

# **Intensive care for adults in Victorian public hospitals 2002**

**Report to the public**

Prepared by

The Victorian Intensive Care Data Review Committee

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## Foreword from the Minister for Health

This is the first annual report of the Victorian Intensive Care Data Review Committee – marking a significant milestone for intensive care in Victoria.

The Australian and New Zealand Intensive Care Society (ANZICS) and Department of Human Services Victoria worked together, through the Victorian Intensive Care Data Review Committee, to review data submitted by Victorian intensive care units to the ANZICS Adult Patient Database.

Such data serves as a valuable resource for the whole healthcare system and will allow intensive care units to benchmark against their peers.

This benchmarking will allow units to acknowledge their own areas of expertise and identify methods of improving their quality of care.

I commend the contributions of intensive care units which ensure the ongoing success of the ANZICS Adult Patient Database.

In a system where the overwhelming driver is patient outcome, it reassures us that the care provided in intensive care units in Victoria is of the highest standard.

I look forward to future developments in the evaluation of care in Victoria's intensive care units.



**Hon Bronwyn Pike MP**  
**Minister for Health**

## Foreword

This well presented report is a tribute to the efforts of those involved, extending from the members of the Data Review Committee and the ANZICS Database Management Committee, through to the many doctors, nurses and other team members that have collected and collated their ICU's data. The support and contribution of the Victorian Department of Human Services in its partnership role also requires acknowledgement.

We should be reassured that intensive care within Victoria remains at a high level in comparison with other Australian states and by international standards. This report should provide encouragement to all stakeholders to maintain their commitment to achieving such excellence.

The practical difficulties in terms of time and personnel required for these data to be collected likely accounts for only 60% of total patients admitted to Victorian intensive care units being captured. Future improvement, through complete and accurate reporting from existing contributors and recruitment of those ICUs not currently contributing data, must be a goal. Extending the data collection and interpretation to include specific markers of quality of care beyond mortality and length of stay represents a noteworthy future direction identified by this committee.

Congratulations to all those who have contributed to this valuable report.



**David Ernest**  
**Chairman, Victorian Branch**  
**Australian and New Zealand Intensive Care Society**

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## Acknowledgements

This report would not have been possible without the efforts of doctors, nurses, ward clerks and data collectors who have contributed unit level data to the Adult Patient Database. Their contribution is gratefully acknowledged.

The report was compiled by Dr Peter Stow, on behalf of the Victorian Intensive Care Data Review Committee. Data from the ANZICS Adult Patient Database was extracted by Ms Carol George. Dr Therese Anderson compiled data from the ANZICS Research Centre for Critical Care Resources (ARCCCR). Mr Peter McNair extracted the Victorian Admitted Episode Dataset data.

The ANZICS Database Management Committee is funded by grants from States and Territories according to the terms of Australian Health Minister's Advisory Council (AHMAC) Out of Session Paper No 135.

## Introduction

This report provides information on the quality and outcomes of care for adults in intensive care units (ICUs) within Victorian public hospitals, over the 12 months from July 2001 to June 2002.

The report summarises the first annual report issued by the Victorian Intensive Care Data Review Committee, which was established in February 2002 by the Australian and New Zealand Intensive Care Society (ANZICS) and the Department of Human Services, Victoria.

ANZICS has been compiling Victorian data in the Adult Patient Database (APD) since 1992. Data collection in Victorian ICUs is voluntary, and the data in the APD for the period 1999-2002 have been contributed by 15 of Victoria's 22 public hospital ICUs, comprising:

- four tertiary hospitals (ie hospitals providing super-specialist care):
  - Austin and Repatriation Medical Centre
  - Royal Melbourne Hospital
  - St Vincent's Hospital
  - The Alfred Hospital
- six metropolitan hospitals (five Melbourne and one Geelong):
  - Box Hill Hospital
  - Dandenong Hospital
  - Frankston Hospital
  - Geelong Hospital
  - Maroondah Hospital (data submitted for only part of the 12 months)
  - The Northern Hospital
- five regional hospitals:
  - Ballarat Health Services (data submitted for only part of the 12 months)
  - Bendigo Health Care Group
  - Goulburn Valley Hospital
  - Latrobe Regional Hospital
  - Wangaratta District Base Hospital

The remaining seven institutions with ICUs did not contribute. They are:

- Central Gippsland Health Service
- Mildura Base Hospital
- Monash Medical Centre
- Southwest Healthcare
- The Western Hospital
- Western District Health Service
- Wimmera Health Care Group

Each hospital is coded in this report by a letter of the alphabet: A to E are tertiary hospitals; F to M, and X, are metropolitan hospitals; and N to W are regional hospitals.

The report also draws on data that all Victorian hospitals are required to report to the department.

## In summary

- Victorian public hospital ICUs provide high quality care that compares favourably with other Australian ICUs and benchmarks from the United States and the United Kingdom.
- For the year July 2001 to June 2002, the hospital death rate for patients whose time in hospital included an ICU admission was 15.5 per cent.
- The standardised mortality (death) rate was lower than might be expected when measured against the outcomes of international best practice.
- The standardised mortality (death) rate for patients receiving ICU treatment also tended to be lower than seen in other Australian states and territories.
- Overall, the standard of care, as measured by length of stay and the results of care, should be regarded as excellent.

## Victoria's public ICUs

### Number of beds

Altogether, there are 227 available adult ICU beds in Victorian public hospitals. This represents 5.1 ICU beds per 100,000 residents, which is lower than the national average of 6.6 per 100,000 residents.

Three quarters (173) of Victoria's ICU beds are equipped to treat patients requiring ventilation (artificial breathing). Ten of the 22 ICUs have six or more beds and treat more than 350 ventilated patients each year.

### Medical and nursing staff

Across all Victoria's adult ICUs during 2001, there were 45.7 full-time equivalent (FTE) **specialist doctors** (in addition to hospital registrars and resident medical officers). This amounts to:

- one FTE specialist for every 3.89 Victorian ICU beds, compared to one for 4.02 across Australia
- 1.05 FTE specialists for every 100,000 Victorians, compared to 1.23 FTE specialists for every 100,000 people across Australia.

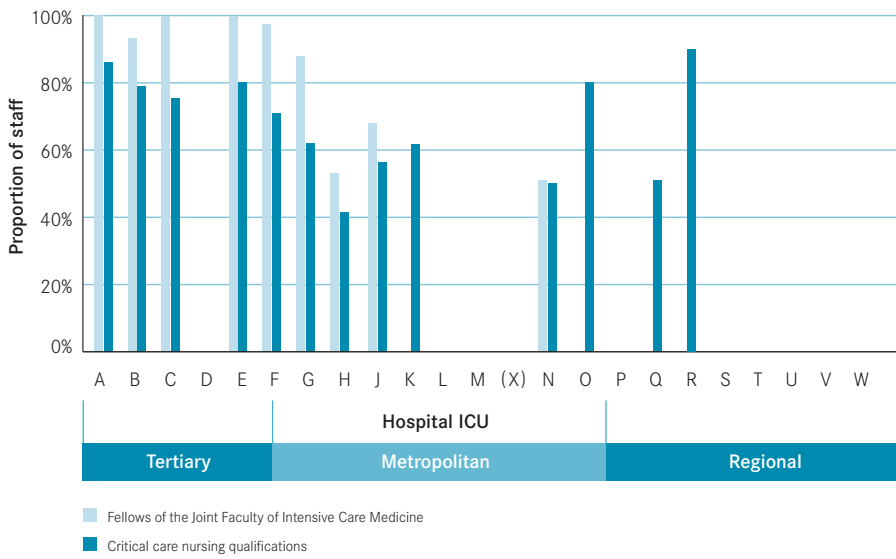
Of these specialist doctors, 86 per cent were specialists in intensive care and the remainder had other specialist qualifications.

There were 1,299 **registered nurses** (933.3 FTE) employed in Victorian adult public ICUs. Almost seven out of every 10 (68.2 per cent) held a qualification in critical care.

The graph on page 6 shows, for each public hospital ICU:

- the proportion of intensive care medical staff who are Fellows of the Joint Faculty of Intensive Care Medicine (FJFICM)
- the proportion of the nursing staff who hold a critical care qualification.

**Figure 1: Proportion of medical and nursing staff at each public hospital ICU who hold specialist qualifications**



## Patients

### Numbers

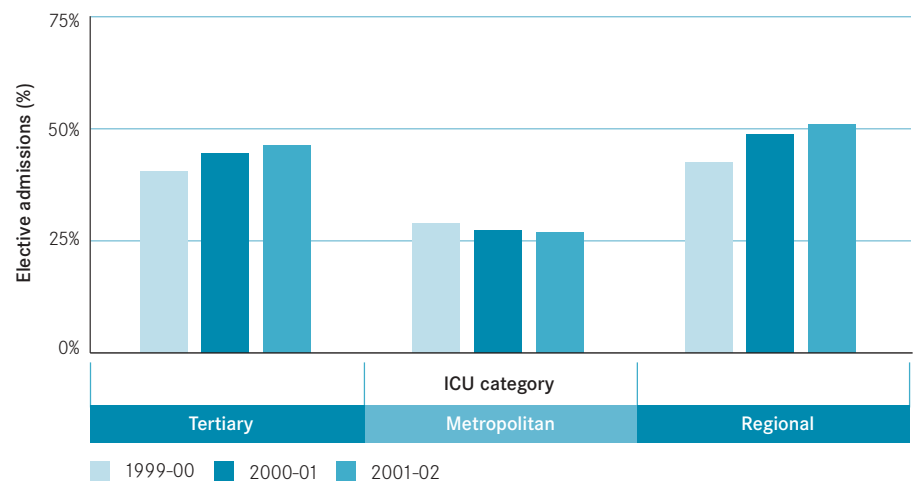
For the financial year 2001-02, the APD received data on 10,187 admissions to ICUs in Victorian public hospitals. This includes some repeat admissions for patients returning to ICU during their hospital stay.

These data, from the 15 public hospitals contributing to the APD, represent around 60 per cent of all admissions to Victoria's adult public hospital ICUs.

### Elective versus emergency admission

Some admissions to ICUs are elective (ie pre-planned), and usually for patients who are having complicated surgery. Tertiary and regional ICUs tend to have a higher proportion of elective admissions while metropolitan ICUs have a higher proportion of emergency admissions.

**Figure 2: Proportion of ICU admissions that are elective**

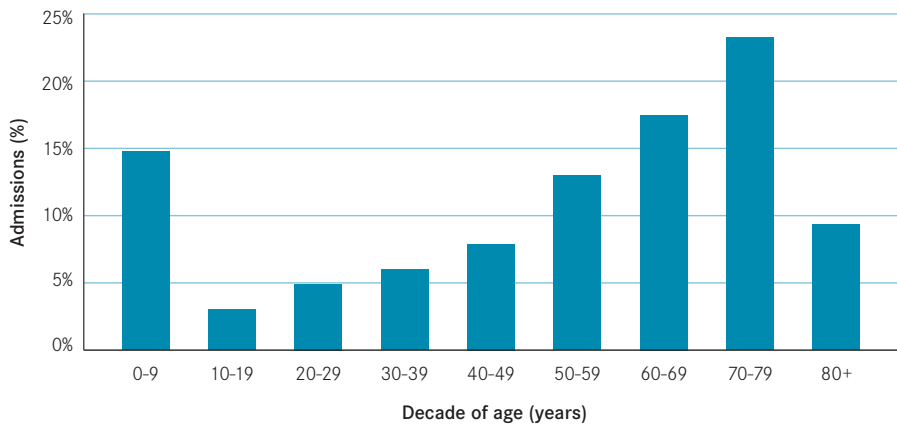


## Age

Over the three years reported, there has been an increase in the average age of patients treated in all three categories of public hospital ICU (regional, metropolitan and tertiary).

Across all Victorian public hospitals during the year July 2001 to June 2002, there were 19,834 admissions that included a stay in intensive care. Almost one third (32.8 per cent) of these admissions involved patients aged 70 years or older and nearly one in ten (9.8 per cent) involved patients aged 80 years or older.

**Figure 3: Percentage of admissions in each different age group, for all Victorian public hospital admissions to ICU during the 2001-02 year**



## What are the most common diagnoses in ICU?

Coronary artery bypass surgery is the most common diagnosis for patients in an ICU in Victoria, as shown in the table below. The diagnoses as shown in this table are not, however, always the main reason for the admission to ICU. For example, people who need a long stay in ICU also often need a tracheostomy (a tube in the neck to assist breathing), but tracheostomy, of itself, is not a reason for admission to ICU. On the other hand, all patients undergoing coronary artery surgery are admitted to ICU after their surgery.

Top ten diagnoses for people admitted to ICU	
Diagnosis	% of total
Coronary artery bypass	11.8%
Tracheostomy	10.1%
Acute myocardial infarction (heart attack)	4.3%
Poisoning/overdose	4.1%
Heart valve surgery	4.1%
Major bowel surgery	3.2%
Craniotomy (surgery that involves opening the skull)	3.2%
Heart arrhythmia	3.1%
Vascular (blood vessel) surgery	3.0%
Unstable angina	2.8%
Other	50.3%

## How long was the stay in ICU?

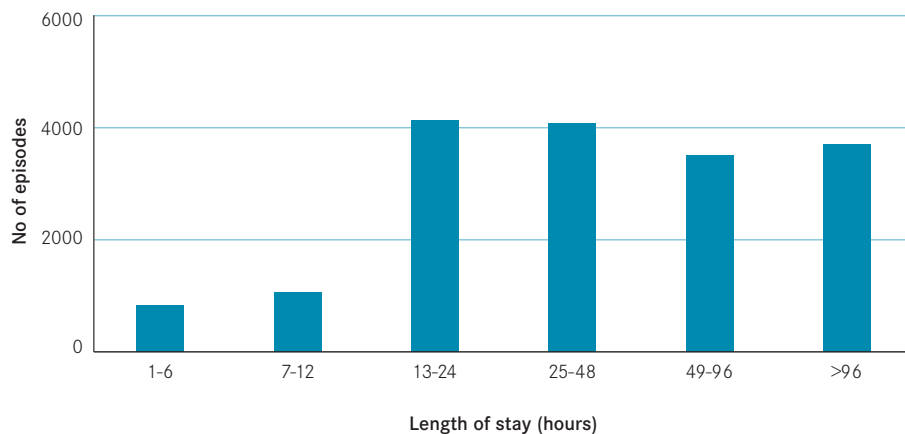
Figures for all Victorian ICUs show that, during the 2001-02 year:

- about one third of people (34.2 per cent) stayed in ICU for up to 24 hours
- just under one quarter (23.5 per cent) stayed for one to two days
- one fifth (20.4 per cent) stayed for two to four days
- just over one fifth (21.9 per cent) stayed for longer than this.

The average length of stay for all Victorian ICUs is 66.25 hours (2.76 days).

Sometimes, however, a patient may stay in ICU for many weeks.

**Figure 4: Number of admissions to ICU (“episodes”) by length of stay, for all Victorian public hospital ICUs during the 2001-02 year**



The average length of stay varied depending on the category of ICU. It was significantly longer in metropolitan ICUs than in other ICUs. This is probably due to the higher proportion of emergency cases reported by metropolitan hospitals. The following graphs show length of stay for each category of ICU, and for the individual ICUs.

Figure 5: Average stay in ICU for each category of ICU during the 2001-02 year. The horizontal line shows the average across all ICUs<sup>1</sup>

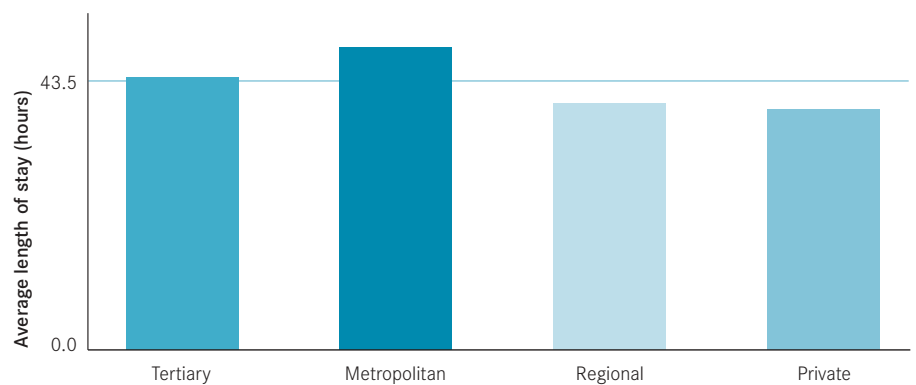
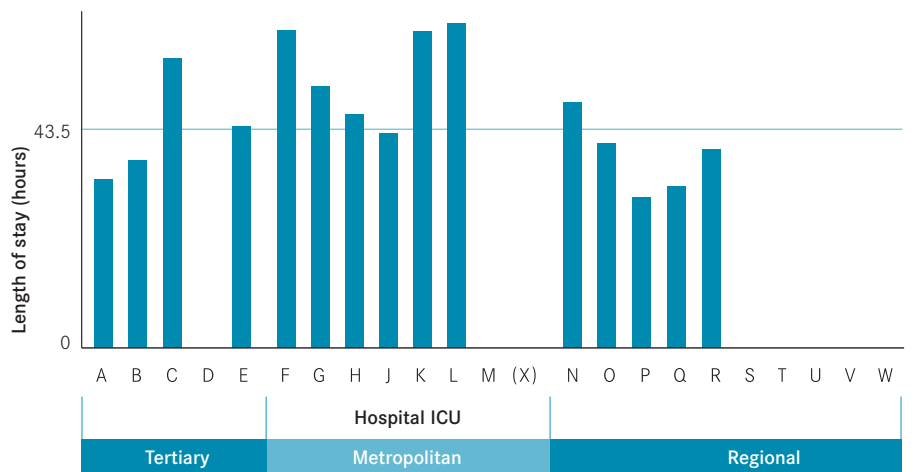


Figure 6: Average length of stay in ICU for each hospital during the 2001-02 year. The horizontal line shows the average across all ICUs

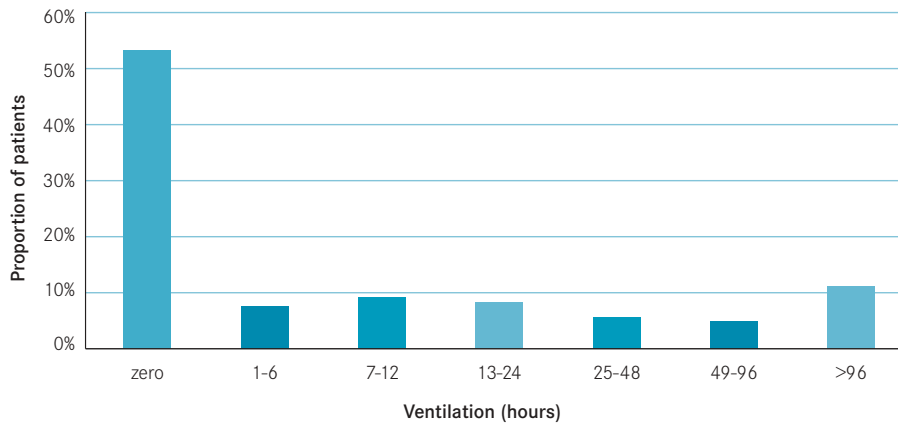


<sup>1</sup> Private hospital ICUs are included in this graph for interest, as they also contributed data to the APD during the 2001-02 year

## Ventilation (artificial breathing)

Just under half of the patients admitted to a Victorian ICU (48 per cent) required ventilation (artificial breathing), and of the patients who were ventilated, over half (54 per cent) needed it for 24 hours or less. A small number needed ventilation for four days or more.

**Figure 7: Length of ventilation time for patients in all Victorian public hospital ICUs during the 2001-02 year**



## Source of admission to ICU

Patients come to ICU from a range of different sources. During the 2001-02 year, 42 per cent of all ICU admissions reported to the APD were from the operating theatre or recovery room, 30 per cent were from the emergency department and 21 per cent came direct from a general ward of the hospital. A small number of patients were also admitted from the wards or ICUs of other hospitals.

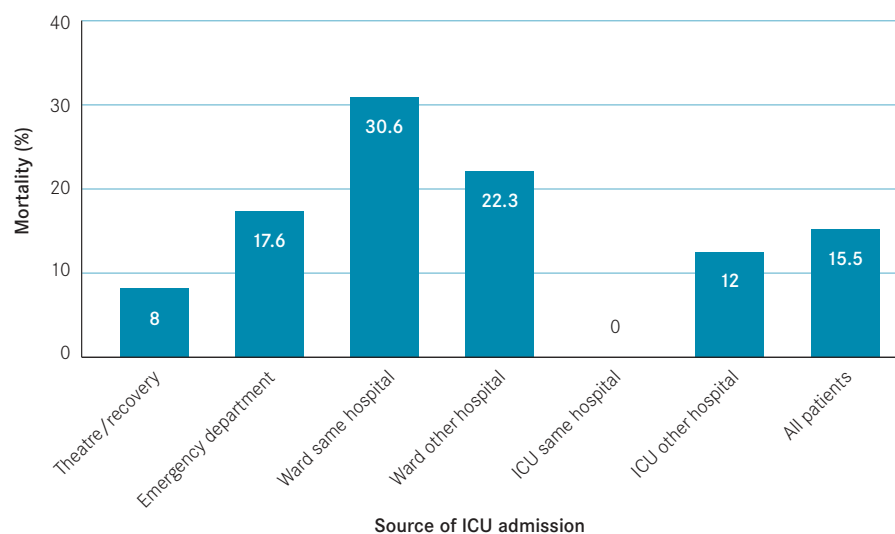
## Mortality rates in intensive care

People admitted to intensive care are very sick, and it is to be expected that not all will recover, however mortality rates (death rates) provide one measure of the effectiveness of the care delivered in ICUs, and the performance of ICUs.

The overall mortality rate of Victorian intensive care patients was 15.5 per cent (including deaths in intensive care, or while still in the hospital after leaving intensive care). This means that over 84 per cent of patients admitted to Victorian ICUs survived through their ICU admission and subsequent hospital stay.

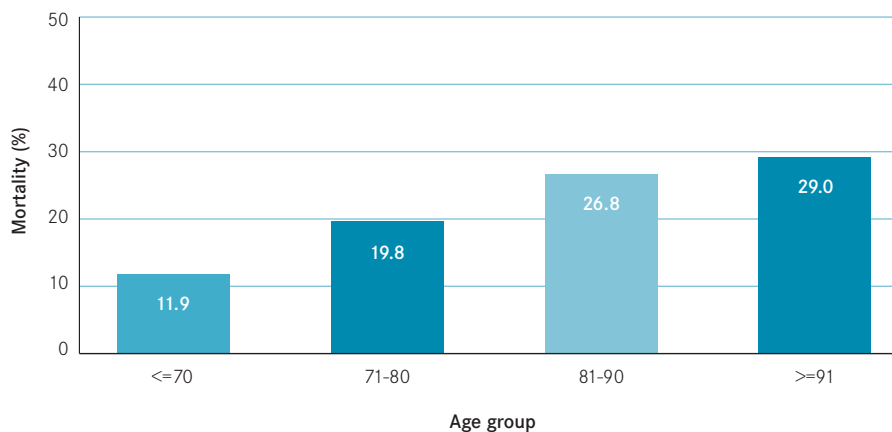
Mortality rates differed depending on the source of admission to an ICU. Patients admitted from another ward of the same hospital had the highest mortality rate (30.6 per cent), while those admitted from operating theatre or recovery room had the lowest mortality (8 per cent).

**Figure 8: Mortality rate by source of ICU admission, for the 15 ICUs reporting to the APD**



The older the person, the higher the risk. Among patients aged over 80 years, mortality was two and a half times higher than for people aged 70 years or less. Nevertheless, around seven in every ten patients age 91 years or older survived their ICU admission(s) and subsequent hospital stay.

**Figure 9: Mortality rate by age group**



## The Standardised Mortality Ratio

Standardised mortality ratios provide a method of comparing the outcomes of care (death versus survival) across different and often widely varying groups of patients.

People who are admitted to intensive care range from those who require monitoring for a short time, to people who require prolonged and complex care for severe life – threatening illness or injuries. The likelihood of surviving a stay in an ICU and hospital therefore varies considerably across the range of patients. In addition, the mix of patients varies greatly between ICUs at different hospitals.

This means that the raw mortality rates – the actual numbers of deaths – are not a reliable way of comparing different ICUs or different patient groups, as these rates can be expected to be highest in hospitals that treat the most difficult cases.

The Standardised Mortality Ratio (SMR) takes these factors into account and provides a reliable way of comparing mortality between hospitals or different patient groups.

The SMR presents the number of deaths that occur as a percentage of the number of deaths that might be expected, given best practice treatment and taking into account the severity of the particular patients' conditions. "Expected deaths" thus reflects outcomes that have been achieved internationally across hospitals seen to be delivering best practice treatment.

An SMR below 100 per cent represents a lower than expected mortality rate.

## SMRs in Victorian ICUs

SMRs showed that, across the 15 Victorian ICUs reporting data to the APD, patients admitted from wards within the same hospital were at slightly higher risk than those from operating theatre/recovery room, emergency, or other hospitals. Patients admitted from the operating theatre or recovery room were at lower-than-average risk, possibly reflecting a relatively high proportion of elective (rather than emergency) cases admitted to intensive care from these sources.

Importantly, while SMRs differed across the Victorian ICUs, every unit had an average SMR that was lower than the proportion of expected deaths – that is, below 100 per cent. Overall, the SMRs for Victorian ICUs compared favourably with those seen internationally (in the US and UK) and, in general, they were better than seen elsewhere in Australasia.

## Ninety five per cent confidence interval

The bar charts on the following pages show SMRs for a number of different groups of ICU patients. These bar charts show the “95 per cent confidence interval” around each SMR; that is, the range in which we would expect a result to fall (19 times out of 20) if we were to repeat the study. In other words, the 95 per cent confidence interval is used to show the range over which the “true” result almost certainly falls. If the 95 per cent confidence intervals for two results overlap it is unlikely that there is a “true” difference between the results.

**Figure 10: SMR by source of ICU admission during the 2001-02 year. The thin black line on each bar shows the 95 per cent confidence interval**

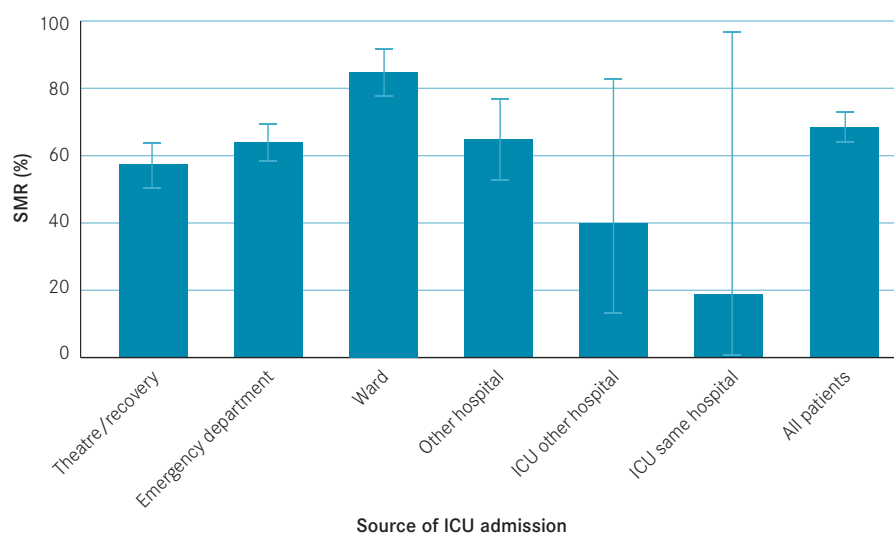
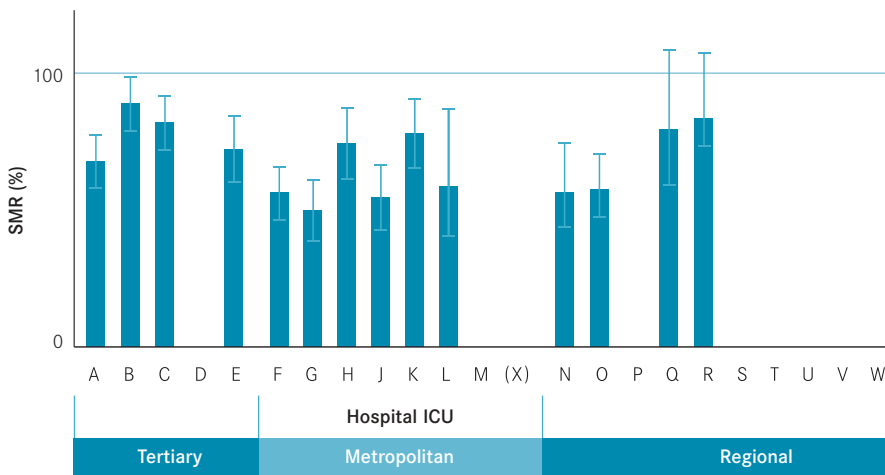


Figure 11: SMR for each public hospital ICU during the 2001-02 year. The thin black line on each bar shows the 95 per cent confidence interval.



## ICU admissions from operating theatre or recovery room

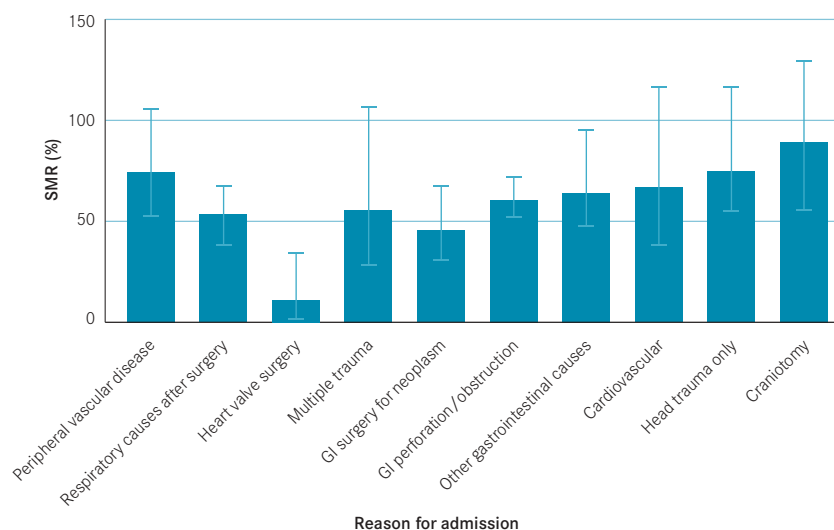
ICU admissions from the operating theatre or recovery room accounted for 42 per cent of all ICU admissions reported to the APD. The top ten reasons for these admissions during the 2001-02 year, and the mortality rates, are shown below. The bar chart that follows shows the SMR for these admission diagnoses. All compare favourably with the “expected” rate of 100 per cent.

**Top ten diagnoses for patients admitted to ICUs from operating theatres or recovery rooms during the 2001-02 year**

Diagnosis	Admissions (% of total)	Mortality
Peripheral vascular disease	7.6%	9.9%
Respiratory causes after surgery	7.5%	6.4%
Heart valve surgery	7.4%	1.1%
Multiple trauma	7.3%	3.2%
Gastrointestinal surgery for neoplasm (ie cancer)	7.1%	7.4%
Gastrointestinal perforation or obstruction	6.6%	23.6%
Other gastrointestinal causes	6.4%	9.7%
Cardiovascular	2.3%	8.0%
Head trauma only	2.8%	15.7%
Craniotomy (ie opening the skull) for bleeding in or around the brain	2.0%	24.0%

*Note: The most common reason for admission from operating theatres is, in fact, coronary artery grafts. However, it is not included in this table, or SMR calculations, as it is not an SMR diagnostic category.*

**Figure 12: SMR (with 95 per cent confidence interval) for top ten diagnoses for patients admitted to ICU from operating theatre or recovery room during the 2001-02 year**



## ICU admissions from emergency departments

ICU admissions from emergency departments accounted for 30 per cent of all ICU admissions. Respiratory diagnoses (infection, chronic obstructive airways disease and asthma) accounted for a high percentage of admissions. Self-administered drug overdose was the most common diagnosis, accounting for almost 10 per cent of these admissions overall, and a higher proportion in non-tertiary hospitals.

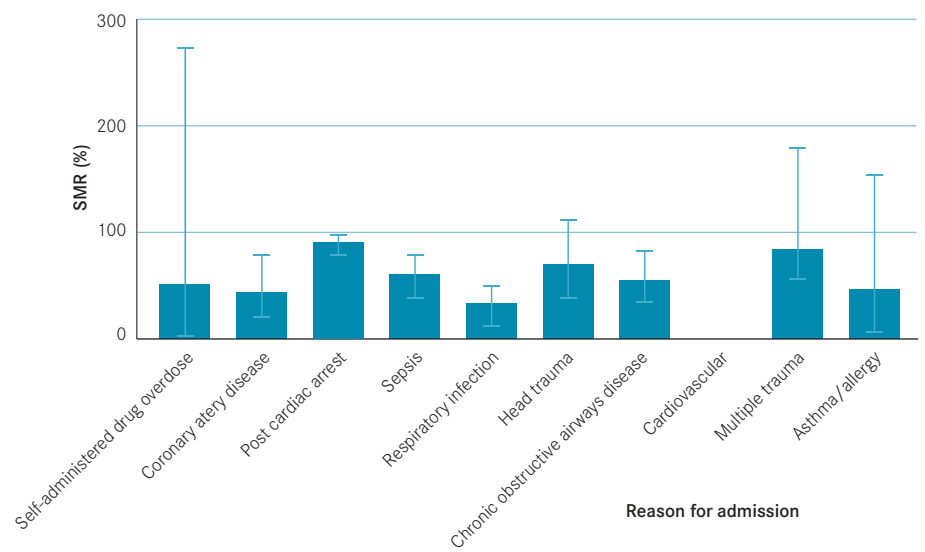
The mortality rate for these patients with overdose who reached ICU was very low (less than one per cent). For patients admitted after a cardiac arrest (heart attack), however, the mortality rate was high (56.3 per cent).

The top ten reasons for these admissions during 2001-02, and the mortality rates, are shown below. The bar chart shows the SMR for these diagnoses. The very wide 95 per cent confidence interval around the SMR for self-administered drug overdose possibly reflects the wide range of severity seen in these patients. With this possible exception, all SMRs compare favourably with international experience.

### Top ten diagnoses for patients admitted to ICU from emergency departments during the 2001-02 year

Diagnosis	Admissions (% of total)	Mortality
Self-administered drug overdose	9.9%	0.7%
Coronary artery disease	6.6%	7.4%
Post cardiac arrest	6.0%	56.3%
Sepsis	6.0%	26.2%
Respiratory infection	5.7%	12.8%
Head trauma	5.7%	14.1%
Chronic obstructive airways disease	4.9%	17.0%
Cardiovascular causes	4.7%	0.7%
Multiple trauma	4.3%	6.5%
Asthma/allergy	4.0%	1.8%

**Figure 13: SMR (with 95 per cent confidence interval) for the top ten diagnoses for patients admitted to ICU from emergency departments during the 2001-02 year**



## ICU admissions from general wards

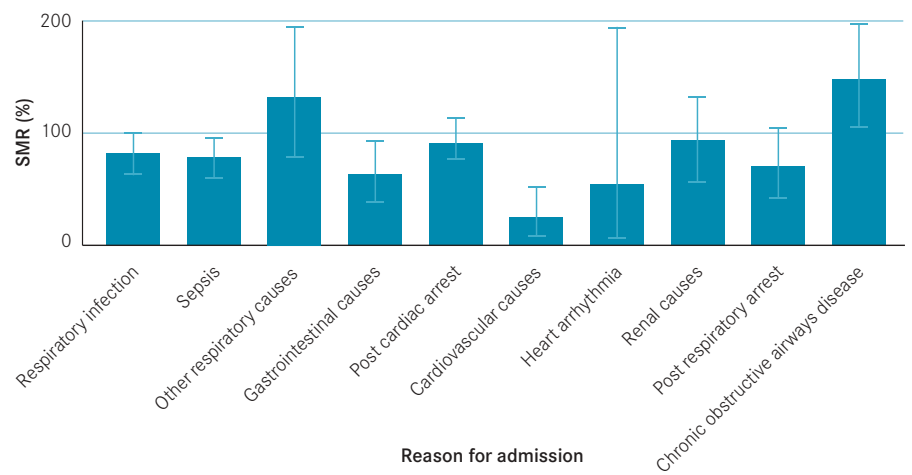
Admissions from the general wards of the same hospital accounted for more than one in five (21 per cent) of ICU admissions, and almost one quarter of these (24 per cent) involved a respiratory diagnosis (infection, chronic obstructive pulmonary disease, post respiratory arrest, or other). The top ten reasons for these admissions during 2001-02, and the mortality rates, are shown below. The bar chart shows the SMR for these diagnoses.

Admissions from the general wards usually involve serious illness and the mortality rates were high. Furthermore, these admissions were also associated with the highest SMRs, with the SMRs for some diagnoses falling above 100 per cent – that is, above international benchmarks. In particular, these SMRs suggest the need to look more closely at the management of patients with severe respiratory disease.

### Top ten diagnoses for patients admitted to ICU from general wards in the same hospital during the 2001-02 year

Diagnosis	Admissions (% of total)	Mortality
Respiratory infection	10.5%	27.7%
Sepsis	10.0%	33.5%
Other respiratory causes	6.8%	19.4%
Gastrointestinal causes	6.1%	28.8%
Post cardiac arrest	5.3%	68.0%
Cardiovascular causes	4.5%	8.4%
Heart arrhythmia	4.3%	5.1%
Renal causes	3.8%	20.0%
Post respiratory arrest	3.6%	33.3%
Chronic obstructive airways disease	3.1%	42.8%

**Figure 14: SMR (with 95 per cent confidence interval) for the top ten diagnoses for patients admitted to ICU from general wards in the same hospital during the 2001-02 year**



## Admissions to tertiary ICUs

Admissions to the four tertiary (ie super-specialist) ICUs reporting to the APD accounted for over half (51 per cent) of all the ICU admissions reported. The top ten reasons for admission to a tertiary ICU are shown below. The most common was cardiac surgery, which (because of the way the SMR categories are organised) is included in the group 'Other: Undefined'. Trauma accounted for 7.2 per cent of admissions.

### Top ten diagnoses for patients admitted to tertiary ICUs during the 2001-02 year

Diagnosis	Admissions (% of total)
Other: Undefined	15.3%
Respiratory	6.7%
Diagnosis missing	6.5%
Heart valve surgery	5.9%
Sepsis	4.8%
Peripheral vascular disease	4.3%
Gastrointestinal causes	4.0%
Cardiovascular causes	3.8%
Post-op: multiple trauma	3.7%
Post-op: head trauma	3.5%

## Admissions to metropolitan ICUs

Admissions to metropolitan ICUs accounted for less than a third (29 per cent) of public hospital ICU admissions reported to the APD. The top ten reasons for admission are shown below. Diagnoses categorised as 'undefined' are, in fact, patients admitted to ICUs following cardiac surgery at the one metropolitan hospital performing this type of surgery. Patients with gastrointestinal conditions and people with self-administered drug overdose both appear more commonly in metropolitan hospitals.

### Top ten diagnoses for patients admitted to metropolitan ICUs during the 2001-02 year

Diagnosis	Admissions (% of total)
Undefined	9.6%
Gastrointestinal causes	6.7%
Self-administered drug overdose	6.4%
Post-op: gastrointestinal perforation or obstruction	6.0%
Post-op: peripheral vascular disease	5.7%
Respiratory infection	5.4%
Post cardiac arrest	4.5%
Gastrointestinal surgery for neoplasm (ie cancer)	4.4%
Other respiratory causes	4.1%
Chronic obstructive airways disease	4.0%

## Admissions to regional ICUs

Admissions to regional ICUs accounted for one in five (20 per cent) of public hospital ICU admissions. The top ten reasons for admission are shown below. The three most common are all cardiac-related, reflecting the large proportion of coronary care admissions in these hospitals. In contrast to metropolitan ICUs, there are a significant number of ICU admissions following multiple trauma.

### Top ten diagnoses for patients admitted to regional ICUs during the 2001-02 year

Diagnosis	Admissions (% of total)
Heart arrhythmia	9.9%
Coronary artery disease (without surgery)	9.5%
Cardiovascular causes	7.7%
Post-op: multiple trauma	6.9%
Other gastrointestinal causes	6.7%
Respiratory causes	5.4%
Post-op: gastrointestinal perforation/obstruction	4.6%
Sepsis	4.5%
Gastrointestinal surgery for neoplasm (ie cancer)	4.4%
Renal causes	3.7%

## Readmission to intensive care

Readmission to intensive care during a hospital stay is of concern, as it may reflect premature discharge from intensive care, or a problem with out of intensive care treatment. Readmission rates vary considerably between hospitals, ranging from 0 to 9.6 per cent of all patients admitted to intensive care. There is some concern that readmission rates are under-reported in many hospitals. The table below shows the percentage for each hospital that reported readmission rates.

### ICU readmission rates for the hospitals reporting to the APD during the 2001-02 year<sup>2</sup>

Hospital	Readmissions (% of total)
<b>Tertiary hospitals:</b>	
Hospital A	5.6%
Hospital B	9.6%
Hospital C	7.5%
Hospital E	0.1%
<b>Metropolitan hospitals:</b>	
Hospital F	6.3%
Hospital G	1.9%
Hospital H	4.7%
Hospital J	5.3%
Hospital K	0.7%
<b>Regional hospitals:</b>	
Hospital N	0.0%
Hospital O	3.1%
Hospital Q	0.0%
Hospital R	5.6%

<sup>2</sup> All Victorian hospital ICUs are assigned a letter for reporting purposes

## Time of discharge from intensive care

A study conducted in Britain indicated that being discharged from intensive care to a general ward during the night may result in poorer patient outcome. Some night time discharges are inevitable, when an urgent case has to be accommodated. Eight of the Victorian hospitals (hospitals A, F, H, J, N, O, Q and R) reported discharging less than 10 per cent of their patients from intensive care between 10.00 pm and 7.00 am; and a further four hospitals (B, C, G and K) discharged between 10 and 20 per cent of their ICU patients between these hours. The remaining hospital (E) discharged about 40 per cent of patients from their ICU during these hours. This indicator will be investigated further in future reports.

## In conclusion

The standard of intensive care in Victoria is high, when judged by international standards and when compared with other Australian states and territories.

To improve the quality and breadth of data collected in future, the Victorian Intensive Care Data Review Committee recommends that:

- ICU data collection be made mandatory for all hospitals
- the scope of data collection and analysis should be broadened to include other markers of quality of provision of intensive care.

## Glossary

**95 per cent confidence interval:** The range in which we would expect a result to fall (19 times out of 20) if we were to repeat the study. In other words, the 95 per cent confidence interval is used to show the range over which the 'true' result almost certainly falls. If the 95 per cent confidence intervals for two results overlap it is unlikely that there is a 'true' difference between the results.

**APD:** The Adult Patient Database, compiled by the Australian and New Zealand Intensive Care Society (ANZICS), with data on intensive care contributed on a voluntary basis by public and private hospitals throughout Victoria.

**FTE:** Full-time equivalent; that is, the number of full-time staff (in this report, specialist doctors or nurses), plus the full-time equivalent of all part-time staff.

**SMR:** Standardised mortality ratio. This provides a reliable way of comparing mortality between hospitals or different patient groups. It presents the number of deaths that occur as a percentage of the number of deaths that might be expected, given best practice treatment and taking into account the severity of the particular patients' conditions. An SMR below 100 per cent represents a lower-than-expected mortality rate.

**Tertiary hospital:** A hospital that provides super-specialist care for the most complex injuries and illnesses.