Ten-year trends in the use of catheter ablation for treatment of atrial fibrillation vs. the use of coronary intervention for the treatment of ischaemic heart disease in Australia

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Aims

Percutaneous coronary intervention (PCI) and catheter ablation are well-accepted therapeutic interventions for treatment of coronary artery disease and atrial fibrillation (AF), respectively. We sought to examine temporal trends in the provision of these services over the past decade in Australia.

Methods and results

A retrospective review of the numbers of PCIs and AF ablations from 2000/01 to 2009/10 was performed on data from three sources: the Australian Institute of Health, Welfare and Aging (AIHW), Medicare Australia database (MA), and local records at a high volume tertiary referral centre (RMH) for AF ablation. Linear regression models were fitted comparing trends in population-adjusted procedural numbers over the 10-year period. There was a 5% per year population-adjusted increment in PCIs over 10 years from both the AIHW and MA sources, respectively (P < 0.001). This was similar to the growth rate of all cardiovascular procedures (AIHW: 5.1 vs. 3.8%/year, P = 0.27). Atrial fibrillation ablations showed a 30.9, 23.2, and 39.8% per year population-adjusted increment over 10 years from the AIHW, MA, and RMH sources respectively (P < 0.001 for all). Growth of AF ablations was significantly higher than PCIs (P < 0.001 for AIHW and MA sources) and all cardiovascular procedures (AIHW: 30.9 vs. 3.8%/year, P < 0.001).

Conclusion

The provision of catheter-based AF ablation services in Australia has increased exponentially over the past decade. Its annual growth rate exceeded that of PCIs and all cardiovascular procedures. Given the increasing epidemic of AF, these data have critical implications for public health policy assessing the adequacy of infrastructure, training, and funding for AF ablation services.

Keywords

Atrial fibrillation • Ischaemic heart disease • Coronary artery disease • Percutaneous coronary intervention • Catheter ablation

Introduction

Coronary artery disease (CAD) and atrial fibrillation (AF) are two of the most common cardiovascular conditions contributing substantially to the health-care expenditure of most Western countries. AF portends significant morbidity from its association with stroke, heart failure, and dementia, in addition to increased all-cause mortality. The incidence of CAD is expected to rise such that it will afflict ~40% of the population by 2030 based on estimates from the USA. Similarly, the prevalence of AF doubles with each decade of life, reaching 8% after 80 years of age, and is forecasted...

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Ten-year trends in AF ablation vs. PCI

What’s new?

- This is the first study of its kind that describes temporal trends in the provision of well-accepted therapeutic interventions, catheter ablation and percutaneous coronary intervention (PCI), for two of the most common cardiovascular conditions namely atrial fibrillation (AF) and coronary artery disease in Australia.
- There was a 5%/year population-adjusted increment in PCIs over 10 years, which was similar to the growth rate of all cardiovascular procedures (3.8%/year, \( P = 0.27 \)).
- Atrial fibrillation ablations showed a 30.9% per year population-adjusted increment over 10 years which was significantly higher than PCIs and all cardiovascular procedures (\( P < 0.001 \)).
- Given the increasing epidemic of AF, the reported exponential increase in the provision of catheter-based AF ablation services has critical implications for public health policy assessing the adequacy of infrastructure, training and funding for AF ablation services in Australia.

to increase by 2.5-fold over the next 50 years, independent of known predisposing factors. Moreover, the epidemic of AF-related hospitalization and health-care expenditure is rising exponentially in most developed nations. Percutaneous coronary intervention (PCI) is one of the most commonly performed cardiovascular procedures and has established efficacy for treatment of acute coronary syndromes and chronic stable angina refractory to medical therapy. Catheter ablation for AF has also evolved significantly over the past decade in parallel with improvements in the understanding of the mechanisms of AF initiation and improvements in cardiac mapping and ablation. Catheter ablation is now a class I recommendation for the treatment of symptomatic, drug refractory paroxysmal AF.

Despite the high prevalence and substantial economic resources devoted to the management of these conditions, there is a lack of data on the temporal trends in procedural numbers of PCIs and AF ablations. Therefore, we sought to examine the nationwide temporal trends in the use of catheter ablation and PCI for the treatment of AF and CAD, respectively, in Australia.

Methods

We performed a retrospective data review on the total numbers of PCIs, all ablations combined, and AF ablations over the past 10 years from three major sources:

2. Medicare Australia database of statistics on item numbers (MA).
3. Atrial fibrillation ablation database from a high-volume tertiary referral centre for cardiac electrophysiology at The Royal Melbourne Hospital (RMH).

The AIHW data represent nationwide statistics combining procedures performed in the public and the private sector, whereas the MA data reflect nationwide private hospital activity alone. Percutaneous coronary interventions, all ablations combined, and AF ablation data were sourced from the RMH data to gain insight into local trends in these procedures. Furthermore, local RMH data allowed us to validate AIHW and MA data on AF ablations as there is no specific stand-alone procedure or billing code for AF ablations from the latter two sources, whereas specific data on AF ablation numbers were available from the RMH database. Two independent investigators (S.K. and T.W) reviewed all three data sources to obtain consistency.

Australian Institute of Health, Welfare and Aging data

Cardiovascular procedure data cubes for years 2000/01 to 2009/10 on the AIHW website were searched. An example of the interrogation flow sheet is in Figure 1.

Procedural data from the AIHW database is derived from the National Hospital Morbidity Database which is contributed to by each of the state and territory health authorities in Australia. The data are derived directly from electronic confidentialized summary records for episodes of care in public and private hospitals in Australia. The proportion of missing data is negligible, representing <0.004% of cases per year. The database collects the following information: type of procedure, year of procedure, gender of patient, age group, and whether the procedure required same day or overnight admission. Procedure type is classified according to the second edition of the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM) and the 3rd to 6th editions of Australian Classification of Health Interventions (ACHI).

Of interest to the present analysis, atrial ablation procedures were classified from 2000/01 to 2007/08 as either: (i) ‘ablation of arrhythmia circuit or focus involving one atrial chamber’ or (ii) ‘ablation of arrhythmia circuit or focus involving two atrial chambers’ (from 2000/01 to 2007/08). In 2008/09 to 2009/10 as: (i) ‘catheter ablation of arrhythmia circuit or focus, not elsewhere classified’, or (ii) ‘catheter ablation of arrhythmia circuit or focus involving left atrial chamber’, or (iii) ‘ablation of arrhythmia circuit or focus involving both atrial chambers’ (in 2008/09 and 2009/10). Procedures classified as ‘ablation of arrhythmia circuit or focus involving two atrial chambers’ were considered to be representative of AF ablations. This category most closely represents the Medicare item number description used for billing AF ablation procedures (Figure 1). For the purpose of the present analysis, we also calculated the numbers of all ablations combined which represented the sum of all atrial and ventricular ablation procedures (Figure 1).

To maintain consistency in data for this study, estimates for the number of AF ablations were derived from the category of ‘ablation of arrhythmia circuit or focus involving both atrial chambers’. To account for the change in classification from 2008, we performed three separate sub-analyses: (i) to include 2008/09 to 2009/10 numbers derived from category ‘ablation of arrhythmia circuit or focus involving both atrial chambers’ only; (ii) to include 2008/09–2009/10 numbers derived from ‘catheter ablation of arrhythmia circuit or focus involving left atrial chamber’; and (iii) restricting the analysis to years 2000/01 to 2007/08 only thus excluding the final 2 years. The combination of ‘transluminal coronary angioplasty’ and ‘transluminal coronary angioplasty with stenting’ were used to derive numbers for combined total PCIs.

We also conducted a sensitivity analysis in which we restricted the numbers of procedures from the AIHW database to include only those patients aged ≥30 years for PCIs and to those patients aged 30–85 years for AF ablations.

Medicare Australia database

Procedural data from the MA database is derived from billing claims made for procedures performed in the private hospital sector. The MA database collects information about type of procedure according to billing
Data from MA was derived on the basis of Medicare item numbers described by Medicare Benefits Schedule (MBS) online. To calculate data for 'all ablations combined', relevant MBS item numbers included were: (i) '38287—ablation of arrhythmia circuit or focus involving 1 atrial chamber'; (ii) '38290—ablation of arrhythmia circuits or foci, or isolation procedure involving both atrial chambers and including curative procedures for atrial fibrillation'; and (iii) '38293—ventricular arrhythmia with mapping and ablation, including all associated electrophysiological studies performed on the same day'. Of note, there is no specific billing code for tracking AF ablations alone. To calculate data for AF ablations, we used '38290—ablation of arrhythmia circuits or foci, or isolation procedure involving both atrial chambers and including curative procedures for atrial fibrillation'.

To calculate data for PCIs, we included the following MBS item numbers: '38300—percutaneous transluminal coronary angioplasty (PTCA) of one coronary artery'; '38303—PTCA > 1 coronary artery'; '38306—stenting'; '38309—percutaneous transluminal coronary atherectomy'; and '38312—atherectomy'.

### Tertiary hospital database

The Royal Melbourne Hospital is a high-volume tertiary referral centre in metropolitan Melbourne for electrophysiology and ablation of cardiac arrhythmias. The RMH electrophysiology database is maintained with a mandatory entry for every cardiac electrophysiology procedure performed. It contains a comprehensive record of all types of catheter ablation procedures with patient demographics, intra-procedural parameters, and procedural outcomes.

We searched the local electrophysiology database from its inception in financial year 2001/02 for a 10-year period ending 2010/11 and identified total numbers of PCIs, all ablations combined, and AF ablations. This data set was chosen, as it would reflect procedural trends from a typical tertiary referral teaching hospital in Australia. In contrast to the AIHW and MA database, the RMH database allowed us to account for ‘redo’ AF ablation procedures and calculate the rate of ‘de novo’ AF ablations alone.

### Australian estimated resident population

A yearly estimate of the resident population in Australia was obtained from the Australian Bureau of Statistics which was available online.
To account for an increase in the population size, we calculated population-adjusted number of procedures performed per 1000 persons for the AIHW and MA databases:

$$\text{Population - adjusted number of procedures for Year A (per 1000 persons)} = \left( \frac{\text{Absolute number of procedures for Year A}}{\text{Estimated resident population for Year A}} \right) \times 1000$$

### Statistical analysis

The Statistical Package for Social Sciences (SPSS, version 15.0, SPSS, Inc.) was used for analysis. Absolute numbers and population-adjusted number of procedures per year were entered. Linear regression models were used to evaluate the yearly trends in population-adjusted numbers of procedures. A two tailed $P < 0.05$ was considered to be statistically significant. Graphs were constructed by using Prism, version 5.0d (GraphPad Software, Inc.).

### Results

#### AIHW data

There was a steady increase in the numbers of all cardiovascular procedures over 10 years from 22.1 to 26.2 procedures per 1000 persons, representing a 3.8% per year population-adjusted increment [95% confidence interval (CI): 2.4 to 5.2% per year, $P < 0.001$; Table 1, Figure 2].

PCIs represented a small proportion of all cardiovascular procedures (6.1%). PCIs increased from 1.2 to 1.7 procedures per 1000 persons over 10 years, representing a 5.1% per year population-adjusted increment (95% CI 3 to 7.3% per year, $P < 0.001$; Table 1, Figure 2). There was no significant difference in the annual population-adjusted increment in PCI compared to all cardiovascular procedures ($P = 0.27$).

All ablation procedures combined represented a small proportion of all cardiovascular procedures (0.36%). Overall, ablation numbers increased from 0.01 to 0.31 procedures per 1000 persons over 10 years, representing a 34.6% annual population-adjusted increment per year (95% CI 18.6 to 52.5% per year, $P < 0.001$; Table 1, Figure 2). This increment was significantly higher compared with PCIs ($P < 0.001$).

Atrial fibrillation ablations represented 28% of all ablation procedures. The numbers of AF ablations increased from 0.003 to 0.04 procedures per 1000 persons over 10 years, representing a 30.9% per year population-adjusted increment (95% CI 21.1 to 41.8% per year, $P < 0.001$; Figure 2). This rate of increment was significantly higher compared with all cardiovascular ($P < 0.001$) and PCI procedures ($P < 0.001$), but not significantly different compared with all ablation procedures ($P = 0.69$).

To address the classification change in 2008/09 to 2009/10 for ‘destructive procedures on the atrium’ to include a subcategory ‘left atrial chamber ablations’ in addition to the previous years’ classification ‘ablation of arrhythmia circuit or focus involving both atrial chambers’, we repeated the analysis to include only ‘left atrial chamber ablations’ and found that the population-adjusted increment in AF ablations was 23.9% per year (95% CI 14.2 to 34.2%, $P < 0.001$), which remained significantly higher compared with the rate of increment of all cardiovascular ($P < 0.001$), and all PCI procedures ($P < 0.001$).

Further, when we excluded years 2008/09 and 2009/10 from the analysis altogether, population-adjusted increment in AF ablations was 29.8% per year (95% CI 13.8 to 48% per year, $P = 0.003$) and remained significantly higher than all cardiovascular ($P = 0.002$) and PCI procedures ($P = 0.004$).

#### Sensitivity analysis on AIHW data

To address possible errors in coding, we performed a sensitivity analysis where patients’ PCI procedures were restricted to those aged ≥30 years and AF ablations to those between 30 and 85 years of age. With this restricted definition, annual population-adjusted growth for PCIs was 3.6% per year (95% CI 1.4 to 5.8% per year, $P < 0.001$) and AF ablations was 30.1% per year (95% CI 20.1 to 40.8% per year, $P < 0.001$). Rate of growth of AF ablations was significantly higher than for PCIs ($P < 0.001$).

### Table 1 Population-adjusted numbers of procedures over the past 10 years from the AIHW database

<table>
<thead>
<tr>
<th></th>
<th>Year</th>
<th>2000/01</th>
<th>2003/04</th>
<th>2006/07</th>
<th>2009/10</th>
<th>% increment/year</th>
<th>$P$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIHW (procedures/1000 persons)</td>
<td>All cardiovascular procedures</td>
<td>22.1</td>
<td>24.8</td>
<td>28.4</td>
<td>26.2</td>
<td>3.8</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>All PCIs</td>
<td>1.2</td>
<td>1.6</td>
<td>1.7</td>
<td>1.7</td>
<td>5.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>All ablations (absolute numbers)</td>
<td>0.014 (264)</td>
<td>0.046 (920)</td>
<td>0.49 (1040)</td>
<td>0.31 (6843)</td>
<td>34.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>AF ablations (absolute numbers)</td>
<td>0.003 (59)</td>
<td>0.014 (277)</td>
<td>0.018 (373)</td>
<td>0.044 (961)</td>
<td>30.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Medicare Australia (procedures/1000 persons)</td>
<td>All PCIs</td>
<td>0.643</td>
<td>1.023</td>
<td>1.068</td>
<td>1.07</td>
<td>5</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>All ablations (absolute numbers)</td>
<td>0.072 (1043)</td>
<td>0.112 (2255)</td>
<td>0.163 (3416)</td>
<td>0.21 (4741)</td>
<td>12</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>AF ablations (absolute numbers)</td>
<td>0.011 (219)</td>
<td>0.024 (477)</td>
<td>0.052 (1084)</td>
<td>0.074 (1624)</td>
<td>23.2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>RMH data (absolute number of procedures)</td>
<td>All ablations (year covered)</td>
<td>159 (2001/2)</td>
<td>404 (2003/4)</td>
<td>642 (2006/7)</td>
<td>717 (2009/10)</td>
<td>18.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>AF ablations (year covered)</td>
<td>16 (2001/2)</td>
<td>66 (2003/4)</td>
<td>168 (2006/7)</td>
<td>200 (2009/10)</td>
<td>39.8</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Medicare Australia data

Percutaneous coronary interventions increased by 0.64 to 1.07 procedures per 1000 persons, representing a 5% per year population-adjusted increment (95% CI 2 to 8.2% per year, $P < 0.001$; Table 1, Figure 3).

All ablations increased from 0.07 to 0.21 procedures per 1000 persons, representing a 12% per year population-adjusted increment (95% CI 10.7 to 13.3% per year, $P < 0.001$; Table 1, Figure 3).

Atrial fibrillation ablations increased from 0.01 to 0.07 procedures per 1000 persons, representing a 23.2% per year population-adjusted increment (95% CI 18.9 to 27.8% per year, $P < 0.001$; Table 1, Figure 3). The increment in AF ablations was significantly greater than that of PCIs ($P < 0.001$) and all ablations ($P < 0.001$; Figure 3).

Sensitivity analysis on the Australian Institute of Health, Welfare and Aging data

To address possible errors in coding, we performed a sensitivity analysis where patients PCI procedures were restricted to those aged ≥35 years and AF ablations to those between 35 and 85 years of age. The age cut-off of 35 years was used to match the Medicare databases’ age cut-off categories. With this restricted definition, annual population-adjusted growth for PCIs was 6.18% per year (95% CI 2.8 to 9.6% per year, $P = 0.003$) and AF ablations was 27.9% per year (95% CI 21.2 to 35% per year, $P < 0.001$). Rate of growth of AF ablations was significantly higher than for PCIs ($P < 0.001$).

Tertiary institution data

The number of total ablations increased by 18.1% per year (95% CI 9.4 to 27.4% per year, $P < 0.001$; Table 1, Figure 4). Atrial fibrillation ablation in its current form began in 2001/02 at RMH. Hence the 10-year data were taken from 2001/02 to 2010/11. The numbers of AF ablations increased by 39.8% per year (95% CI 29 to 51.3% per year, $P < 0.001$; Table 1, Figure 4). Rate of growth of AF ablations was significantly higher than for all ablations ($P < 0.001$).

When analysing rates of ‘de novo’ AF ablation alone, there was a 37.9%/year increment per year (95% CI 27.8 to 48.7%, $P < 0.001$), which was significantly higher than all ablations combined and PCIs ($P < .001$ for both).

Discussion

To our knowledge there is a lack of data describing the temporal trends in procedural numbers for PCI vs. AF ablations. We thus sourced two publically available databases as well as a single, high-volume, tertiary hospital source to examine the local and nationwide trends in interventional procedures for two established, efficacious treatment options for two of the most common cardiovascular conditions, CAD and AF, over the past decade.

Main findings

We found that PCI is still more commonly performed than AF ablation and its growth rate parallels that of all cardiovascular procedures over the past decade. In contrast, procedural numbers for AF ablations have increased exponentially over the past decade at a rate that outstrips the growth rate of all cardiovascular procedures even after adjusting for population growth. Local data for AF ablations mirrored the exponential increase noted in nationwide statistics. To address limitations in procedural coding in the national databases that did not allow specific identification of AF ablation procedures, we used local data from a high-volume tertiary referral centre which confirmed the significant increase in AF ablation procedures, including ‘de novo’ AF ablation procedures. Given the population prevalence of AF, burden from hospitalizations, and health-care expenditure is continuing to rise exponentially,1-16 these data have critical implications.
for future public health policy addressing infrastructure, training and funding for catheter ablation for AF.

**Possible explanations for temporal trends in atrial fibrillation ablations vs. percutaneous coronary intervention over the past decade**

Atrial fibrillation is associated with significant detriment to quality of life (QOL) to below population norms, and is comparable with QOL of patients with other chronic illness such as CAD, congestive heart failure, and diabetes.\(^{20–22}\) The paroxysmal form of AF generally afflicts patients without structural heart disease, who are in an age group of gainful employment posing significant cost, absence, and productivity burdens on employers,\(^{23}\) and significant curtailment of social and recreational activities. Anti-arrhythmic drugs have only modest efficacy for maintaining sinus rhythm and are poorly tolerated. Atrial fibrillation is also a costly public health problem with hospitalization as the primary cost driver.\(^{24}\) Costs are strongly influenced by number of arrhythmia recurrences with 1–2 recurrences costing US$6331 and \(\geq 3\) recurrences of paroxysmal AF US$10 312.\(^{25}\)

A recent analysis from Australia showed a nationwide increase in the number of AF-related hospitalizations compared with two other common cardiovascular illnesses, myocardial infarction, and heart failure.\(^8\) This is consistent with the exponential increase in AF-related hospitalizations and health-care expenditure noted by other developed nations.\(^{5,6,9–11}\)

Significant improvements in our understanding of AF mechanisms have occurred over the past decade that may explain the exponential rise in procedural numbers noted in the present study. Since the seminal observation that paroxysmal AF originates from one or more triggers located within the pulmonary veins,\(^13\) catheter ablation for AF has evolved significantly from targeting ectopic triggers from within the pulmonary veins\(^13\) to targeting entire regions critical for AF initiation and maintenance.\(^14\) Subsequently, several randomized trials\(^{26–29}\) and meta-analyses of randomized and non-randomized studies\(^{26,30–32}\) over the past decade have demonstrated the superiority in AF-free survival with catheter ablation compared with anti-arrhythmic drugs or rate control agents alone. Importantly, AF-free survival is maintained over long-term follow-up (\(\sim 5\) year) in the vast majority of patients with paroxysmal AF (63 – 80%) with a low incidence of progression to chronic AF (\(\sim 2\%)\) with a mean of \(\sim 1.2 \pm 0.5\) procedures.\(^{26,33–37}\) A recent meta-analysis of all studies reporting long-term outcomes of catheter ablation of AF with at least 2 years’ follow-up after the index procedure showed a multiple procedure success rate of 79.8% with 1.5 procedures/patient.\(^{38}\)

Perhaps more importantly, catheter ablation is superior to anti-arrhythmic drugs in QOL measures with improvement in QOL scores relative to baseline, and restoration to levels at or above population norms.\(^{27–29,39}\) Importantly, the higher efficacy of catheter ablation over anti-arrhythmic drugs in AF-free survival translates to an 85% reduction in hospitalization for cardiovascular causes.\(^{31}\)

Cost-effectiveness analyses of catheter ablation suggest that the procedure becomes cost neutral after 3–8 years.\(^{40–44}\) The risk of complications is low in appropriately selected young patients without structural heart disease.\(^{45}\) In view of these developments, it is plausible that an increasing number of patients are seeking AF ablation as a definitive cure to restore QOL while accepting a low risk of complications; similarly clinicians may have become more comfortable with the risk : benefit ratio of this procedure. Although cost-effectiveness have taken into account single procedure efficacy rates of 50–75%,\(^{31,47}\) repeat procedure rate of 25% and accounted for either late attrition rates (1–5%)\(^{47}\) or overall failure rates (10%),\(^{48}\) analyses may be different if late recurrence rates are higher.

Over the past decade, PCI has been demonstrated to be an efficacious treatment strategy in high-risk patients with acute coronary syndromes (with or without ST-segment elevation) providing significant reduction in death and myocardial infarction compared with a conservative strategy of medical therapy alone,\(^{49}\) prompting an increase in primary PCI for ST-elevation MI and concerted effort to shorten revascularization times by establishment of pre-hospital triage systems.\(^{46}\) However, the COURAGE trial, released in 2007, demonstrated equivalent rates of death and myocardial infarction in chronic stable angina patients treated with medical therapy alone vs. medical therapy plus PCI.\(^{47}\) This has resulted in a significant and sustained decline in the use of PCI to treat patients with chronic stable angina according to a recent US study.\(^{48}\) This may have contributed to the slower rate of growth in PCIs over the past decade studied in the present study.

**Clinical implications**

The present data suggest that the demand for AF ablation is increasing exponentially in parallel with its recognition of superiority over anti-arrhythmic drugs in AF-free survival, QOL, reduction in hospitalizations, and a low risk of complications in appropriately selected patients. However, it is important to note that catheter ablation for AF requires 2–4 hours per procedure with use of sophisticated computerized mapping tools, specialized ablation catheters, and appropriately trained personnel. To meet the increasing demand, further resources will be required for infrastructure, training of appropriate personnel and funding if catheter ablation is going to remain a viable treatment option to all patients.

**Study limitations**

The absence of a specific billing code for AF ablation may have over-estimated the numbers of procedures performed. The use of the different editions in the three databases of AIHW from 2002/03 to 2009/10 means that data across years may not be exactly comparable. However, three different databases were used to account for this possibility, all yielding similar trends in AF ablation numbers. In addition, we carried out relevant sub-analyses to exclude the latter years when there was a change in classification. We also used the RMH database to separate out ‘de novo’ from ‘redo’ AF ablation procedures and found similar results. A prospective, procedure-specific nationwide registry is needed as this would allow the most accurate analysis of procedural trends.

**Conclusions**

Examination of the temporal trends in cardiovascular procedures over the past decade in Australia shows an exponential increase in catheter ablation for AF that outstrips the annual population-adjusted growth rate of all cardiovascular and all PCI procedures. These findings strongly suggest that significant further work is
needed to improve infrastructure, training and funding to match the increased demand for catheter ablation of AF over subsequent years.

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References


