Cost-effective chronic disease treatment – targeting global risk to prevent death and avoidable hospitalization

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Total health expenditure and GDP

$89.6B representing 9% GDP

(a) Constant price health expenditure for 1995–96 to 2005–06 is expressed in terms of 2004–05 prices.
Private Health Insurance Expenditure

Total funding: $6,284 million

- Private hospitals: 48.6%
- Medical services: 10.1%
- Dental services: 12.1%
- Other health practitioners: 6.1%
- Administration: 10.2%
- Other health services(a): 6.4%
- Public hospital services(a): 6.5%

AIHW cat. No. HWE37 2007
## ABS Leading Causes of Death 2004

<table>
<thead>
<tr>
<th>Multiple Causes</th>
<th>Number (%)</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer</td>
<td>52217 (39.4)</td>
<td>1</td>
</tr>
<tr>
<td>IHD</td>
<td>46985 (35.5)</td>
<td>2</td>
</tr>
<tr>
<td>Stroke</td>
<td>23359 (17.6)</td>
<td>3</td>
</tr>
<tr>
<td>Influenza and pneumonia</td>
<td>18305 (13.8)</td>
<td>4</td>
</tr>
<tr>
<td>Heart failure</td>
<td>16837 (12.7)</td>
<td>5</td>
</tr>
<tr>
<td>Hypertensive diseases</td>
<td>15605 (11.8)</td>
<td>6</td>
</tr>
<tr>
<td>Kidney failure</td>
<td>15235 (11.5)</td>
<td>7</td>
</tr>
<tr>
<td>Chronic lower respiratory</td>
<td>14190 (10.7)</td>
<td>8</td>
</tr>
<tr>
<td>Organic (incl. mental disorders)</td>
<td>11843 (8.9)</td>
<td>9</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>11749 (8.9)</td>
<td>10</td>
</tr>
</tbody>
</table>
Growth in total demand for RRT services from 1980 to 2004

Index number relative to 1980 = 100

Population growth
ESKD growth

Graph showing the growth in total demand for RRT services from 1980 to 2004, with index numbers relative to 1980 = 100.
Projected annual health care costs for RRT for each year from 2004-10

<table>
<thead>
<tr>
<th>Year</th>
<th>Steady state</th>
<th>Linear growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>559.9</td>
<td>559.9</td>
</tr>
<tr>
<td>5</td>
<td>640.1</td>
<td>652.5</td>
</tr>
<tr>
<td>6</td>
<td>688.0</td>
<td>712.9</td>
</tr>
<tr>
<td>7</td>
<td>724.5</td>
<td>763.8</td>
</tr>
<tr>
<td>8</td>
<td>754.5</td>
<td>808.6</td>
</tr>
<tr>
<td>9</td>
<td>782.3</td>
<td>852.5</td>
</tr>
<tr>
<td>2010</td>
<td>811.3</td>
<td>899.1</td>
</tr>
</tbody>
</table>
Burden hospitalisation 2004-5

5.5M hospitalisations (excluding dialysis)

1 in 4 hospitalisations

AIHW cat. no. CVD37 2007
Lower risk group

- High cholesterol
- Hypertension
- Diabetes

Higher risk group

Established CVD
Treatment gaps

BP lowering | Chol lowering | Antiplatelet | All 3
--- | --- | --- | ---
Low (<10%) | Medium (10-15%) | High (>15%) | %

Unpublished data The George Institute
Mr INGRAM, Bobby (PID 1)

PID: 1
Mr INGRAM, Bobby.
Male DOB: 11/Dec/1954 (52 years)

365 King St
Marrickville, NSW, 2204
Australia

Referral source:
UID: 0
Dr CHAN, Leah
34 links Ave,
Bexley NSW 2194,
Australia

'CC' list:
UID 1: Arjumna Medical Service, 42 Clove Ave
UID 2: Dr Sunitha SINGH, Suite 308 St George M

Other 'CC' list:

Add new... Delete... Edit...
Add patient to 'CC' list
Mr INGRAM, Bobby (PID 1)

Problem List:
1. CAD (LAD mid on angiogram 2005)
2. Sarcoid

Inactive medical history:
1. Gout
2. Osteoarthritis

Other History (local information, not for output letters):
Mr INGRAM, Bobby (PID 1)

Medication List:

<table>
<thead>
<tr>
<th>No</th>
<th>Medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>aspirin 75mg PO daily</td>
</tr>
<tr>
<td>2</td>
<td>atenolol Tablet 50 mg PO daily</td>
</tr>
<tr>
<td>3</td>
<td>lisinopril Tablet 20 mg PO daily</td>
</tr>
<tr>
<td>4</td>
<td>simvastatin Tablet 40 mg PO daily</td>
</tr>
</tbody>
</table>

Allergies/Drug SE:

<table>
<thead>
<tr>
<th>No</th>
<th>Allergy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nil known</td>
</tr>
</tbody>
</table>

Other non-medical remedies:
**Mr INGRAM, Bobby (PID 1)**

**Body measurements:**
- Height: 184 cm
  - 23/Aug/2007
- Waist: 96 cm
  - 23/Aug/2007
- Hip: <N/A>
- Weight: 80 kg
  - 23/Aug/2007

**Observations:**
- **BP:** 162/82 mmHg
  - 05/Oct/2007
- Heart Rate: 80 / min
  - 23/Aug/2007
- Resp: <N/A>
- Temperature: <N/A>
- O2metry: <N/A>

**Derived values:**
- BM: 26.5 kg/m²
  - 23/Aug/2007
- BSA: 2.1 m²
  - 23/Aug/2007
- Waist-Hip Ratio: <N/A>

**Graph:**
- BP trend from 11/08/2007 to 10/10/2007
- Systolic BP: Red line
- Diastolic BP: Blue line

**Legend:**
- Red triangle: Systolic BP
- Blue triangle: Diastolic BP
Mr Ingram, Bobby (PID 1)

**Lifestyle assessment**

**Smoking:**
- Never smoked
- Smoker/Ex-smoker

**Diet:**
- Alcohol (estimate):
  - None or minimal EtOH use
- Dietary Sodium (estimate):
  - <N/A>
- Dietary dairy intake (estimate):
  - <N/A>
- Dietary fresh F & V intake (estimate):
  - <N/A>

**Exercise:**
- Exercise Amount (estimate):
  - <N/A>
- Exercise Duration (estimate):
  - <N/A>
- Exercise Frequency (estimate):
  - <N/A>

Set Exercise Summary Data

Set Dietary Summary Data
Vascular Health Clinic

Mr INGRAM, Bobby (PID 1)

Lifestyle assessment

Smoking:
- Never smoked
- Smoker/Ex-smoker

- Started at age: 15 years
- Has smoked for: <N/A>
- Number per day: 20
- Tobacco type: Cigarettes
- Year ceased: 1994

Diet:
- Alcohol (estimate): None or minimal EtOH use
- Dietary Sodium (estimate): High
- Dietary dairy intake (estimate): <N/A>
- Dietary fresh F & V intake (estimate): medium

Exercise:
- Exercise Amount (estimate): <N/A>
- Exercise Duration (estimate): <N/A>
- Exercise Frequency (estimate): <N/A>

Set Exercise Summary Data

Set Dietary Summary Data

Set new values
Mr INGRAM, Bobby (PID 1)

Lifestyle assessment

Smoking:
- Never smoked
- Smoker/Ex-smoker

- Started at age: 15 years
- Has smoked for: <N/A>
- Number per day: 20
- Tobacco type: Cigarettes
- Year ceased: Current

Set new values

(SOC) Smoking intentions:
- Not considering cessation

Use of gum/patches (NRT):
- No use of NRT

Use of oral cessation Rx:
- <N/A>

Set new values

Diet:
- Alcohol (estimate):
  - None or minimal EtOH use
- Dietary Sodium (estimate):
  - High
- Dietary dairy intake (estimate):
  - <N/A>
- Dietary fresh F & V intake (estimate):
  - medium

Set Dietary Summary Data

Exercise:
- Exercise Amount (estimate):
  - <N/A>
- Exercise Duration (estimate):
  - <N/A>
- Exercise Frequency (estimate):
  - <N/A>

Set Exercise Summary Data
Vascular health clinic data entry

**History: CVD**

- **Set all unchecked to negative**
- **CAD**
- **Stroke**
- **PVD**
- **Atherosclerotic disease**
  - Year of Event: <N/A>
- **Genetic lipid disease**: No
- **LVH**: No

- **CVD in 1st relative (F < 65Y, M < 55Y)**
- **Aboriginal**
- **Pacific Island background**
- **5th Asian background**
- **Maori**
- **Other indigenous**

- **Proteinuria (ACR > 30mg/mm or > 300mg/day)**
- **Diabetes**
  - Year of Diagnosis: <N/A>
  - HbA1c > 8% (over a year or more)

**Date & Time:**
- Year: <N/A>
- Month: <N/A>
- Day: <N/A>
- Hour: <N/A>
- Min: <N/A>

**Set 'CVD' risk data**

**Patient List**

**Referral List**
<table>
<thead>
<tr>
<th>Lipid</th>
<th>Value</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total-C</td>
<td>6.1 mM</td>
<td>23/Aug/2307</td>
</tr>
<tr>
<td>HDL-C</td>
<td>1.2 mM</td>
<td>23/Aug/2307</td>
</tr>
<tr>
<td>LDL-C</td>
<td>3.7 mM</td>
<td>23/Aug/2307</td>
</tr>
<tr>
<td>Triglyceride</td>
<td>&lt;N/A&gt;</td>
<td>&lt;N/A&gt;</td>
</tr>
<tr>
<td>TC/HDL</td>
<td>5.1</td>
<td>&lt;N/A&gt;</td>
</tr>
<tr>
<td>LDL/HDL</td>
<td>3.1</td>
<td>&lt;N/A&gt;</td>
</tr>
<tr>
<td>CRF</td>
<td>&lt;N/A&gt;</td>
<td>&lt;N/A&gt;</td>
</tr>
<tr>
<td>VLDL-C</td>
<td>&lt;N/A&gt;</td>
<td>&lt;N/A&gt;</td>
</tr>
<tr>
<td>IDL</td>
<td>&lt;N/A&gt;</td>
<td>&lt;N/A&gt;</td>
</tr>
<tr>
<td>Lp(a)</td>
<td>&lt;N/A&gt;</td>
<td>&lt;N/A&gt;</td>
</tr>
<tr>
<td>Apo-E</td>
<td>&lt;N/A&gt;</td>
<td>&lt;N/A&gt;</td>
</tr>
</tbody>
</table>
Risk management inputs:

- Age: 52 years
- Sex: Male
- LVH: No
- Smoking: Yes
- Total-C: 6.1 mM
- HDL-C: 1.2 mM
- LDL-C: 3.7 mM
- Trigs: 2.7 mM
- SBP: 162 mmHg
- DBP: 82 mmHg
- Creatinine: 100 μM
- Proteinuria: No
- CKD: No (eGFR: 72 mL/min)
- Diabetes: No
- DM > 10y: No
- HbA1c >8%: No
- Hx CVD: No
- Gen. Dyslip.: No
- FHx CVD: No
- ↑ risk B/G: Yes
- BMI: 26.6 kg/m²
- Lipid Rx: No
- BP Rx: No
- Pt Rx: No

Set management inputs

These data are transient. Changing values does not affect patient data.

Absolute risk:

Estimated 5 year risk of CVD event: **22% (high)**

CVD Recommendations:

- Absolute risk assessment is **recommended** because age is ≥50, and elevated BP, elevated lipid, and higher risk B/G are present.

- Diabetes evaluation is **recommended** as higher risk background (age ≥35), and elevated blood pressure (age ≥45) are present.

- Lipids evaluation is **recommended** as age ≥45, higher risk B/G, smoking, and elevated BP are present.

- BP monitoring is **recommended** as age is over 13 years. (note elevated blood pressure present)

- Lipid modifying therapy is **recommended** as risk background, lipids, and elevated risk are present.

- Lipid modifying treatment is **not subsidised by the PBS**.

- BP lowering therapy is **recommended** as multiple indications are present.

- Antiplatelet therapy is **not required**.
Systolic BP (mmHg): 125
Diastolic BP (mmHg): 77
Risk management inputs:
- Age: 52 years
- Sex: Male
- LVH: No
- Smoking: Yes

- Total-C: 6.1 mM
- HDL-C: 1.2 mM
- LDL-C: 3.7 mM
- Trios: 2.7 mM
- Creatinine: 100 μM
- Proteinuria: No
- CKD: No (eGFR: 72 mL/min)
- Diabetes: No
- DM > 10y: No
- Hba1c >8%: No
- Hx CVD: No
- Gen. Dyslip.: No
- FHx CVD: No
- ↑ risk B/G: Yes
- BMI: 26.8 kg/m²
- Lipid Rx: No
- BP Rx: No
- Plt Rx: No

Set management inputs

Absolute risk:
- Estimated 5 year risk of CVD event: 15% (medium)

CVD Recommendations:
- Absolute risk assessment is **recommended** because **age** is ≥ 50, and **elevated lipid**, and **higher risk B/G** are present.
- Diabetes evaluation is **recommended** as **higher risk background (age ≥35)** is present.
- Lipids evaluation is **recommended** as **age ≥45**, **higher risk B/G**, and **smoking** are present.
- BP monitoring is **recommended** as age is over 18 years.
- Lipid modifying therapy is **recommended** as **risk background & lipids** is present.
- Lipid modifying treatment is **not subsidised by the PBS**.
- BP lowering therapy is **not required**.
- Antiplatelet therapy is **not required**.
CVD Management

Risk management inputs:
- Age: 52 years
- Sex: Male
- LVH: No
- Smoking: Yes
- Total-C: 6.1 mM
- HDL-C: 1.2 mM
- LDL-C: 3.7 mM
- Trigs: 2.7 mM
- SBP: 162 mmHg
- DBP: 82 mmHg
- Creatinine: 100 μM
- Proteinuria: No
- CKD: No (eGFR: 72 mL/min)
- Diabetes: No
- DM >10y: No
- HoA1c >8%: No
- Hx CVD: No
- Gen. Dyslip: No
- FHx CVD: No
- ↑ risk B/G: Yes
- BMI: 26.8 kg/m²
- Lipid Rx: Yes
- Br Rx: No
- Plt Rx: No

These data are transient. Changing values does not affect patient data.

Absolute risk:
- Estimated 5 year risk of CVD event: **22% (high)**

CVD Recommendations:
- Absolute risk assessment is **recommended** because age is ≥ 50, and elevated BP, elevated lipid, and higher risk B/G are present.
- Diabetes evaluation is **recommended** as higher risk background (age ≥ 35), and elevated blood pressure (age ≥ 45) are present.
- Lipids evaluation is **recommended** as age ≥ 45, higher risk B/G, smoking, and elevated BP are present.
- BP monitoring is **recommended** as age is over 18 years. *(Note elevated blood pressure present)*
- Lipid modifying therapy is **recommended** as risk background & lipids, and elevated risk are present.
- Lipid modifying treatment is **subsidised by the PBS if criteria have previously been met**.
- BP lowering therapy is **recommended** as multiple indications are present.
- Antiplatelet therapy is **not required**.
- Lipid modifying therapy is **not meeting target** as LDL ≥ 2.5 mM.
BP and outcomes

Approximate mean usual DBP (mm Hg)

Relative Risk

Primary stroke

CHD

Source: Lancet 1990;335:765-74
What would we gain?

1. Target treatment at high risk
   > cost-effective
2. Close evidence-practice gap
3. Bring together multiple conflicting guidelines into one evidence-based algorithm
4. Prevent avoidable hospitalisations
5. Potential $ saved for private health insurers
6. Attract members to high-quality prevention services