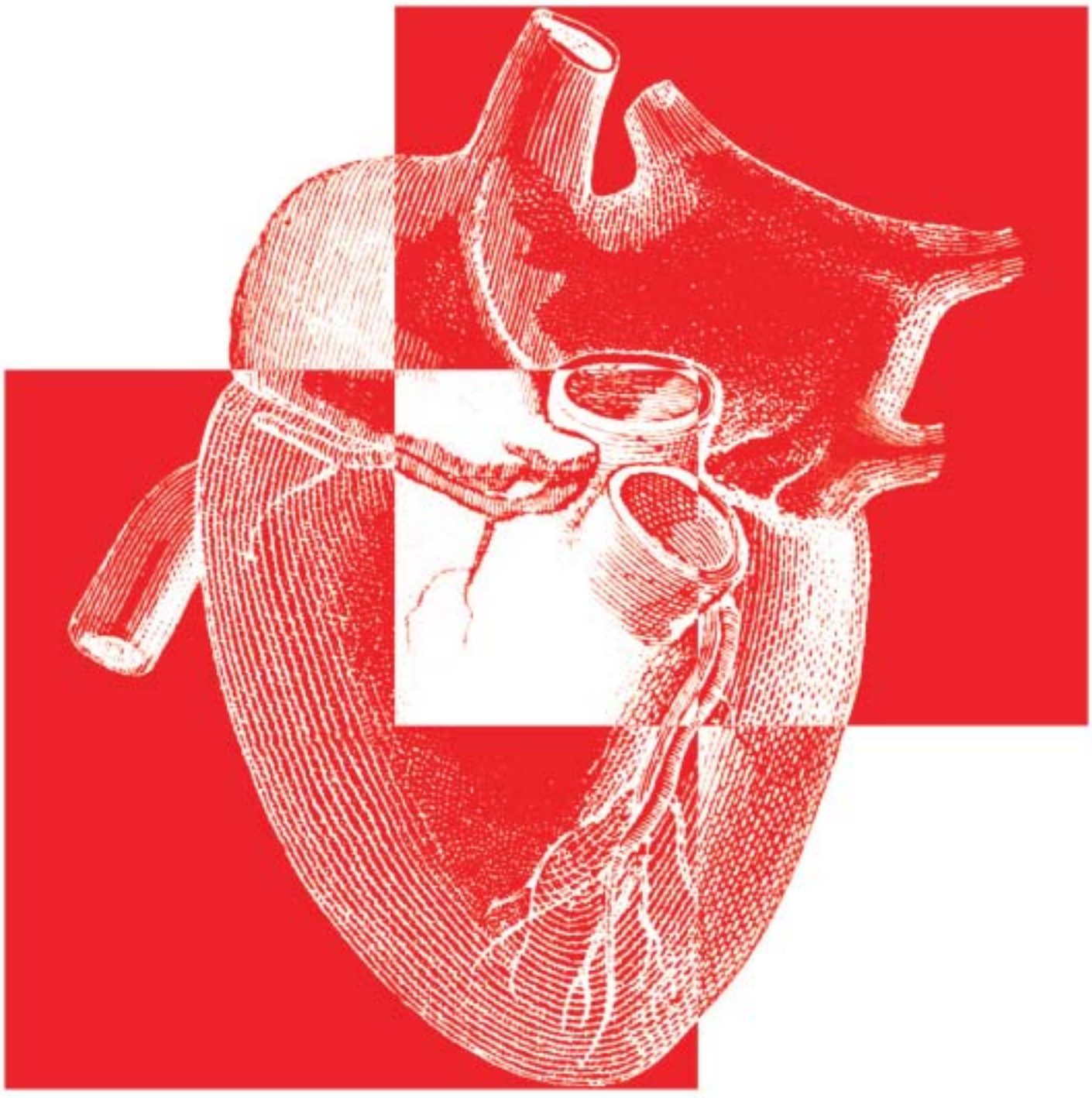
Cardiac surgery in Victorian public hospitals

Report to the public 2002



Victoria
The Place To Be

Australasian Society of Cardiothoracic Surgeons
Victorian Cardiac Surgery Database Project

Report to the Public on Cardiac Surgery in Victorian Public Hospitals 2002

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Introduction

The Australasian Society of Cardiac and Thoracic Surgeons, together with the Victorian Department of Human Services, have developed a program to collect data about, and report on, cardiac (heart) surgery in Victorian hospitals.

This report is based on the data on surgery performed between 1 August 2001 and 31 July 2002, at the six specialist Cardiac Surgery Units that exist within Victorian Public Hospitals. These are at:

- Austin Hospital
- Geelong Hospital
- Monash Medical Centre – Clayton
- Royal Melbourne Hospital
- St Vincent's Hospital
- The Alfred.

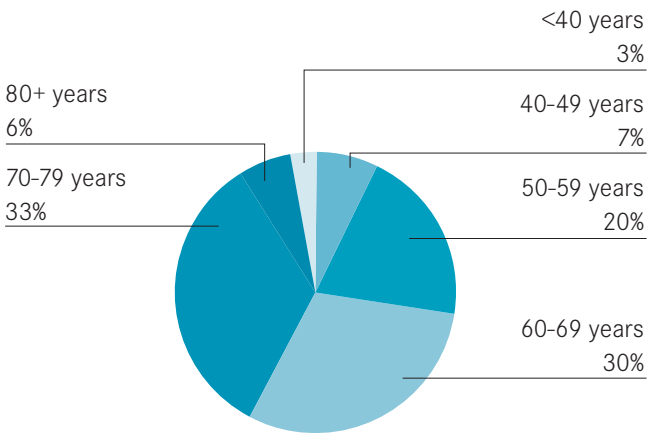
The report provides an overview of the patients who underwent surgery, the types of surgery performed, complications, and other details relating to risk and the outcomes of surgery.

Who received cardiac surgery?

Almost 3,000 people had cardiac surgery in Victorian Public Hospitals over the 12 months from August 2001 to July 2002.

More than four out of five of these patients were aged between 50 and 80 years (as shown in the pie chart below). The average age was 65, and slightly over two thirds of the patients (70%) were male.

Figure 1: Age distribution of the patients having cardiac surgery in Victorian Public Hospitals, August 2001 to July 2002



A number of factors place people at higher-than-average risk of heart disease and surgical complications. Of the people undergoing cardiac surgery, almost one in five were current smokers, almost one in three had diabetes, two out of every three had high blood pressure at a level requiring treatment, and almost one in five had had previous heart surgery. The percentages are set out below.

Increasingly, patients having elective (ie pre-planned) cardiac surgery are being admitted on the day of the surgery, rather than a day or more beforehand. Over the year covered by this report, nearly two in every five patients (over half of those having elective surgery) fell into this category.

Total number of patients included*	**2969**
Patients admitted for elective surgery on the day of their operation	38%
Risk Factors	
Current smoker	18%
Diabetes	28%
Hypertension (high blood pressure)	66%
Cerebrovascular disease (stroke)	11%
Peripheral vascular disease	12%
Cardiac History	
Previous cardiac surgery	17%
This included:	
Previous CABG	5%
Previous valve replacement	2%
Previous PTCA / Stent	9%
Myocardial infarction (MI)	42%
This included:	
MI less than 21 days before surgery	32%
Congestive heart failure	28%

** There were actually 13 more cardiac operations carried out over the year, but for these 13, either not all the data were available or the operation was a second procedure for a patient on the same day, so they are not included as part of this report.*

What operations were done?

The main operations were:

- coronary artery bypass graft (CABG) alone – 68%;
- heart valve repair or replacement alone – 12%; and
- a combination of these two operations – 8%.

The remaining 12% of patients had less common heart operations.

Coronary artery bypass graft is a surgical procedure where new pathways are created around blocked or narrowed arteries to allow blood to reach the heart muscle again.

A heart valve repair is performed on a valve that is too narrow to allow sufficient blood to flow through the valve opening or on a valve that cannot close tightly enough to prevent backflow of blood.

A heart valve replacement is performed when a diseased valve that cannot be repaired is removed and replaced with a substitute mechanical or tissue valve.

The hospitals were required to report in more detail on the patients undergoing CABG, so the rest of this report focuses on these patients.

How successful was surgery?

The data collected show that cardiac surgery in Victorian hospitals is very safe by world standards. One measure of success (or lack of it) in the short term is the number of complications and deaths that occur. In both these areas, the Victorian figures were as low, or lower, than those from the USA and the UK.

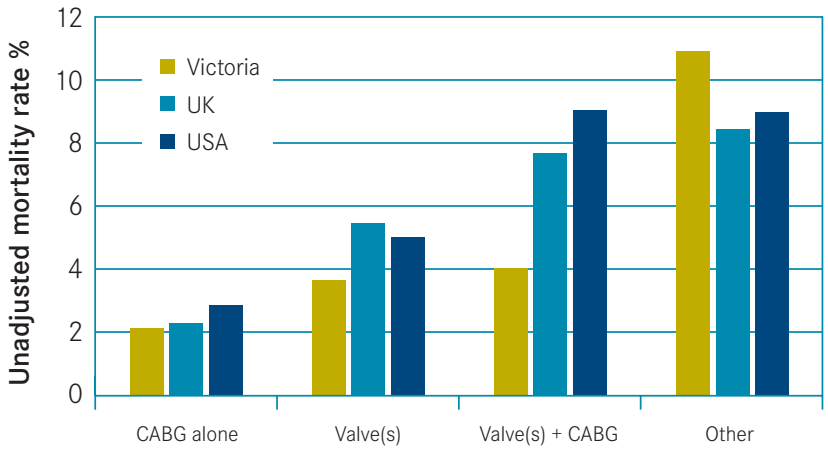
It must be remembered that people undergoing these operations have a serious heart condition, and their poor health places them at greater risk of complications than people in good health. Older age increases the risk.

Mortality rates from cardiac surgery

The mortality rates (that is, rate of death resulting from the surgery) quoted here cover deaths that occurred in the 30 days after surgery. While there were small variations from hospital to hospital, the average mortality rates across the Victorian hospitals were lower than the figures from the UK and the USA for all three main operations. This is shown on the graph below.

In the Victorian hospitals, for example, among people undergoing CABG alone, there was about one death for every 50 patients, within 30 days of surgery – that is, a death rate of around 2%.

Figure 2: Mortality rate for different cardiac operations in the USA, UK and Victorian Public Hospitals, August 2001 to July 2002

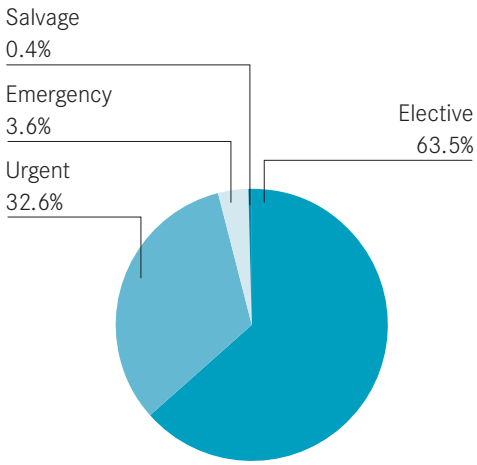


For people having an operation other than CABG and/or valve surgery (shown as "Other" in the graph), the mortality rate was higher, at around 11%. It must be remembered, however, that this group includes a number of very sick patients undergoing high risk surgery.

The more urgent the surgery, generally the higher the risk. Ideally, the heart condition will be diagnosed and surgery planned and undertaken before an emergency arises, but this is not always possible. The pie-chart below shows that, of the people presenting at Victorian Public Hospitals for cardiac surgery:

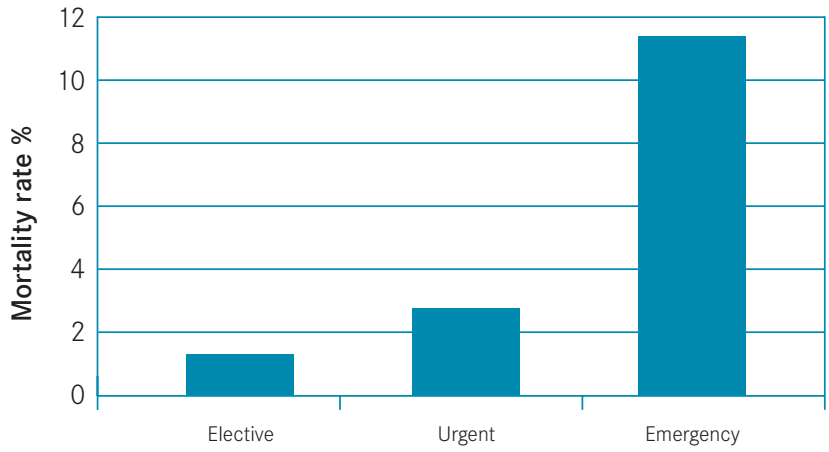
- nearly two thirds were admitted as elective patients;
- one third were operated on as urgent cases;
- around one in 25 was operated on as an emergency (within 24 hours of presenting at the hospital);
- a very small number were operated on as "salvage" procedures, that is, an urgent attempt to save the patient's life when a life-threatening event had already occurred.

Figure 3: The urgency of surgery, for patients undergoing CABG alone



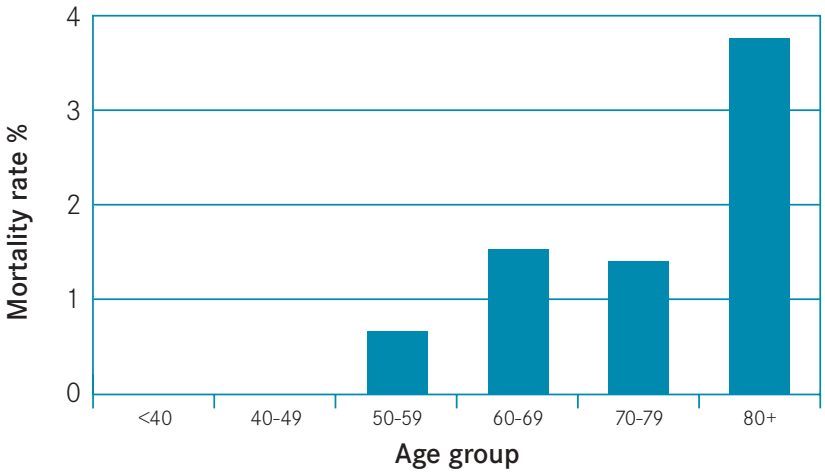
The mortality rate for people undergoing elective surgery is about one-tenth the rate for emergency surgery, as shown in the following graph.

Figure 4: Mortality rate for CABG alone, in relation to the urgency of surgery



Older patients are also at greater risk. The graph below shows the mortality rates for people undergoing CABG alone, as an elective procedure. There is a clear increase in rates with increasing age. Even so, for people over 80 years the death rate was as low as 4% – that is, one in 25 people who had the operation.

Figure 5: Mortality rate following CABG alone, carried out as an elective operation



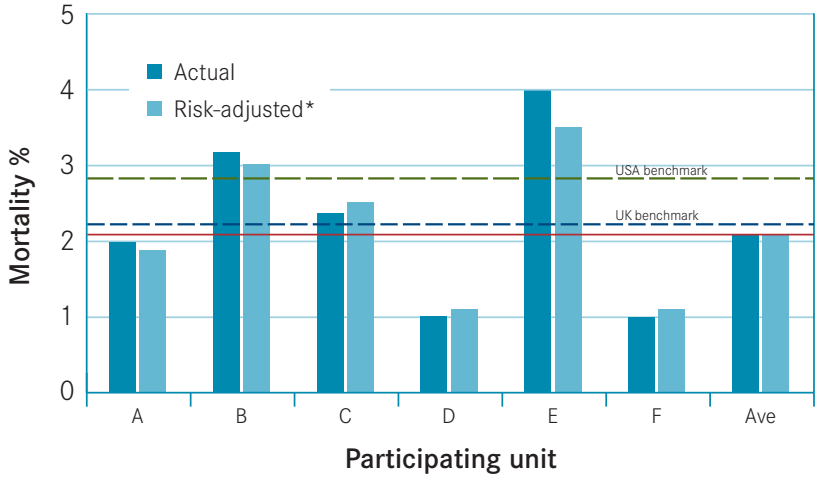
Do figures differ at different hospitals?

As discussed above, over the 30 days after CABG alone, the average mortality rate in Victorian Public Hospitals is below that reported by the UK and the USA.

The Victorian figures show small variations between hospitals, as shown in the figure below. While mortality rates for two Victorian Cardiac Surgery Units were above the USA benchmark, and three above the UK benchmark, the differences are very small and within the range of variation that might be expected. In statistical terms, the differences are not significant (all hospitals in Victoria fell within 3 standard deviations of the mean).

The graph includes both "actual mortality" (the raw data) and "risk-adjusted mortality". The patients who undergo cardiac surgery vary widely in their ages, the range of other diseases they have, and the urgency of the surgery–all factors that affect a person's likelihood of surviving cardiac surgery. Furthermore, the mix of patients varies considerably from hospital to hospital. This means that raw mortality rates are not a fair way of comparing cardiac surgery survival between hospitals. Risk-adjusted mortality takes these factors into account so that a fair comparison of mortality can be made between hospitals.

Figure 6: Mortality rate within 30 days of CABG alone, for the six Victorian Public Hospital Cardiac Surgery Units



*Risk-adjusted using Euroscore model

The average mortality rates for Victorian Public Hospitals, UK hospitals, and USA hospitals are shown with a red, blue and green line respectively.

Complications of surgery

All Cardiac Surgery Units had very low rates of surgical complications.

Deep sternal infection is a serious but rare complication of CABG surgery. In all six Victorian Cardiac Surgery Units, less than 1% of patients were affected. This amounted to one or two patients in each unit, and only eight patients overall, out of nearly 3000.

In one unit, no patients had this complication over the 12 month period, and it is recommended that this be closely examined to look for strategies that other units can use to improve further their already low rates.

Another complication that occurs is haemorrhage (bleeding) after surgery, to an extent that requires the patient to return to the operating theatre. This is less serious and a little more common than deep sternal infection. Over the year, a total of 42 patients were affected – about one in 75 – and again, there was no significant difference between rates at the different hospitals.

Length of stay and mechanical ventilation

In the hours or days immediately after cardiac surgery, most patients need "mechanical ventilation" – that is, equipment to support and assist their breathing. The length of time this is needed depends on the extent and complexity of the surgery, the patient's age, and whether the person is obese and/or has pre-existing respiratory disease.

Patients on mechanical ventilation generally need to be in the Intensive Care Unit (ICU), and the length of stay in ICU after surgery generally depends on how long ventilation is needed.

The following graphs show the median length of time spent on mechanical ventilation and in ICU in each Cardiac Surgery Unit.

Figure 7: Median time (in hours) on mechanical ventilation after CABG alone

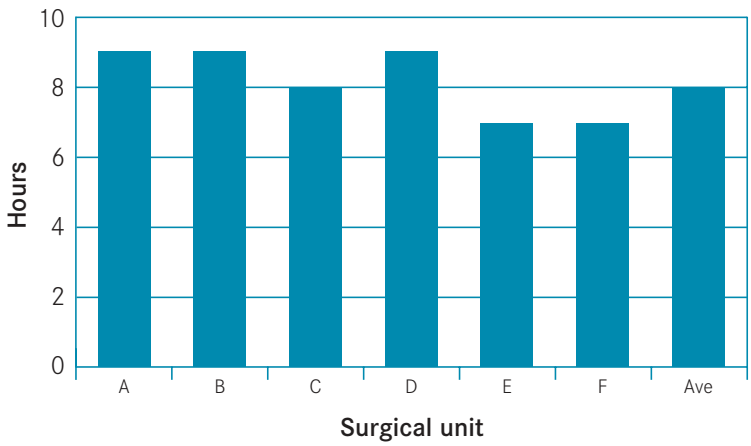
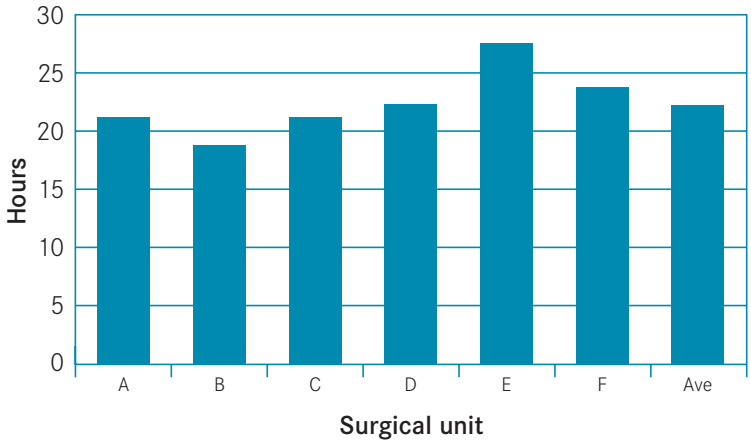


Figure 8: Median time (in hours) in ICU, following CABG alone



Summary

Cardiac surgery in any of Victoria's Public Hospitals is as safe, or safer, than in equivalent hospitals overseas. Furthermore, the recent introduction of the system of monitoring cardiac surgery (on which this report is based) is expected to lead to further improvements in the quality and outcome of care for patients having cardiac surgery in the Victorian public hospital system.