 years (35-74)
- **Systolic blood pressure**: 142 [75-250 mmHg]
- **Smoking status**: Yes
- **Total Cholesterol**: 6.5 [2-30 mmol/L]
- **HDL Cholesterol**: 1.4 [0.2-10 mmol/L]
- **Diabetes**: Yes
- **ECG LVH**: Yes

**Risk score**: 5 year possibility of CVD

*Your heart and stroke risk is 3%*

This puts you at LOW RISK of cardiovascular disease (CVD)

Please speak to your doctor for further advice.

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Who to ‘medicalise’?

• Other than smoking Joe has no elevated individual risk factors that would warrant medication.
• Joe’s absolute risk is high (21%).
• Joe requires medication in addition to lifestyle factor changes.

• Jane has ‘hypercholesterolaemia’ and ‘hypertension’ that would have her taking lifelong antihypertensive and lipid lowering therapy.
• Jane’s absolute risk is low (3%).
• Jane needs attention paid to her antecedent risk behaviours rather than medication.
• Risk is communicated as low (<10%), moderate (10-15%) or high (>15%).

• Medication is recommended for individuals at high risk and sometimes moderate risk if additional risk factors are at play (e.g. Aboriginal and/or Torres Strait Islander status or family history of premature CVD).
Don’t need a calculator

- Manifest CVD / TOD
- Known high risk of CVD (e.g. diabetes + >60)
- <45 almost all patients will be low risk.
- >74 years enter their age as 74 in the calculator to provide a minimum estimate of risk.
Is there evidence for the absolute risk approach?

- No RCT
- Individual patient data (IPD) meta-analyses of BP trials
  - RRR was constant down to 110 SBP / 70 DBP
  - results were consistent in primary and secondary prevention trials.
  - Ditto cohort studies.
- IPD meta-analysis of lipid lowering trials
  - RRR results were consistent in primary and secondary prevention trials.
  - constant RRR regardless of the baseline risk and increasing benefits from treatment with increased absolute risk of CVD.
• Poor referral patterns / implementation

• Perception of low efficacy

• What is the evidence? Present it and reinforce value.
• Reduces the risk of CVD substantially and sustainably, and also reduces all-cause mortality.

• Health professional advice, NRT and medication are effective smoking cessation interventions.
• Reduces elevated BP, lipid and glucose levels.
• Even modest weight loss (5 to 10% of initial weight) can improve health.
• Some evidence that low CHO-high protein diets, such as the CSIRO diet, have greater weight loss and lower attrition rates (short term).
• Medication disappointing because of the lack of sustained weight loss and the risk of side effects.
Weight loss surgery

• Swedish Obese Study showed average weight loss of 14-25% over 10 years, and a reduction in all-cause mortality, diabetes and cardiovascular disease. (Observational)

• Weight loss surgery is recommended if BMI is > 40 kg/m2 or > 35 kg/m2 with co-morbidity.
• Regular reduces CVD risk, reduces individual CVD risk factors and protects against other diseases.
• Health benefits are achieved with around 150-300 minutes of moderate-intensity activity or 75-150 minutes of vigorous activity each week.
• Drugs for BP and cholesterol (and others) are on the PBS.
• BP lowering medications are ‘older’ and have a clinical indication ‘hypertension’
• Cholesterol medication are ‘newer’ and to contain costs have restricted prescribing criteria.
• Lipid lowering criteria by the PBAC in 2006 attempted to bring the PBS criteria more in line with the absolute risk approach
• Then no widespread access to a CVD risk calculator
• Needs to be addressed.
• Oscillometric BP (both clinic and home use).

• Ambulatory BP (ABP) devices.

• Opportunity to self-cite 😊 and translate own research findings into practice.


Multiple clinical, biomarker and imaging tests have been proposed as methods for identifying patients at high risk of cardiovascular disease.

None superior to current algorithms and add little to them.

Usually costly and adverse effects.

May have utility in reclassification esp. moderate to high risk (e.g. CT coronary angiography & coronary artery calcium score).
New therapies for CVD risk factors

- Fish consumption but not fish oil
- Denervation of the kidney using minimally invasive devices
  - has BP-lowering effects
  - glucose metabolism, renal impairment, left ventricular hypertrophy, and other conditions possible benefits. At the moment
  - still early in its development and availability.
Vascular disease risk factor prevalence in Australia

- BP = 13.8% (1.4 million)
- Lipid & BP = 12.7% (1.3 million)
- Lipid = 14.0% (1.42 million)
- BP & DM = 1.7% (172,000)
- Lipid & DM = 1.4% (142,000)
Hypertension

<table>
<thead>
<tr>
<th>Description</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.6 million adult Australians have hypertension (&gt;140/80 mmHg or meds)</td>
<td></td>
</tr>
<tr>
<td>1.46 million on meds and have controlled hypertension</td>
<td></td>
</tr>
<tr>
<td>1.1 million on meds are not controlled</td>
<td></td>
</tr>
<tr>
<td>2 million are not on any meds</td>
<td></td>
</tr>
<tr>
<td>Controlled</td>
<td>2 in 3 are unmanaged/uncontrolled (3.1 million)</td>
</tr>
</tbody>
</table>
GP perception of CV risk in Stroke and MI patients

- **MI patients**
  - Low: 31%
  - Moderate: 22%
  - High: 13%
  - Very high: 35%

- **Stroke patients**
  - Low: 48%
  - Moderate: 22%
  - High: 8%
  - Very high: 22%
Patients Perception of Risk

- MI patients
  - Low: 24%
  - Moderate: 62%
  - High: 3%
  - Very High: 12%

- Stroke patients
  - Low: 43%
  - Moderate: 50%
  - High: 1%
  - Very High: 5%
Primary Prevention Prescribing by Absolute Risk Category

Proportion of Patients (%)

- BP lowering
- Lipid lowering
- BP + lipid lowering
- BP + lipid lowering + antiplatelet

Low (<10%), Medium (10-15%), High (>15%)
Secondary Prevention Prescribing for Stroke and MI Patients compared to those at High CV Risk
Numbers to treat

<table>
<thead>
<tr>
<th>Risk level: 5-year CVD risk (fatal and non-fatal)</th>
<th>Benefits: NNT for 5 years to prevent one event (CVD events prevented per 100 people treated for 5 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30%</td>
<td>1 intervention (25% risk reduction)</td>
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<tr>
<td></td>
<td>13  (7.5 per 100)</td>
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<tr>
<td>20%</td>
<td>2 interventions (45% risk reduction)</td>
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<tr>
<td></td>
<td>20  (5 per 100)</td>
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<tr>
<td>15%</td>
<td>27  (4 per 100)</td>
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<tr>
<td>10%</td>
<td>40  (2.5 per 100)</td>
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<tr>
<td>5%</td>
<td>80  (1.25 per 100)</td>
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<tr>
<td></td>
<td>3 interventions (55% risk reduction)</td>
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<tr>
<td></td>
<td>6   (16 per 100)</td>
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<td>9   (11 per 100)</td>
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<td>12  (8 per 100)</td>
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<tr>
<td></td>
<td>18  (5.5 per 100)</td>
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<tr>
<td></td>
<td>36  (3 per 100)</td>
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</table>

NNT = Number needed to treat

Based on the conservative estimate that each intervention: aspirin, BP treatment (lowering SBP by 10 mm Hg) or lipid modification (lowering LDL-C by 20%) reduces cardiovascular risk by about 25% over 5 years.