

---

# Why Australia Needs a Cardiac Procedures Database

Andrew M. Tonkin, MD, FRACP

*Health, Medical and Scientific Affairs, National Heart Foundation of Australia, Melbourne, Victoria, Australia*

The development of a national cardiac procedures database is in the interest of many groups: cardiac surgeons and interventional cardiologists, participating hospital units, patients, governments, health insurance funds and industry. To date, information about short-term outcomes of coronary interventions has been fragmented and uncoordinated at state and national levels. Long-term outcomes have not yet been systematically addressed in Australia. A highly desirable objective is the development of a dataset of information that is pertinent to the Australian context, with common minimum datasets for surgery and percutaneous intervention. Information will gain added value if it is linked to other national databases such as the National Death Index. Also, risk adjustment should be used to improve the value of outcome data. Development of a 'common' Cardiac Procedures Database, in turn, should lead to improved health policy and better health management in an area that currently runs at significant cost. Thus, provided due care is taken to protect the privacy of stakeholders, maintain quality control and entry of only valid information into the database, the resulting outcome will benefit all interested parties; clinicians, hospitals, patients and the wider Australian community. (*Heart, Lung and Circulation*; 10 (Suppl.): S22-S25)

**Key words:** cardiac procedures, dataset, health management.

## Introduction

In Australia to this time, monitoring of outcomes in patients who have had myocardial revascularisation procedures has been non-uniform and uncoordinated. With a few notable exceptions,<sup>1</sup> little attention has been paid to long-term outcomes and few attempts, if any, have been made to compare outcomes following the different approaches of coronary artery bypass grafting and percutaneous coronary intervention. This is despite the large number of patients being treated by the two approaches in the same institution.

Decisions about the appropriateness and method of revascularisation are made in discussion with the patient. At this time, recommendations often draw on the results of clinical trials comparing the different thera-

peutic approaches, which importantly include medical therapy. However, these may not be completely relevant to clinical practice. In general, controlled clinical trials test the efficacy of a treatment, often administered in these trials by so-called 'experts', to selected patients in a carefully controlled environment. In some cases, the techniques may not be current. In the case of myocardial revascularisation, these trials have often not encompassed advances such as the more complete use of arterial grafts during surgery, stent deployment during percutaneous intervention, nor indeed medical advances such as the use of 3-hydroxyl-3-methylglutaryl coenzyme A (HMG CoA)-reductase inhibitors and angiotensin-converting enzyme inhibitors. In contrast, the assessment of outcomes, as would be achieved in a database, measures the efficiency of a treatment. A long-term database would allow the assessment of interventions in unselected patients treated by 'usual' practitioners with 'usual' approaches.

Correspondence: Andrew M. Tonkin, National Heart Foundation, 411 King Street, West Melbourne, Victoria 3003, Australia. Email: Andrew.Tonkin@heartfoundation.com.au

A cardiac procedures database would also allow better planning by those who develop policy and fund healthcare. This is important. Cardiovascular disease accounts for the largest proportion (12%) of direct health costs in Australia.<sup>2</sup> As shown in Figure 1, a large proportion of this figure, approximately 40%, is associated with hospitalisation. At last estimate, the 12% of the Australian population aged 65 years and over accounted for approximately 60% of patients who needed hospitalisation for cardiovascular disease, and much of the associated direct costs. The disease burden associated with the elderly, many of whom will have manifestations of atherosclerosis, particularly coronary artery disease, is projected to increase still further.<sup>2</sup> Age itself is associated with increased risk, and those other factors which influence operative mortality and the value of intervention, including temporal proximity to an acute coronary syndrome such as myocardial infarction, have also been well-defined. Therefore, a database with appropriate risk adjustment will allow better assessment of the role of these therapeutic approaches.

How might a cardiac procedures database be established? What would be the best way to integrate databases? While separate establishment and maintenance of databases by cardiac surgeons and interventional cardiologists would be a simpler process, cooperation from the outset is exceedingly important to maximise the potential of both databases. Not only common patient identifiers, but common definitions, coding and technology should be used. Coordinated (but separate) approaches would still allow ownership by the individual professional groups. From a practical viewpoint, an overseeing committee should have an appropriate broad representation and coordinate development or change to databases to allow their technological integration as necessary.

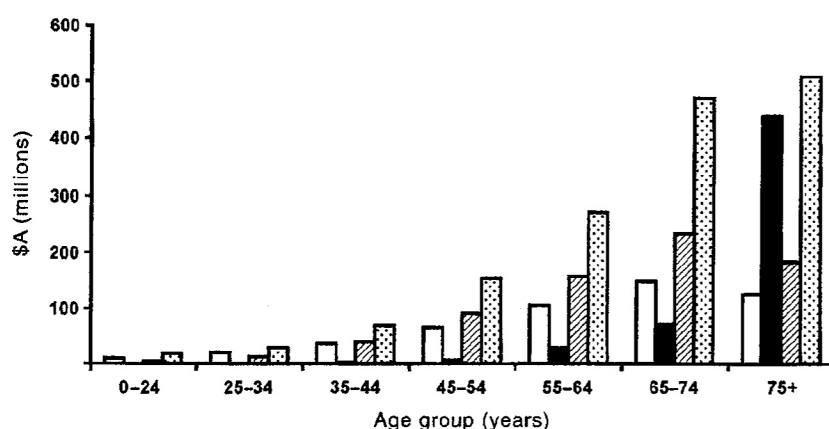
Among other things, the dataset should include:

- 1 Patient and provider (operator, hospital) identifiers, date of procedure and insurance status.

- 2 Relevant demographic features (e.g. gender, date of birth).
- 3 Important coronary risk factors (e.g. diabetes, smoking history, hypertension, dyslipidaemia).
- 4 Other risk factors (e.g. history of stroke, chronic renal disease).
- 5 Admission variables (e.g. indication for procedure, emergency of procedure, heart failure).
- 6 History of previous revascularisation procedures.
- 7 Procedural variables (e.g. number of vessels treated, whether native vessel and/or graft, choice of conduits or whether stent deployed, other procedures).
- 8 Complications (e.g. death, myocardial infarction, repeat procedure, renal failure, transfusion requirement).

The risk-adjusted model for operative surgical mortality would include age, sex, diabetes, hypertension, smoking, procedure type and urgency of procedures.<sup>3</sup> Multivariate analysis can also enable ascertainment of which factors contribute to long-term outcome and survival (e.g. age, sex, diabetes, hypertension, smoking, use of arterial or venous conduits).<sup>4</sup> The database could also include documentation of appropriate ongoing medical care, such as aspirin use and smoking status. While these factors which determine short- and long-term outcomes have been concordant in overseas databases, a local model would allow best use of Australian data.

A number of examples of databases exist internationally in which there is value-adding by record linkage to other databases.<sup>4,5</sup> For example, prospective collection of data on all percutaneous coronary interventions in British Columbia, Canada, and linkage to other Canadian healthcare databases has documented that widespread introduction of stenting has improved clinical outcomes and decreased the need for target vessel revascularisation during 1 year of follow-up after percutaneous coronary intervention.<sup>5</sup> However, because of technological considerations, such findings can not



**Figure 1.** Direct costs of cardiovascular disease healthcare in Australia, 1993-1994 (modified from Mathers and Penm, 1999<sup>8</sup>). □, medical; ■, nursing home; ▨, pharmaceutical; ▩, hospital-admitted patient.

necessarily be extrapolated directly to other countries, or to all surgeons.

Database linkage could also occur at a broader level, internationally. Harmonised datasets have already been established in European countries, and further cooperation with the Society of Thoracic Surgeons in the USA will lead to the launch of an international dataset for coronary bypass surgery.<sup>3</sup>

The implementation of Health Online in Australia will allow allocation of a unique identifier to patients on a voluntary basis, and facilitate their care and portability of their medical records, between care providers.<sup>6</sup> It will also allow patients access to their own records, but not to access comparative data which compares their outcome after treatment by their own doctor with other professionals (the Procedures Database).

### **The Benefits of a Cardiac Procedures Database**

Many benefits would flow from implementation of a procedures database:

- 1 Data collection is presently fragmented. An integrated national database would overcome this and ensure use of a common set of indicators while still accommodating more specific local data collection and analysis.
- 2 The Database would support appropriate application of practice guidelines, resulting in improved patient management, while acknowledging that patients in usual practice may differ from those in controlled clinical trials.
- 3 It would provide better information to assist patients in decisions related to their treatment. The better informed patients are, and the more involved they are in decisions about their care, the less likely they are to initiate medico-legal action.
- 4 The Database would enable clinicians and service planners to compare clinical outcomes with national and international standards and when appropriate, to compare the relative effectiveness of procedures and practices with each other and with emerging therapies.
- 5 Efficiency of the healthcare system is also likely to benefit, with better planning of services and infrastructure, and sounder economic management.

### **How Might a Cardiac Procedures Database be Funded?**

It is likely that funding for the Database could come from a number of sources: government and other healthcare funds that have an interest in obtaining quality health-

care data, industry (the device industry and software vendors supporting the system), and quite possibly participating units who see benefits for their own practice. Funding should cover both software development, and initial and ongoing data collection. Project officers could share tasks between both cardiac surgical and cardiology units and when appropriate, possibly cover a number of institutions.

The terms of reference of the newly established Safety and Quality Council fit well with the aims of a cardiac procedures database. The role of the Council is 'to lead national efforts to promote systemic improvements in the safety and quality of healthcare in Australia with a particular focus on minimising the likelihood and effects of error'. It is to work closely with stakeholders, including healthcare professionals, and it is to establish partnerships with related national bodies and organisations, such as the National Institute of Clinical Studies (which is soon to be established) and the National Health Information Management Advisory Committee, to facilitate developments. The latter Committee will be closely involved with the introduction of online healthcare in Australia.

### **Concluding Comments**

Aspects which might be seen as potential issues (and are dealt with in more detail elsewhere in this supplement) are:

- 1 Privacy. De-identification of data at appropriate points will be very important. It is also relevant to note that the Australian Institute of Health and Welfare (AIHW) is protected from freedom of information by legislation under the AIHW Act of 1987 and the Privacy Act of 1988. It also has a perimeter security system, password protection and no dial-in access. It presently partners the National Heart Foundation in maintaining basic data on revascularisation. This is not patient-based and is limited to documentation of interventions but not outcomes.
- 2 Consent and ethics.
- 3 Technology development.
- 4 Quality control and data validation. The central Database would only be as reliable as the data it received. Internal review should be part of the local audit process and subject to external scrutiny.
- 5 Efficient record linkage to other databases. In Australia, the Database could be linked to the National Death Index and the National Hospital Morbidity Database. Record linkage is certainly feasible and to this time could be obtained with probabilistic matching of key data such as name, date of birth, sex and address. However, the recent enunciation of the key

principles of Health Online are exceedingly important in this regard.<sup>6</sup> In this context, it should also be noted that record linkage would require only a patient (not a clinician or hospital) identifier.

What is not needed is any repeat of the Bristol affair which finally broke in 1995 with a front page story in Britain's *Daily Telegraph*. The establishment of a cardiac procedures database should hold benefits for all interested parties, including clinicians, patients and healthcare funds. As part of the process, the National Heart Foundation has a potential role to play not only because of its previous role in maintaining basic databases for both bypass surgery and coronary angioplasty, but also because it is independent of both health professionals and government, both of whom may at times be understandably, somewhat cautious about the other's motivation.

At present, clinical decisions are made primarily on the basis of patient symptoms and an angiographic designation of the presence of significant one-, two- or three-vessel coronary artery disease. This does not encompass the fact that the pathophysiological basis of acute coronary syndromes such as acute myocardial infarction, unstable angina and sudden death typically relates to unstable but haemodynamically minor coronary artery plaques. The very broad angiographic criteria also conceal many other important variables which influence results. Ultimately, the whole database process should

benefit all parties and overcome the subjectivity inherent in 'optimistic or pessimistic physicians evaluating (and treating) optimistic or pessimistic patients'.<sup>7</sup>

## References

1. Smith JA, Mack JA, Rosenfeldt FL *et al.* Outcomes of coronary artery bypass grafting: A 3 year analysis using the Society of Thoracic Surgeons Database. *Heart, Lung Circulation* 2000; 9: 5-8.
2. Commonwealth Department of Health and Aged Care and Australian Institute of Health and Welfare (AIHW). *National Health Priority Area Report: Cardiovascular Health, 1998*. Canberra: AIHW Cat. no. PHE9; 1999.
3. Wyse RKH, Taylor KM. The development of an international surgical registry: The ECSUR project. *Eur. J. Cardiothorac. Surg.* 1999; 15: 1-7.
4. Myers WO, Blackstone EH, Davis K, Foster ED, Kaiser GC. CASS Registry: Long term surgical survival. *J. Am. Coll. Cardiol.* 1999; 33: 488-98.
5. Rankin JM, Spinelli JJ, Cavere RG *et al.* Improved clinical outcome after widespread use of coronary artery stenting in Canada. *N. Engl. J. Med.* 1999; 341: 1957-65.
6. National Electronic Health Records Taskforce (Australia). *A Health Information Network for Australia*. Canberra: Commonwealth Department of Health and Aged Care; 2000.
7. Bertrand ME, McFadden E. Quality of life after coronary angioplasty or bypass surgery. *Eur. Heart J.* 1999; 20: 635-6.
8. Mathers C, Penm, R. *Health System Costs of Cardiovascular Disease and Diabetes in Australia, 1993-1994*. Canberra: AIHW Cat. no. HWE 11; 1999.