

Report of the

Australian and New Zealand Paediatric Intensive Care Registry 2005

Christie Turton, Lynda Norton, and
Anthony Slater

Christie Turton
Australian and New Zealand Paediatric Intensive Care Registry
Lynda Norton
Australian and New Zealand Paediatric Intensive Care Registry
PhD Candidate - University of South Australia
Anthony Slater
Director Queensland Paediatric Intensive Care Service - Royal Children's Hospital Brisbane

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Report of the Australian and New Zealand Paediatric Intensive Care Registry 2005

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The participating hospitals and people listed below have been associated with the Registry for many years and we thank them for their continued active support. In addition to those listed, we also give our thanks to the many other individuals who are involved in the data collection, collation, cleaning, and submission of data to the Registry.

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Foreword

The annual production of the Australian and New Zealand Paediatric Intensive Care Registry (ANZPICR) report is now taken as a granted. In its tenth year of activity, the ANZPICR has grown from a significant research exercise to a world renowned resource in paediatric intensive care data management. The production of this 5th report also coincides with the first significant change in the structure of ANZPICR. This year Lynda Norton has stepped down as the manager of ANZPICR to follow other academic pursuits. ANZPICR owes a great deal of appreciation to Lynda who was responsible for progressing many of the reporting innovations of ANZPICR and has also worked to support the activities of the ANZICS Paediatric Study Group (PSG).

The ANZPICR reports have been a vital tool for the resource management of paediatric intensive care in Australia and New Zealand, so Lynda's role can not be overstated. Christie Turton now based in Brisbane has taken up the role of ANZPICR manager. This is her first ANZPICR report and she has obviously taken to the role quickly and produced a report that again captures the important elements of the ANZPICR.

The work of ANZPICR would not be possible without the contribution of data from all those units treating children with serious illness, injury or after complex surgery. ANZPICR has made a concerted effort to produce quality information. This can only occur if there is a commitment to collect and record quality data and expend energy in ascertaining its validity. The data collectors and medical and nursing staff at each of the contributing hospitals are to be commended for the efforts that they produce on a daily basis to ensure the ongoing quality and validity of the ANZPICR reports.

Again the leadership of Dr Tony Slater in directing the ANZPICR and ensuring the collaborative efforts of so many hospitals and units is to be commended. The information produced by ANZPICR has been critical in informing some of the most significant decisions facing paediatric intensive care practice in Australia over the last four years. Dr Slater and his colleagues have therefore made a significant contribution to these processes.

I therefore reiterate the appreciation of the paediatric intensive care community for the efforts of those involved in producing this report and also look forward with enthusiasm to the development and advancement of this work in the future

Phil Sargent FRACP FJFICM
Chair Paediatric Division
ANZICS

1. Introduction

1.1 History of the Australian and New Zealand Paediatric Intensive Care Registry

The Paediatric Study Group (PSG) of the Australian and New Zealand Intensive Care Society (ANZICS) established the Australian and New Zealand Paediatric Intensive Care (ANZPIC) Registry in 1997. The aims of the Registry are:

- To describe paediatric intensive care practices and outcomes in Australia and New Zealand.
- To provide contributing units with efficacy and efficiency reports that compare performance in their units against national and international standards.
- To facilitate research in paediatric intensive care.

Prior to April 2006, the ANZPIC Registry was located at the Women's and Children's Hospital in Adelaide. In April 2006, the Registry moved to the Royal Children's Hospital in Brisbane (RCHB), with a new Project Officer maintaining the database under the guidance of the Registry Director Anthony Slater.

This report is the fifth Annual report describing paediatric intensive care practices and outcomes within Paediatric Intensive Care Units (PICUs) across Australia and New Zealand. Data collected from fifteen intensive care units (ICUs) (nine PICUs, six general ICUs), during the 2005 calendar year was used to generate this report.

The nine PICUs are tertiary referral centres for children requiring intensive care. They are based in university affiliated children's hospitals. Data on all patients admitted to these nine units have been included, the age ranges from birth to young adulthood (16 years).

Six general ICUs admitting predominantly adults also contributed data on their paediatric admissions (patients < 16 years of age). These ICUs are based in metropolitan or regional hospitals in Australia and New Zealand. The Royal Darwin Hospital provided data to the ANZPIC Registry for the first time in 2005. Table 1.1.1 lists the hospitals contributing to the ANZPIC Registry in 2005.

Table 1.1.1 Hospitals contributing to the ANZPIC Registry in 2005

Hospital	State	ICU Type
The Canberra Hospital	ACT	Metropolitan
Sydney Children's Hospital	NSW	PICU
The Children's Hospital at Westmead	NSW	PICU
Tamworth Base Hospital	NSW	Regional
Mater Children's Hospital	QLD	PICU
The Prince Charles Hospital	QLD	PICU – Cardiac
Royal Children's Hospital - Brisbane	QLD	PICU
The Townsville Hospital	QLD	Regional
Royal Darwin Hospital	NT	Metropolitan
Women and Children's Hospital	SA	PICU
Monash Medical Centre	VIC	Metropolitan
Royal Children's Hospital - Melbourne	VIC	PICU
Princess Margaret Hospital	WA	PICU
Starship Children's Hospital	NZ	PICU
Wellington Hospital	NZ	Regional

1.2 ICU Classification

Table 1.2.1 displays the ANZPIC Registry ICU classifications.

Table 1.2.1 ICU Classifications

Classification	Description
PICU	Paediatric, tertiary referral intensive care units based in a capital city
Metropolitan	All other intensive care units in capital cities
Regional	Intensive care units outside a capital city

2. Data set

2.1 Data set

The minimum data set analysed for this report consisted of 38 variables. These variables and their definitions are described in Appendix 1. Information collected for the minimum data set includes demographic data, diagnosis directly responsible for ICU admission as well as underlying and additional diagnoses. Additionally, physiologic variables measured at the time of first face to face contact between the patient and the doctor from the ICU (or a specialist retrieval team), the ICU outcome, and the length of stay are recorded. All participating units collect the minimum data set. All variables are routinely measured or recorded in the patients' medical record. The complete data set was expanded at the end of 2004 to include an extra five variables concerning mortality, and nine variables concerning therapies. Not all participating units collected the data for the new variables during the 2005 period, these variables were therefore not analysed for this report.

2.2 Data collection

Data are collected in the hospitals by either completion of the specific ANZPIC Registry form, or by incorporating the ANZPIC Registry data items into the local clinical information system. Participating hospitals maintain unit specific databases and submit electronic copies of the de-identified data to the ANZPIC Registry each year. Ten of the units use the ANZPIC Registry software while the remaining units have incorporated the ANZPIC Registry data fields into their unit specific databases.

In 2004, a paediatric component was added to the Australasian Outcome Research Tool for Intensive Care (AORTIC), software developed by the ANZICS Adult Patient Database (APD). This has allowed units already using AORTIC to collect data on paediatric admissions.

2.3 Data verification

Missing, inconsistent, or unusual data are identified and flagged at the time of submission to the Registry. This initial filtering is performed both automatically, via computer based checks for outliers, and manually by the project manager.

2.6 Data Limitations

Limitations to the data are related to the data collection process, the small population of paediatric patients admitted to ICUs in Australia and New Zealand, and the outcome measures used to assess unit performance.

Nine participating units have designated data managers (refer table 2.6.1). In the remaining ICUs data is collected by a range of staff, from clinical nurses to senior medical staff. It has been noted previously that data collection errors are more common in units where a greater number of staff are involved with the collection of data compared to units who have dedicated data collectors/managers.

Table 2.6.1 Number of hospitals employing data collectors by ICU Type.

Classification	Dedicated data collectors	No dedicated data collectors
PICU	5	3
Metropolitan	2	1
Regional	3	-

3. Demographics

3.1 Population

For 2005, the ANZPIC Registry received data from 7,203 paediatric admissions to ICUs in Australia and New Zealand. In 2004, the ANZPIC Registry received data from 7,329 admissions (from 15 ICUs), and prior to this reported from 6,992 admissions (from 16 ICUs) in the 2003 calendar year. The number of admissions to the Registry varies depending on the individual admission numbers and classification of the ICUs submitting data. Admissions by region are displayed in Table 3.1.1. The postcodes of patients admitted to ICUs were used to assign a home state irrespective of their admission hospital. Overseas admissions ($N = 74$) were excluded. The child population (<16 yrs) for each state or territory was obtained from the Australian Bureau of Statistics (ABS) Australian Demographic Statistics (3), and Statistics New Zealand (4). Admissions per 1,000 children varied from 0.49 to 1.95.

In 2005, the prevalence rate for paediatric ICU admissions was 1.4 per 1,000 children, the same as recorded for the previous reporting year. The ANZPIC Registry prevalence rate is similar to the rate recorded by the Paediatric Intensive Care Audit Network (PICANet) in the UK. (5). Each year a number of children are admitted to general ICUs in Australia and New Zealand that do not contribute to the ANZPIC Registry. In 2005 the number of children admitted to these units was estimated to be 447 (7).

Table 3.1.1 Regional admission prevalence and sex-specific admissions to ANZPIC Registry hospitals in 2005.

Region	Prevalence (per 1,000)	Males	Females	Population
ACT	0.49	16	17	66,889
NSW	1.18	961	706	1,411,354
NT	0.80	20	23	53,596
QLD	1.95	898	792	863,389
SA	1.70	276	241	303,947
VIC	1.39	753	677	1,025,428
WA	1.70	402	326	428,132
NZ	1.07	561	409	903,980
Total	1.39	3887	3191	5,056,715

3.2 Age

The majority of admissions to ICU in 2005 were for children less than 5 years of age (63.5%), with infants < 12 months of age making up more than half this group (37% of all ICU admissions). A greater number of males were admitted than females across the majority of ages as illustrated in figure 3.2.1

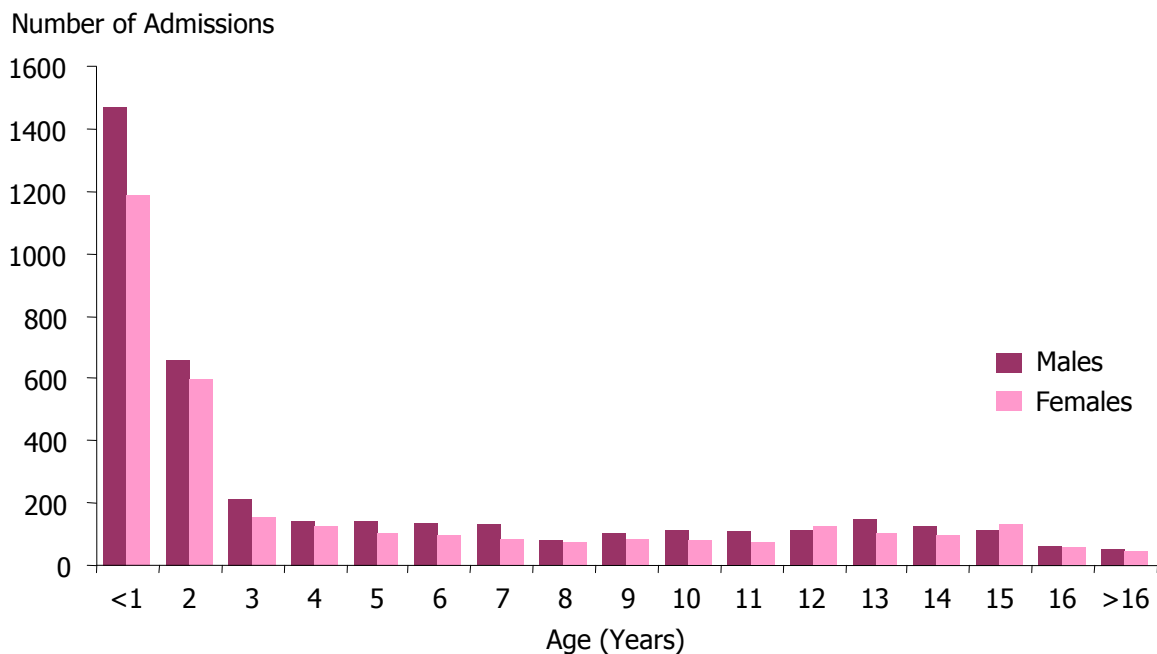


Figure 3.2.1 ICU admission numbers by age years and sex 2005.

Figure 3.2.2 displays the admission numbers for patients under one year of age. Twenty-five percent of infants admitted less than one year old were neonates (< 28 days old).

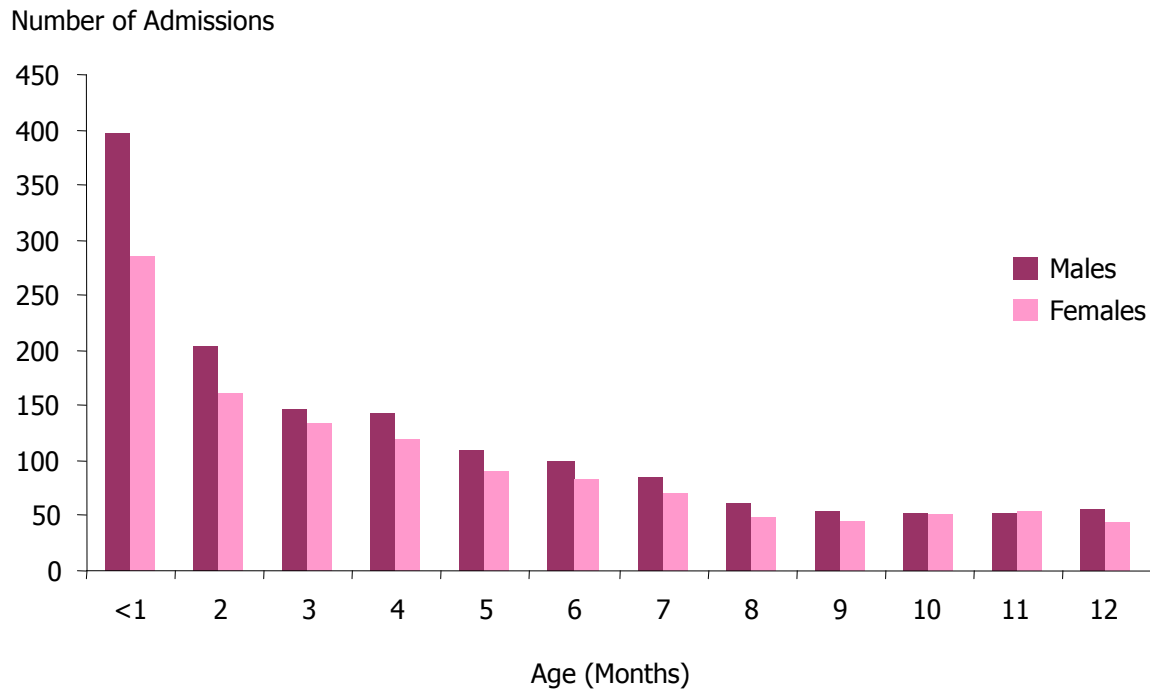


Figure 3.2.2 ICU admission numbers by age (months) and sex, 2005.

3.3 Ethnicity

The ANZPIC Registry uses the Australian Standard Classification of Cultural and Ethnic Groups, and the New Zealand Standard Classification of Ethnicity. Both are based on the principle of self assessed identification with an ethnic group (8). In PICUs, ethnicity is most often determined by the parents or next of kin. Displayed in Figure 3.3.1 are the proportions of the various ethnic groups in the population of children admitted to the ANZPIC Registry ICUs.

Caucasian admissions made up the greatest number of ICU admissions for Australia (82.4%). Nearly half of New Zealand’s admissions were Caucasian (48%); when combined, Maori and Pacific People’s admissions accounted for almost the same proportion (45.8%) of ICU admissions.

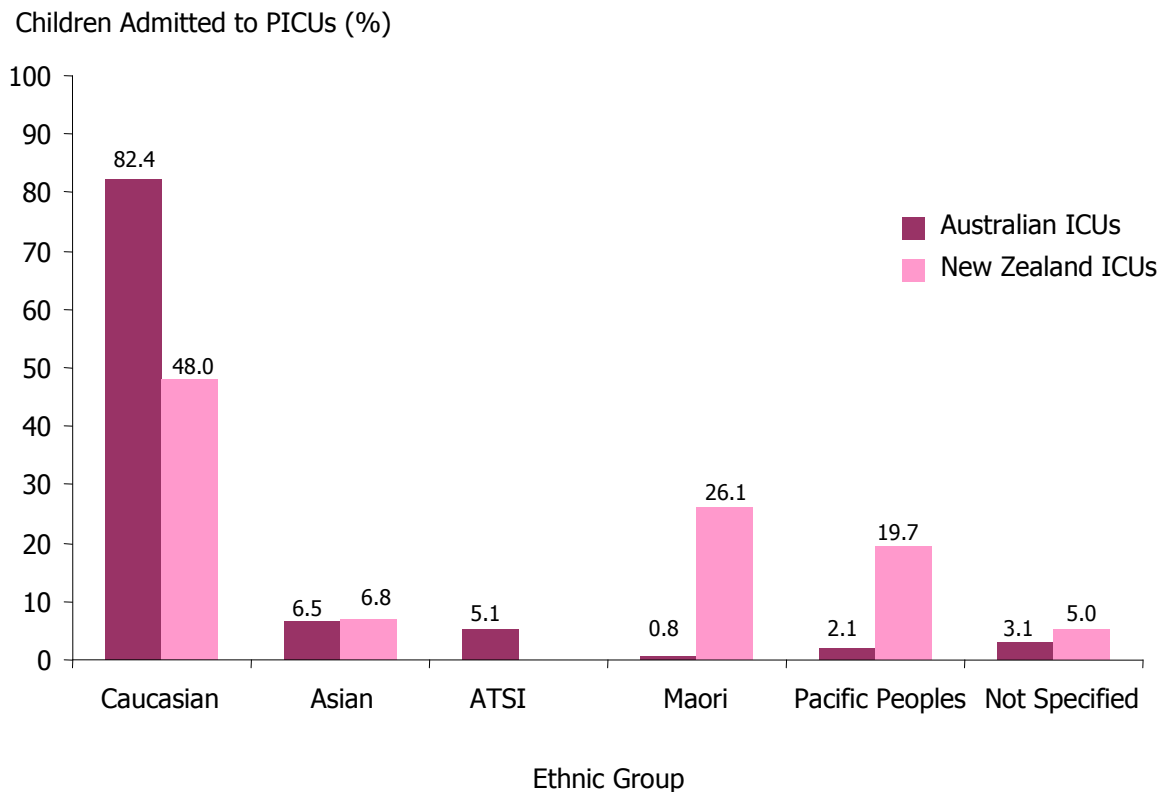


Figure 3.3.1 Proportion of the total patient population by ethnicity and country, 2005

* (ATSI - Aboriginal and Torres Strait Islander)

4. Admission Characteristics

4.1 ICU Admission Source

Admissions for the operating theatre accounted for 43% of all ICU admissions. Nineteen percent of admissions were from other wards, while 15% of admissions were from the emergency department. Twenty-two percent of paediatric admissions were direct to the ICU from outside the hospital (Table 4.1.1).

4.2 Admission Type

Admissions are classified as either elective or non-elective. An admission is elective if the admission follows elective surgery, is for an elective ICU procedure, is a review of home ventilation, or is for elective monitoring. Surgery or an ICU procedure is considered elective if it could be postponed for more than six hours without an adverse effect.

Nearly 60% of all ICU admissions in 2005 were non-elective (see Table 4.1.1). Direct ICU admissions were the highest percentage of non-elective admissions (16.9%), excluding other ICU or NICU, non-elective admissions were relatively even across admission source. Admissions from the operating theatre or recovery accounted for approximately 76% of all elective admissions. Figure 4.2.1 displays elective and non-elective admissions for each hospital.

Table 4.1.1 Intensive care admission source by type, 2005.

Admission Source	% Elective	% Non-elective
Operating Theatre or Recovery	31.05	12.49
Direct ICU Admission	4.59	16.92
Emergency Department	0.27	15.07
Ward	4.32	14.81
Other ICU or NICU	0.25	0.24
Total	40.48	59.53

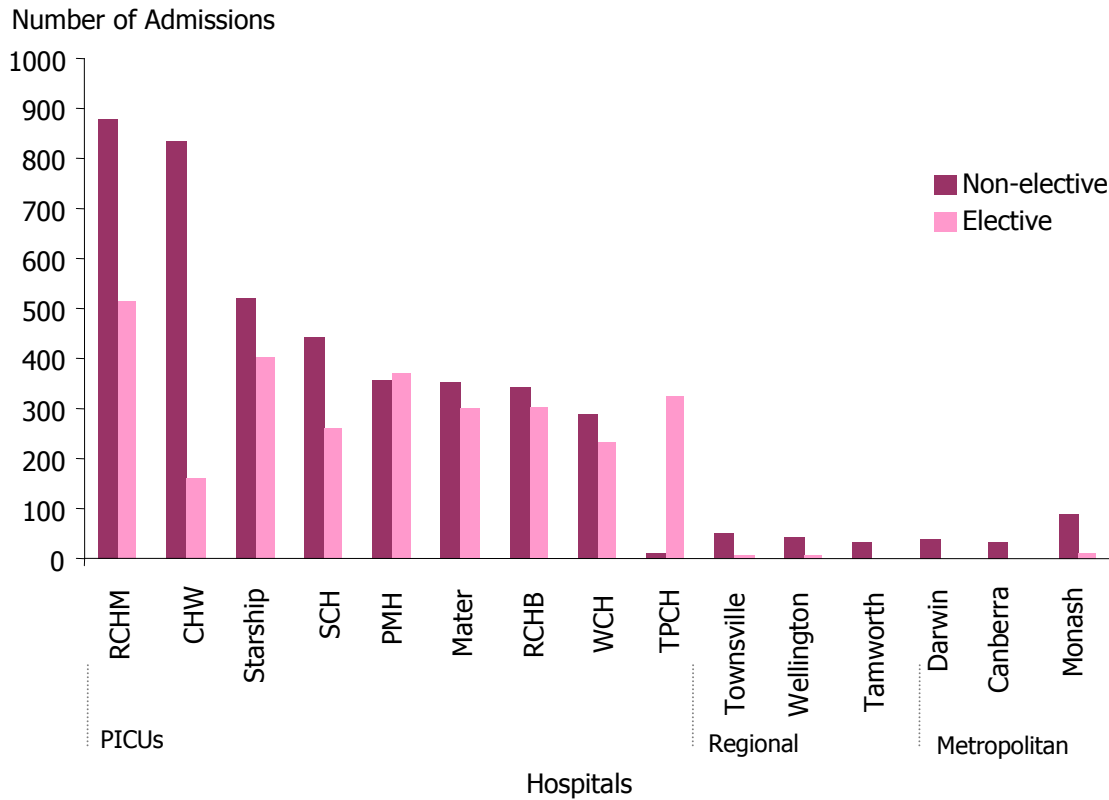


Figure 4.2.1 Elective and Non-elective admissions for each Hospital, 2005

Figure 4.2.1 illustrates that non-elective admissions are the greatest source of admissions for nearly all hospitals, however the proportion of elective admissions to non-elective admissions varies across hospitals. Ninety-six percent of admissions to The Prince Charles Hospital (TPCH) were elective in 2005. The PICU at TPCH is a cardiac PICU and this accounts for the high percentage of elective admissions to this unit. Elective admissions for other hospitals ranged from 10 to 51 percent.

Figure 4.2.2 displays the elective and non-elective admissions for each age group. The difference between the number of non-elective and elective admissions is greatest for children in the < 1, and 1 - 4 year old age groups.

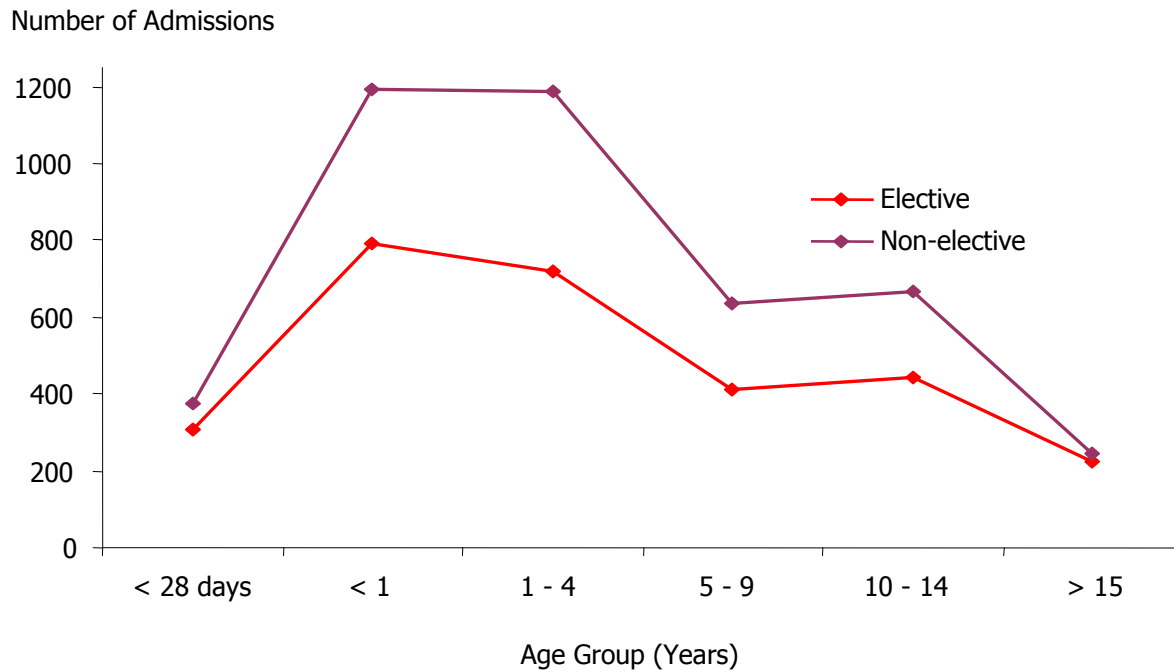


Figure 4.2.2 Elective and Non-elective admissions by age, 2005

4.3 Admission Diagnosis

Diagnosis codes developed by the ANZICS PSG (6) are used to code the principal reason for ICU admission. Underlying and up to five additional diagnoses can also be assigned for each admission. The ANZPIC Registry diagnosis codes are listed in Appendix II.

For the 2005 reporting year, the codes have been aggregated into 13 broad diagnostic categories (refer Table 4.3.1). Following the 2004 report, the diagnostic groups ICU procedures and monitoring, and endocrine / metabolic have been presented separately instead of being included within the 'miscellaneous' category. Additionally this year it was decided that diagnosis codes relating to a Life Threatening Event (LTE) would also be presented separately due to its high mortality rate (29.7%). LTE includes an acute life threatening event, cardiac arrest - in hospital, and cardiac arrest - out of hospital.

Table 4.3.1 Number of admissions, and mortality rate by diagnostic group, 2005

Diagnostic	Number	% of admissions	Mortality Rate (95% CI)
Respiratory	1670	23.2	4.1 (3.2 - 5.2)
Post Operative / Cardiac	1344	18.7	1.1 (0.6 - 1.8)
Post Operative - Other	756	10.5	0.3 (0.03 - 0.9)
Neurological	583	8.1	5.1 (3.5 - 7.2)
Injury	499	6.9	5.1 (3.2 - 7.3)
Post Operative - ENT / Thoracic	498	6.9	0.8 (0.2 - 2.0)
Miscellaneous	476	6.6	5.9 (3.9 - 8.3)
Cardiovascular	342	4.7	9.1 (6.2 - 12.6)
Post Operative - Neurosurgical	307	4.3	1.6 (.53 - 3.7)
ICU Procedure / Monitoring	223	3.1	0.0 (-)
Endocrine / Metabolic	210	2.9	2.9 (1.0 - 6.1)
Gastrointestinal / Renal	167	2.3	5.4 (2.5 - 9.9)
LTE	128	1.8	29.7 (22.0 - 38.4)

The Respiratory category was the most common diagnostic group for the Registry (23.2%) followed by post-operative cardiac surgery (18.7%). These two categories were the most common diagnostic group for patients up to 10 years old, (respiratory 25.8%, and post-operative cardiac 21.1%). For patients greater than 10 years of age the miscellaneous category (19.9%) was the most common reason for ICU admission followed by the post-operative - other (17.2%). Figure 4.3.1 displays the major diagnostic categories by age group.

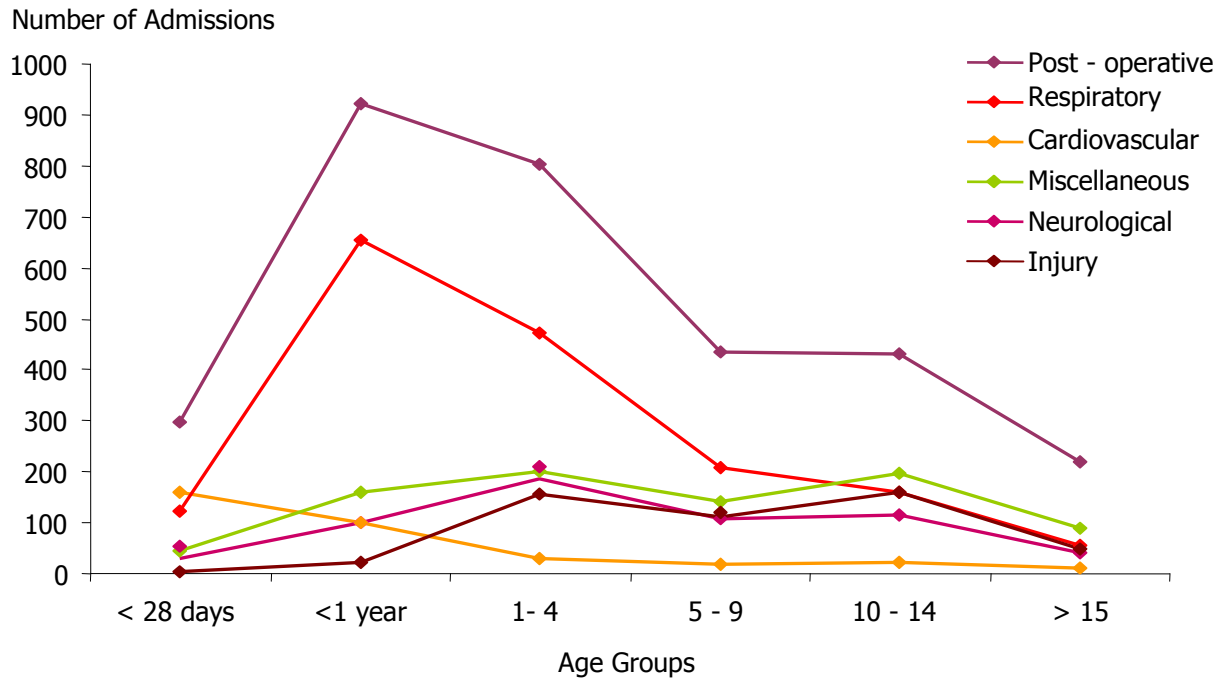


Figure 4.3.1 Diagnostic categories by age group, 2005.

Tables 4.3.2 and Table 4.3.3 display the 10 most common reasons for non-elective and elective admissions to ICU separately. Also displayed are the median length of stay (LOS) for each diagnosis category.

Respiratory failure (8.6%) was the most common reason for non-elective admissions to ICU, followed by seizures (7.4%). Respiratory failure also had the highest LOS for non-elective admissions (3.63 days), which was followed by Pneumonia/Pneumonitis (2.83 days).

The most common elective admissions to ICUs was ICU procedure (6.3%). VSD repair and spinal instrumentation were both the next most common elective admissions (5.1%), however VSD repair had a greater median LOS of 1.73 days compared to 0.91 days for spinal instrumentation.

Table 4.3.2 Top 10 reasons for non-elective admission to ICU, the % of all admissions, and median Length of Stay (LOS) in 2005.

Principal Admission Diagnosis	Number	%	Median LOS
Respiratory Failure	365	8.6	3.63
Seizures	314	7.4	0.88
Asthma	249	5.8	0.76
Bronchiolitis	239	5.6	2.35
Trauma - Head	215	5.1	1.57
Pneumonia or Pneumonitis	152	3.6	2.83
Diabetes Mellitus with Ketoacidosis	110	2.6	0.97
Shock - Septic	98	2.3	2.56
Apnoea - Central	85	2.0	1.56
Upper Airway Obstruction - Other	75	1.8	0.93

Table 4.3.3 Top 10 reasons for elective admission to ICU, the % of all admissions, and median Length of Stay (LOS) in 2005.

Principal Admission Diagnosis	Number	%	Median LOS
ICU Procedure	181	6.3	0.13
VSD Repair	147	5.1	1.73
Spinal Instrumentation	147	5.1	0.91
Valve Repair or Replacement	117	4.0	0.95
Adenoidectomy & / or Tonsillectomy	96	3.3	0.76
Tetralogy of Fallot Repair	80	2.8	1.93
Coarctation Repair	78	2.7	1.44
ASD Repair	76	2.6	0.96
Laryngobronchoscopy	73	2.5	0.70
ENT - Other	72	2.5	0.80

4.4 Admissions by Month

Annual admission numbers per hospital each year since 2001 are displayed in Figure 4.4.1 below. The notable increase in admission numbers for the Starship Children’s Hospital is a result of the transfer of the paediatric cardiac surgery service from Greenlane Hospital to Starship in 2004.

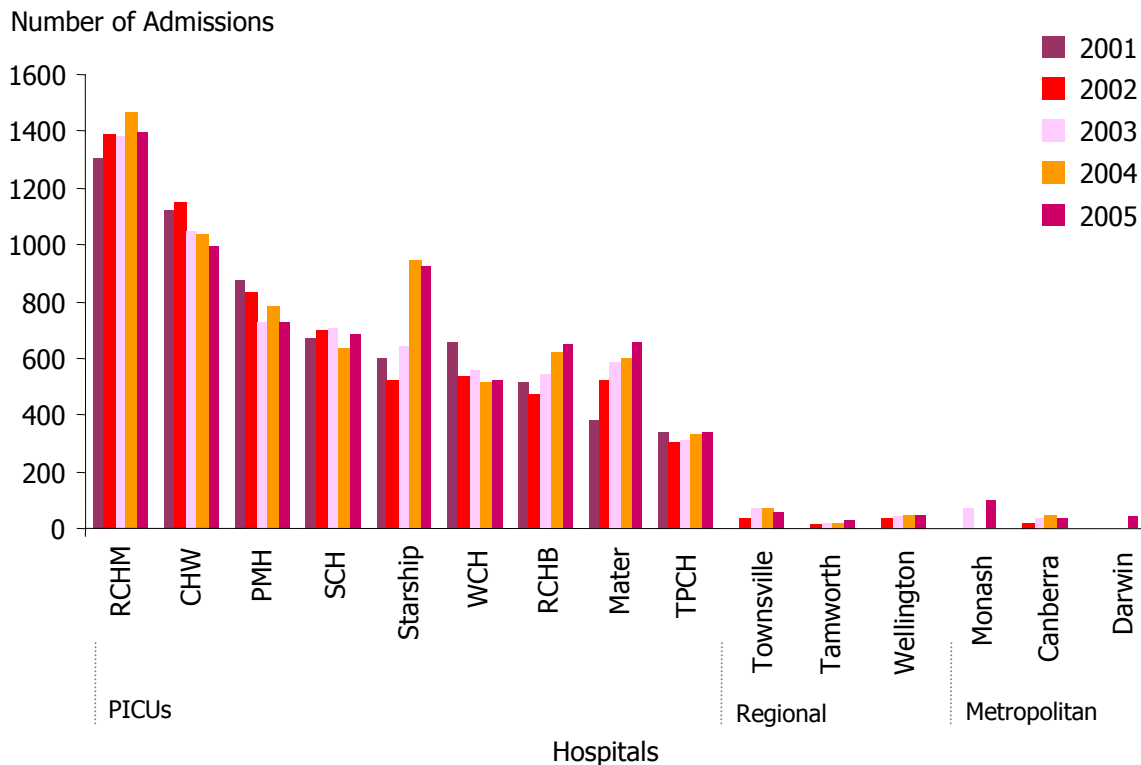


Figure 4.4.1 Number of patients admitted to ICUs participating in the ANZPIC Registry by ICU classification, 2001-2005.

The proportion of children ventilated during ICU admission is considered a simple indicator of admission threshold. The number of admissions in each ICU and the proportion of ventilated admissions are displayed in table 4.4.1. In 2005, the percentage of ventilated patients ranged from 9.7 to 85 percent, which is consistent with preceding reports. The Prince Charles Hospital reported the highest ventilation rate, which is attributed to the cardiac caseload of the ICU.

The ventilation rate for Starship Children’s Hospital was also high (70%), reflecting the ICUs recent cardiac caseload inclusion.

Table 4.4.1 Number of admissions and ventilated patients by unit in 2005.

Hospital	Admissions	Number Ventiladed	%
Royal Children’s Hospital Melbourne	1393	976	70.1
The Children’s Hospital at Westmead	996	558	56.0
Princess Margaret Hospital	728	297	40.8
Sydney Children’s Hospital	684	442	64.6
Starship Children’s Hospital	925	661	71.5
Women’s and Children’s Hospital	522	199	38.1
Royal Children’s Hospital Brisbane	648	221	34.1
Mater Children’s Hospital	655	217	33.1
The Prince Charles Hospital	336	288	85.7
The Townsville Hospital	57	26	45.6
Wellington Hospital	51	26	50.9
Tamworth Base Hospital	31	3	9.7
Monash Medical Centre	50	*	-
The Canberra Hospital	33	20	60.6
Royal Darwin Hospital	43	27	62.8

* data on ventilated admissions was unavailable at the time of the report

In Figures 4.4.2 and 4.4.3 monthly admission numbers by diagnostic group, and monthly admission numbers by age group are displayed. In Figure 4.4.2 the most variation in monthly admissions is seen in the respiratory diagnosis group. An increase in admissions occurs during the winter months, with a corresponding decrease in post-operative admissions. The injury, neurological, and cardiovascular diagnosis group admissions remain relatively stable throughout the year. During the winter months an increase in admissions for the < 1, and 1 - 4 year old age group is evident, reflecting the increase in respiratory related admissions during winter in the younger age groups.

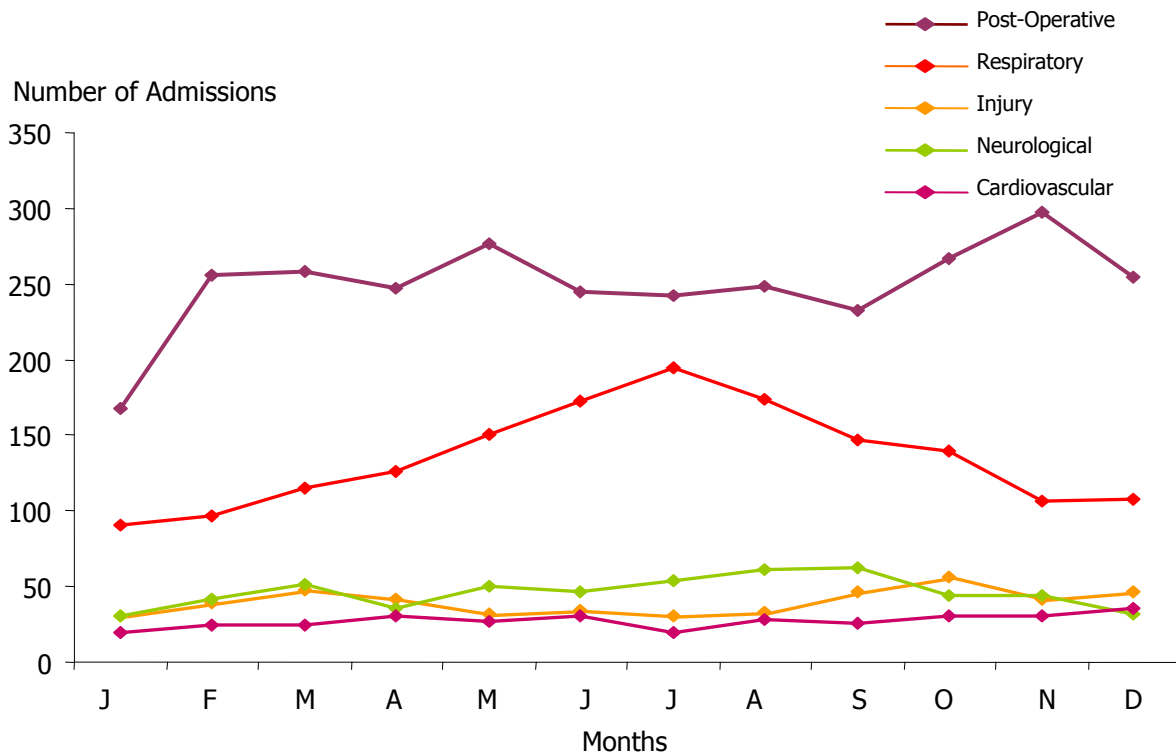


Figure 4.4.2 Monthly admission numbers by diagnostic group in 2005

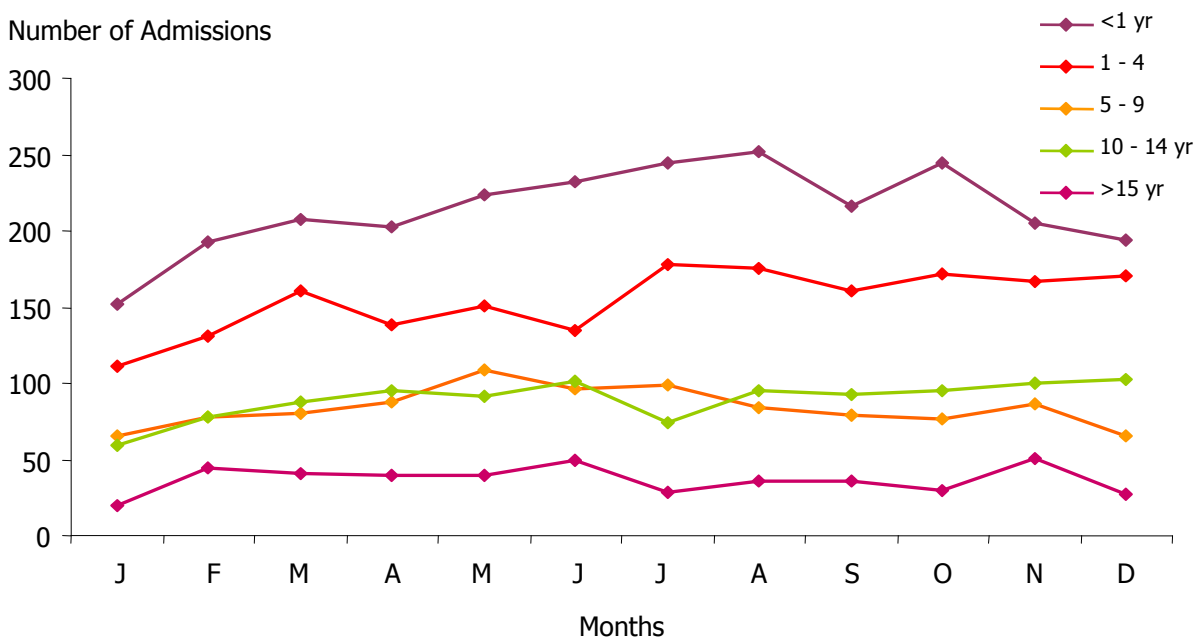


Figure 4.4.3 Monthly admission numbers by age in 2005

5. Length of Stay

5.1 Median Length of Stay

Length of Stay (LOS) is defined as the difference between discharge date and time, and admission date and time. In 2005, the ICU LOS is positively skewed with the majority of patients staying between 1 and 1.5 days (see Figure 5.1.1).

The median LOS was used to compare the LOS across groups. The median LOS was deemed the most appropriate measure of central tendency as the mean LOS is disproportionately influenced by prolonged admissions. In 2005, 1.4% of patients stayed longer than 28 days and these patients occupied 24.5% of bed days. Eight patients stayed in ICU longer than six months occupying 7.3% of bed days.

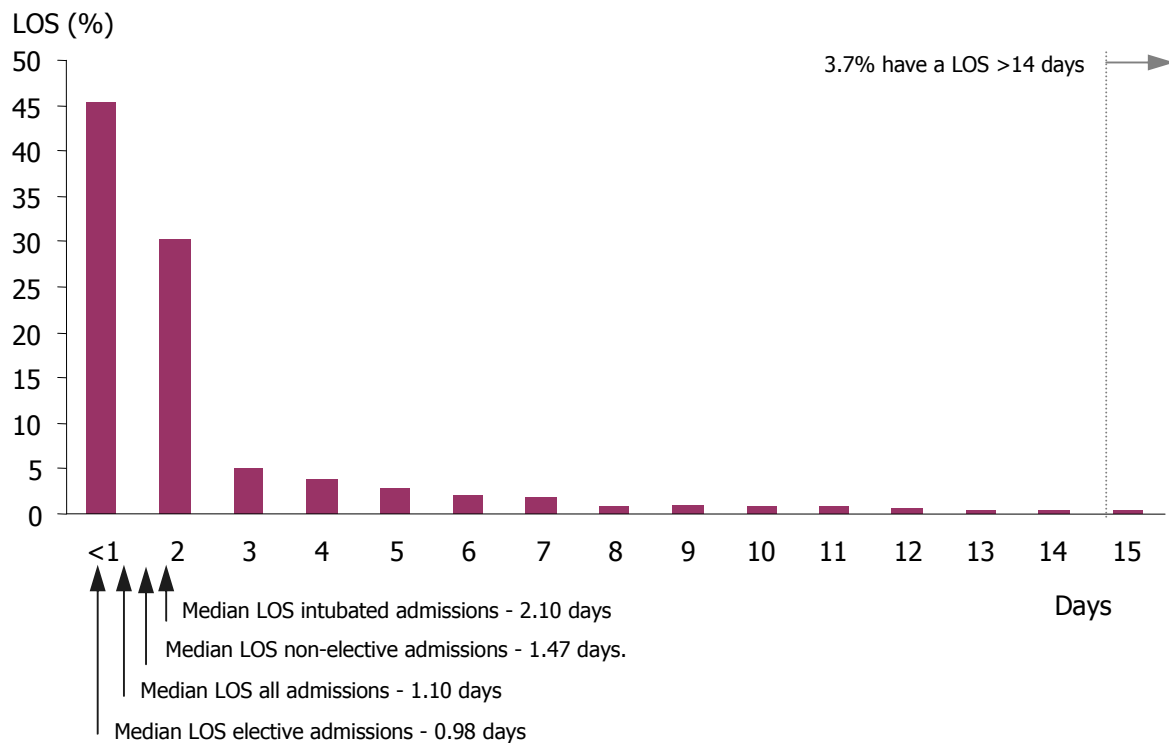


Figure 5.1.1 Length of stay distribution in 2005

The median LOS varied depending on ICU classification (Figure 5.1.2). The median LOS was similar for PICUs and Metropolitan hospitals (1.24 and 1.30, respectively), while the LOS for Regional hospitals was notably lower (0.87). Expectedly LOS varied amongst admission type (Table 5.1.1). The median LOS for intubated patients was 2.10 days, compared to 0.85 days for non-intubated patients. Non-elective admissions had a greater median LOS (1.47) compared to elective admissions (0.98).

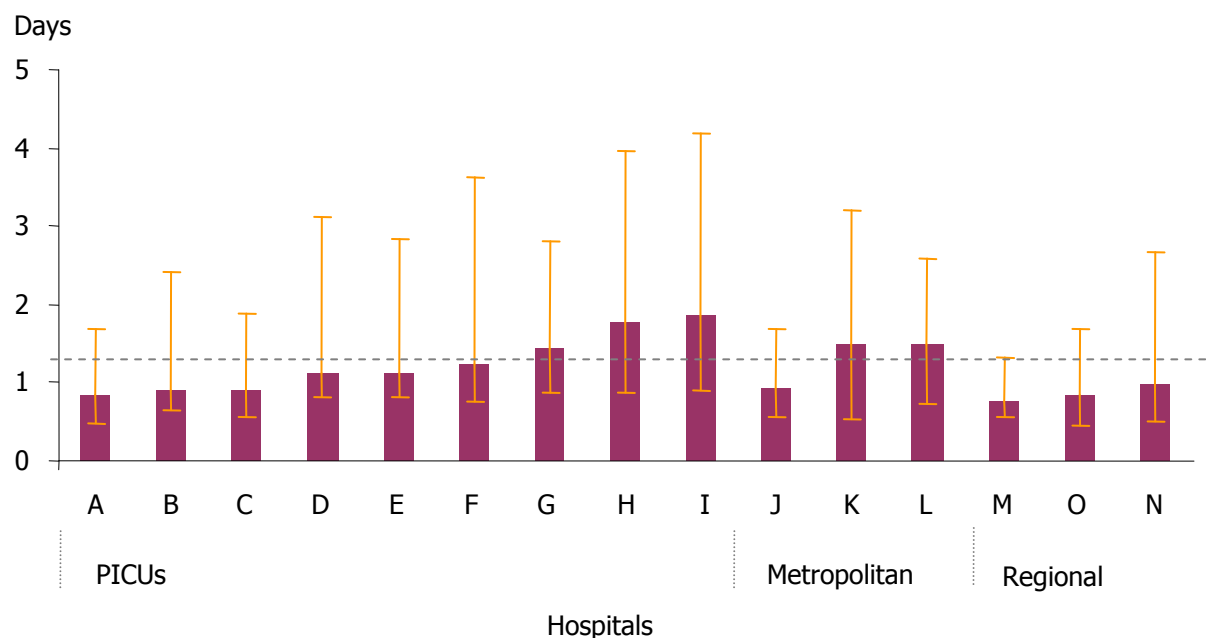


Figure 5.1.2 Median LOS and Interquartile Range (IQR) for all hospitals by ICU classification in 2005. The median LOS for the Registry is shown by the horizontal line.

Table 5.1.1 Median LOS, IQR, and percent of occupied bed days (OBD) by admission type, 2005.

	Median LOS	IQR	OBD %
All admissions	1.10	0.7 - 2.9	100
Elective admissions	0.98	0.7 - 2.0	26.2
Non-elective admissions	1.47	0.7 - 3.6	73.8
Intubated admissions	2.10	1.0 - 4.9	81.4
Non-intubated admissions	0.85	0.5 - 1.4	18.6

Figure 5.1.3 displays the median LOS for intubated patients and the length of intubation for hospitals with intubated patients. The median duration of intubation is shown for each hospital. Hospitals with < 10 intubated admissions have been excluded ($N = 3$). The median LOS for the Registry is indicated by the horizontal line.

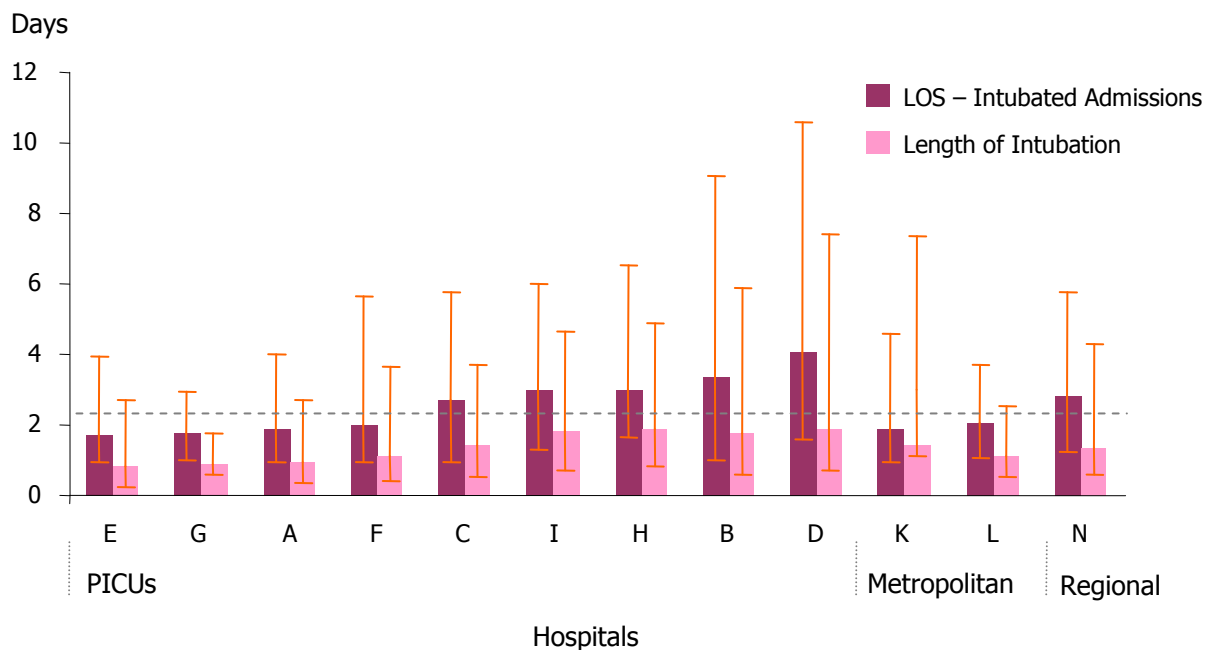


Figure 5.1.3 Median LOS and IQR for intubated admissions in each hospital, by ICU classification in 2005.

The LOS for each diagnostic group is summarised in Table 5.1.2. The longest LOS was observed in the cardiovascular diagnostic group (median LOS 2.66 days) followed by the gastrointestinal/renal diagnostic group (1.8 days). The shortest LOS was observed in the post – operative/ENT/Thoracic diagnostic group category (median LOS 0.82 days).

Table 5.1.2 Median LOS, IQR, and percent of OBD by principal diagnostic group, 2005.

Diagnostic Group	Median LOS	IQR	OBD %
Cardiovascular	2.66	1.0 - 6.3	7.7
Gastrointestinal/Renal	1.88	0.6 - 4.3	4.0
Injury	1.22	0.6 - 3.2	5.8
Miscellaneous	0.91	0.3 - 2.1	11.9
Neurological	1.03	0.6 - 2.6	6.6
Post Operative/Cardiac	1.60	0.9 - 2.9	14.7
Post Operative/ENT/Thoracic	0.82	0.4 - 1.1	3.6
Post Operative/Neurosurgical	0.90	0.7 - 1.6	2.2
Post Operative/Other	0.92	0.8 - 1.6	4.8
Respiratory	1.84	0.8 - 4.8	38.7

5.2 Occupied Bed Days

There were a total of 25,900 Occupied Bed Days (OBD) in 2005. Children aged > 28 days but less than one year occupied 37.7% of ICU bed days (Figure 5.2.1). Intubated admissions utilised 81.4% of bed days, while non-elective admissions utilised 73.8% of bed days (Table 5.1.1).

Patients who stayed in ICU longer than 28 days (1.4%) occupied a total of 6,966 (24.5%) bed days. Table 5.2.1 displays the admission diagnosis categories for patients who stayed longer than 28 days. Diseases associated with a requirement for long term respiratory support occupied the greatest number of bed days (59.4%).

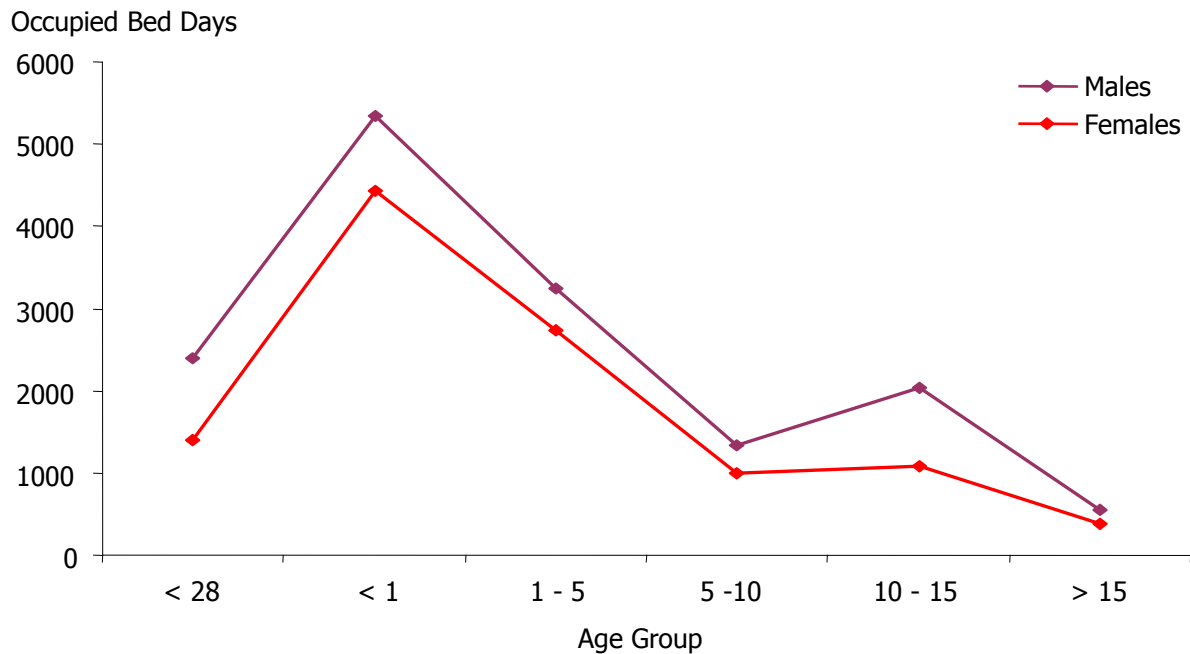


Figure 5.2.1 Occupied Bed Days by age group and sex, 2005.

Table 5.2.1 Admission diagnoses for long stay patients (> 28 days), 2005.

Diagnostic Group	Number of patients	Bed Days	(% days)
Respiratory	49	4135	59.4
Miscellaneous	12	787	11.3
Post - operative / cardiac	14	498	7.2
Gastrointestinal / Renal	3	493	7.1
Cardiovascular	12	491	7.1
Neurological	7	333	4.8
Injury	2	85	1.2
Post - operative / ENT / Thoracic	2	76	1.1
Post - operative / other	1	34	0.5
Post - operative / Neurosurgical	1	29	0.4

6. Mortality

6.1 Mortality Rates

The ANZPIC Registry collected data on ICU outcome from all participating units. In addition some units provide data on Hospital outcome. In 2005, 262 patients died in ICU. The crude mortality rate was 3.6% (Males 3.8%, Females 3.3%). The crude mortality rate for the Registry has remained relatively stable for the last five years, ranging from 3.2 to 3.9 percent. The Crude mortality rates for each unit are shown in Figure 6.1.1. The hospital codes in this section are not the same codes as in earlier sections.

Crude Mortality Rate %

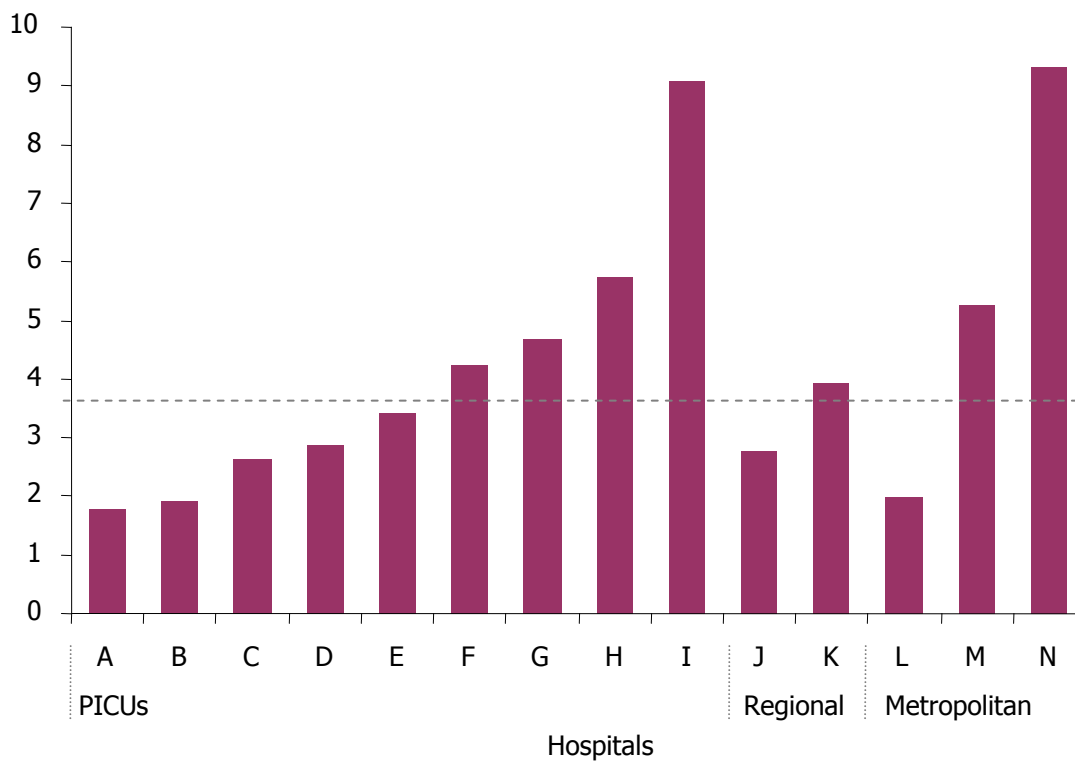


Figure 6.1.1 Mortality rate for 14 hospitals by ICU classification in 2005. The crude mortality rate for the Registry is shown by the horizontal line. One unit did not record any deaths.

In 2005 neonates recorded the highest age specific mortality (7.6%), followed by the 4 - 9 year age group (3.9%). The mortality rates in the other age groups ranged from 2.9 - 3.8% (Table 6.1.1).

Table 6.1.1 Age specific mortality rates

Age	Number	Deaths	Age Specific Mortality (95% CI)
Neonates	683	52	7.6 (6.7-8.5)
> 28 days - 1 year	1983	58	2.9 (2.1-3.7)
1 - 4 years	1907	55	2.9 (1.9-3.9)
5 - 9 years	1049	41	3.9 (2.9-4.9)
10 - 14 years	1111	38	3.4 (2.4-4.4)
> 15 years	469	18	3.8 (2.8-4.8)

6.2 Diagnosis Specific Mortality

In 2005, 27.7% of all deaths had a principal diagnosis in the miscellaneous diagnostic category (Figure 6.2.1). The principal reasons for admission to ICU from the miscellaneous category were, cardiac arrest - out of hospital (29%), septic shock (19.4%), and cardiac arrest - in hospital (18%). Excluding the gastrointestinal / renal diagnostic category, mortality rates for males were higher compared to female mortality rates in all diagnostic categories.

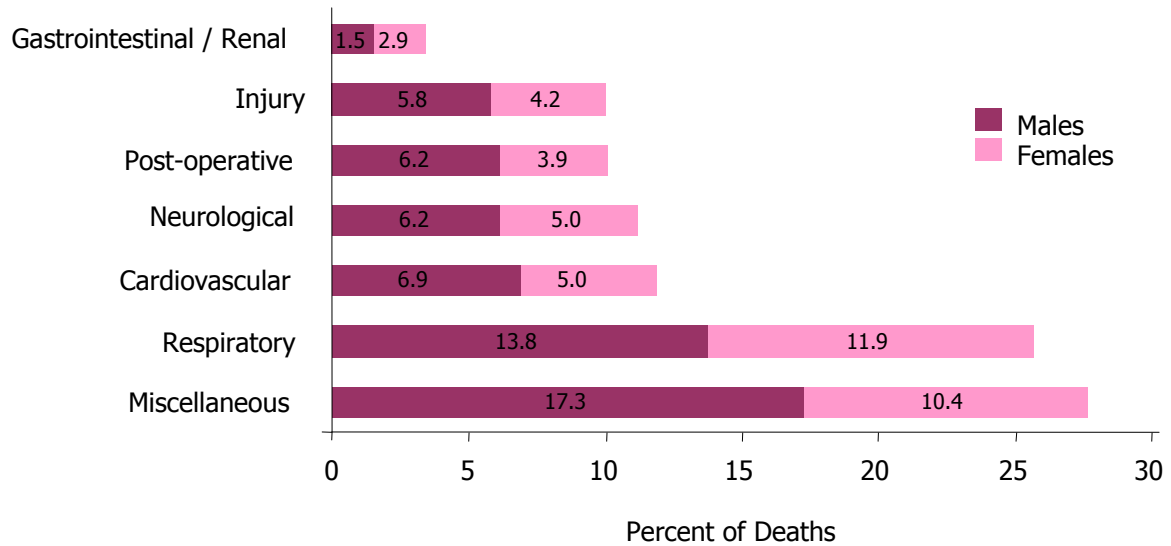


Figure 6.2.1 Diagnostic categories of patients not surviving ICU, by sex in 2005.

The proportion of deaths in specific diagnosis groups varied across age groups. The highest proportion of deaths among infants less than one was recorded in the respiratory category (42.2%).

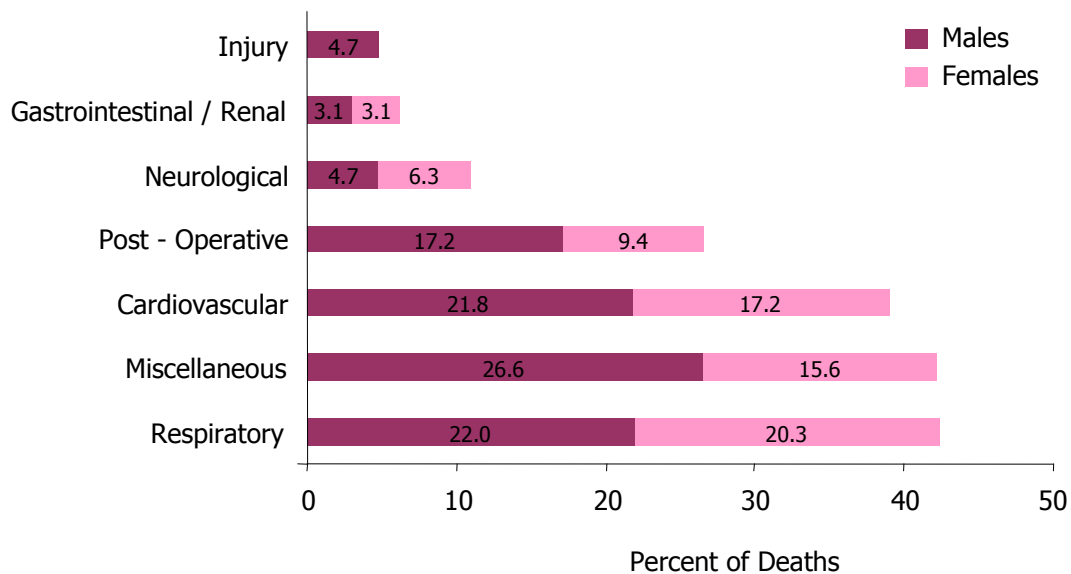


Figure 6.2.2 Diagnostic categories of patients aged < 1 year not surviving ICU, by sex, 2005.

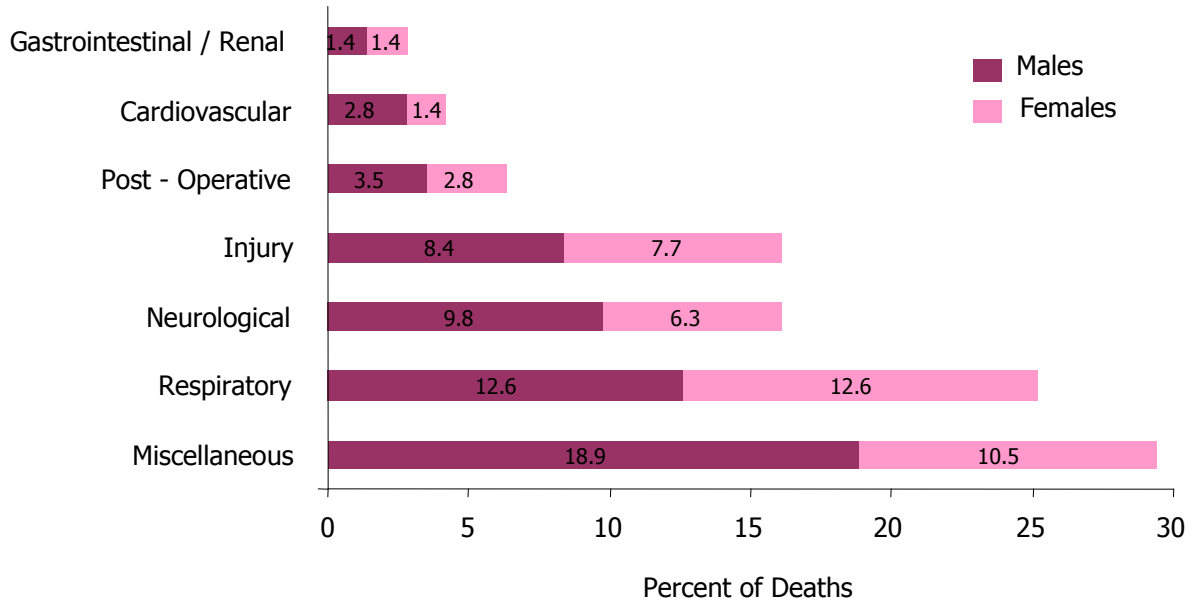


Figure 6.2.3 Diagnostic categories of patients aged 1 - 15 years not surviving ICU, by sex, 2005.

In 2005 the highest proportion of deaths for the 1 - 15 year age group was the miscellaneous category (29.4%). Within the miscellaneous category, cardiac arrest - out of hospital had the highest number of deaths (8.4%), followed by septic shock (6.9%).

6.3 Risk Adjusted Mortality (PIM2)

Risk adjusted standardised mortality ratios (SMR) were calculated for each unit contributing to the ANZPIC Registry. The SMR is the ratio of the number of deaths observed in a given population of patients to the number of deaths predicted for that population by PIM2 (1). PIM2 is the mortality prediction model used by units contributing to the ANZPIC Registry.

Figure 6.3.1 displays the SMR with 95% confidence intervals for eight PICUs in 2005. One PICU along with the metropolitan and regional hospitals were excluded from Figure 6.3.1 as they recorded less than ten deaths. In addition one ICU did not record any deaths. For the eight PICUs, the 95% confidence interval of the SMR included the number 1.0, which indicates that for each unit the observed outcome was not significantly different from the expected outcome.

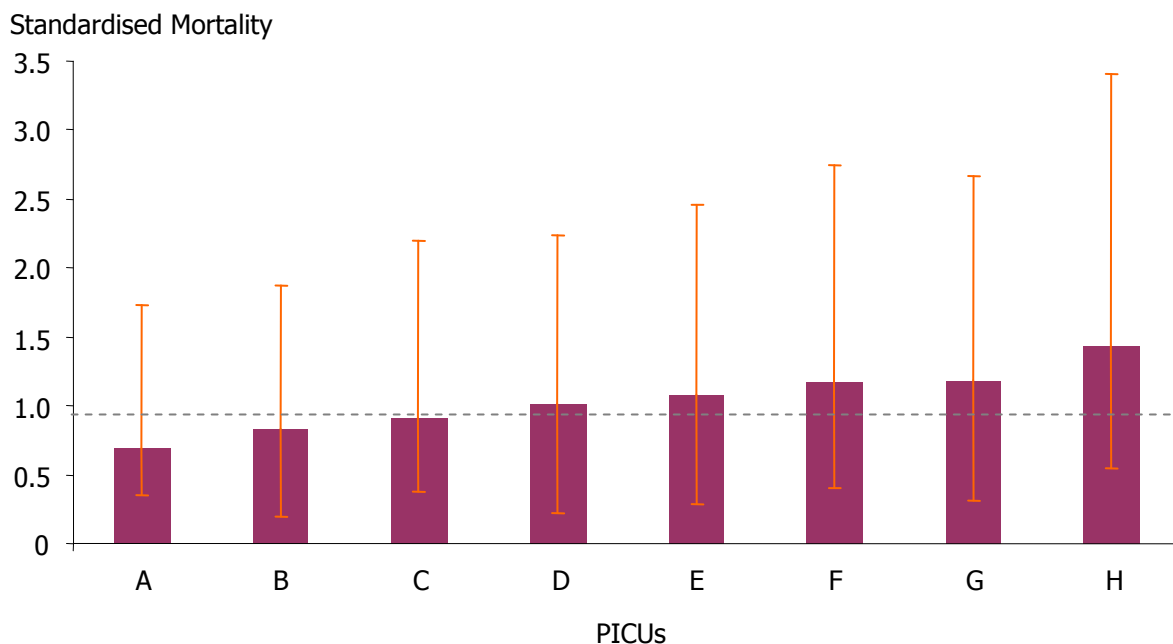


Figure 6.3.1 Standardised mortality rate with 95% confidence intervals for eight participating PICUs in 2005. The ANZPIC Registry SMR is shown by the horizontal line [0.93 (0.83–1.02)].

Figure 6.3.2 illustrates the distribution of mortality risk for patients submitted to the Registry. The majority of children admitted to ICU have a low risk of mortality.

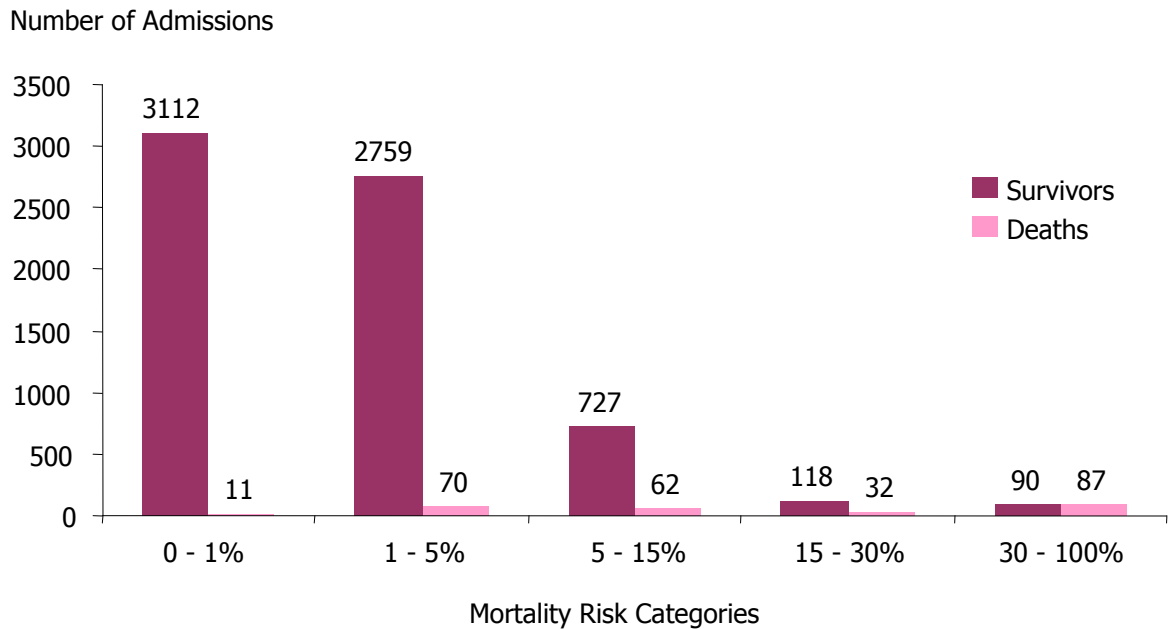


Figure 6.3.2 Number of admissions and vital status at discharge by PIM2 mortality risk category in 2005

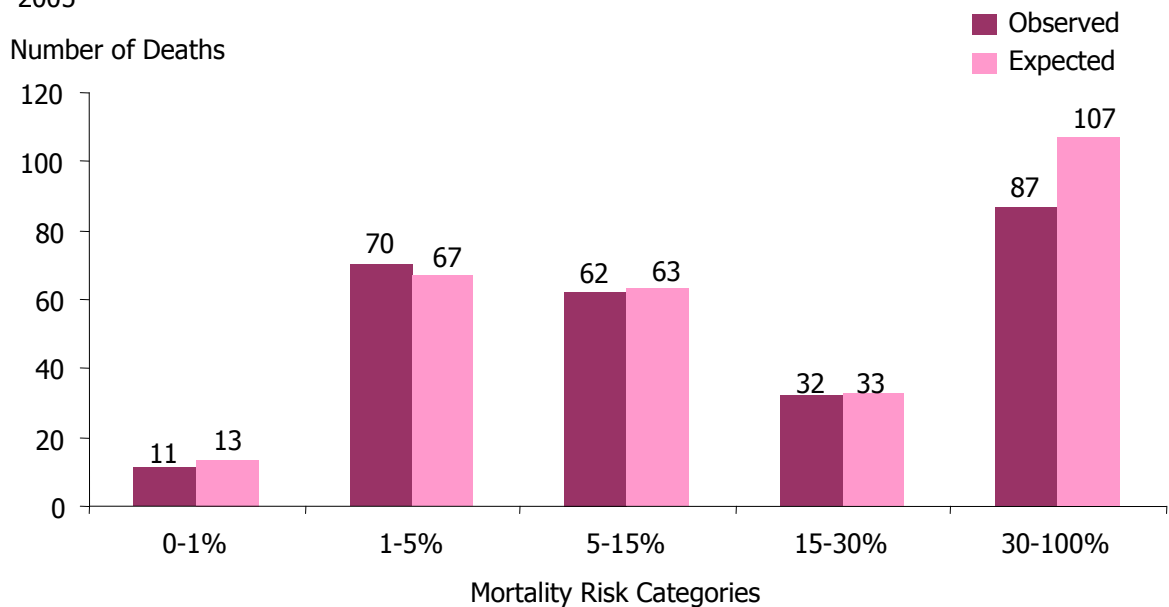


Figure 6.3.3 Observed vs Expected number of deaths by mortality risk category as predicted by PIM2 in 2005

Figure 6.3.3 illustrates the observed and expected numbers of deaths in the five mortality risk categories in 2005.

6.4 Sequential Control Charts

Cumulative sum charts have been constructed for eight units with greater than 200 admissions per year (Figures 6.4.1 - 6.4.9). The upper chart in each figure represents the cumulative excess deaths. The amber line represents the cumulative number of excess deaths - relative to the number of deaths predicted by PIM2. The black line represents the cumulative number of excess deaths without adjustment for mortality risk, and illustrates the effect of risk adjustment. The lower chart represents the sequential probability ratio tests for an increase or decrease in the odds of death. For both charts the x axis represents each admission to ICU in sequence for the two year period 2004 - 2005. The y axis in the upper chart represents the cumulative excess deaths that have occurred relative to the number of deaths predicted. The y axis in the lower chart represents 'process control' where the process is the cumulative observed outcome relative to that predicted by PIM2. The chart is designed to test two hypotheses; Hypothesis A (HA) that the odds of deaths in the unit have doubled relative to the population used to derive PIM2, Hypothesis B (HB) that the odds of death in the unit have halved relative to the PIM2 population.

If the upper line crosses the control limits, HA is accepted, whereas if the lower line crosses the control limits HB is accepted. The control limits of ± 2.9 and ± 4.6 are set arbitrarily. Conceptually the control limits correspond to the hypotheses being accepted at $\alpha = \beta = 0.05$ (± 2.9) or at $\alpha = \beta = 0.01$ (± 4.6). It should be noted, however, that the resetting of the chart and repeated testing mean that the thresholds no longer represent true probabilities, but become more pragmatic thresholds for deciding if the process is in or out of control. For the two year period there were no alarms signalled by the charts for eight of the PICUs (Figure 6.4.1 - 6.4.5, and 6.4.7 - 6.4.9). The chart for unit F signalled an alarm for an increase in the odds of death (Figure 6.4.6). The unit investigated the period leading up to this alarm and was unable to identify a systematic explanation for a change in outcome. During this period the system of data collection had changed with any more staff participating in the data collection. It is possible that inconsistent and inaccurate data collection was responsible for the alarm signal. The unit subsequently improved the system of data collection by identifying resources to employ a safety and quality nurse. This position is now responsible for data collection. Monitoring has continued and no further alarm signals have occurred. The charts for three units signalled a reduction in the odds of death (Figure 6.4.3, 6.4.8, 6.4.9).

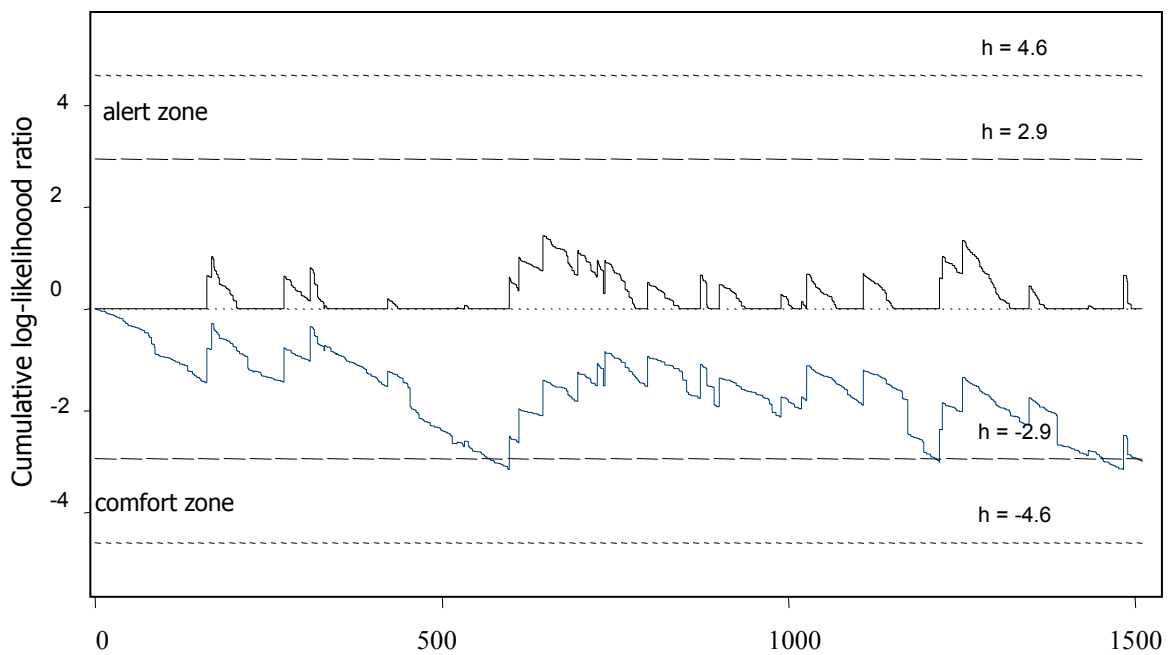
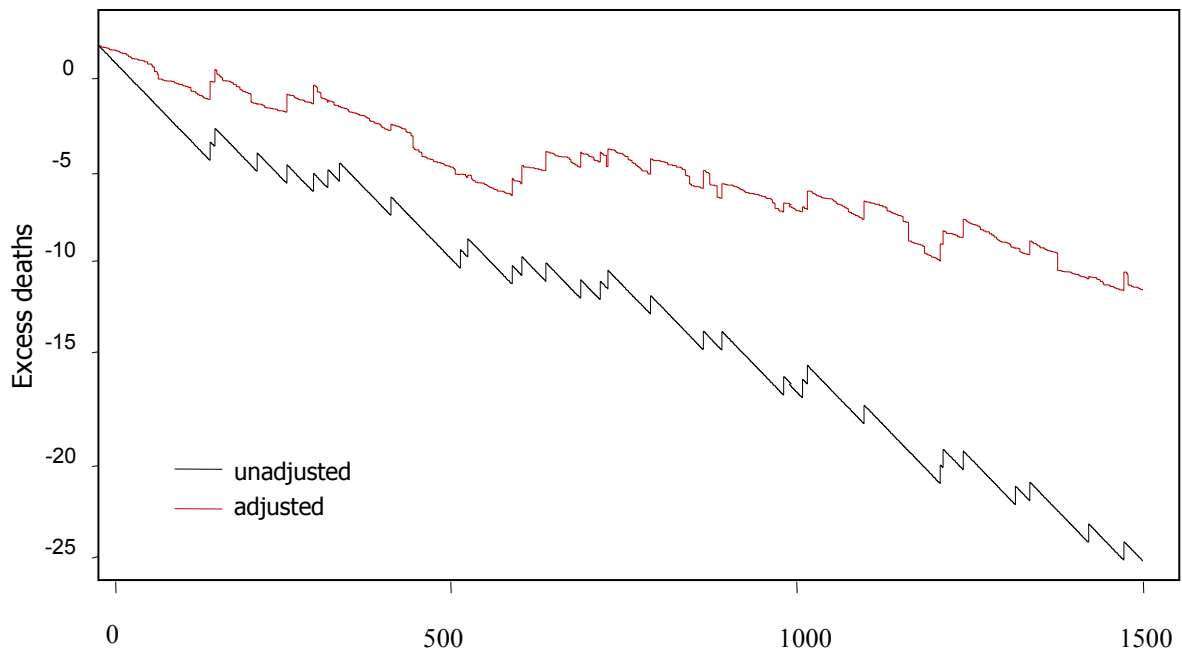


Figure 6.4.1 Sequential cumulative sum control chart for doubling and halving the odds of death for PICU A, 2004 - 2005.

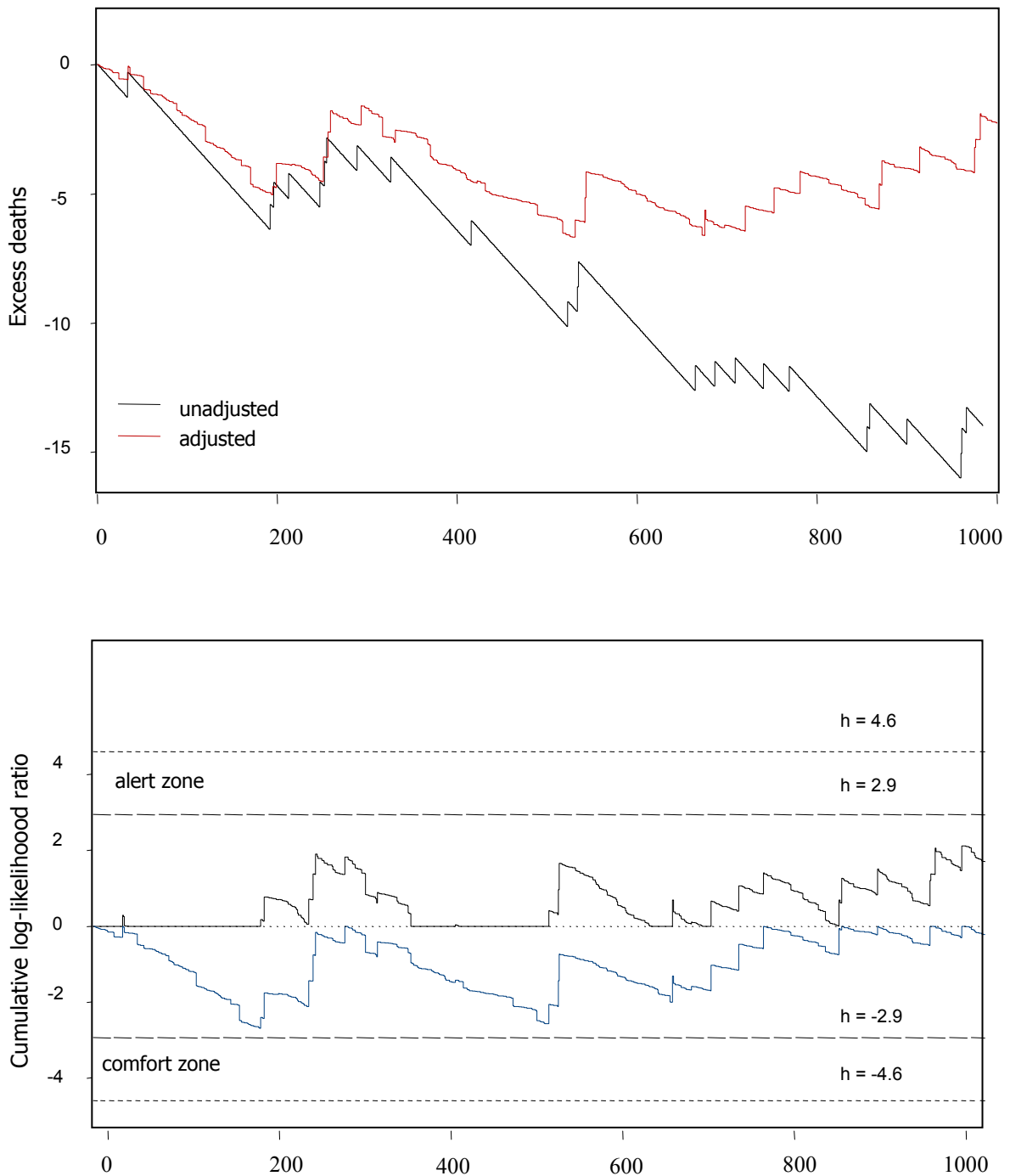


Figure 6.4.2 Sequential cumulative sum control chart for doubling and halving the odds of death for PICU B, 2004 - 2005.

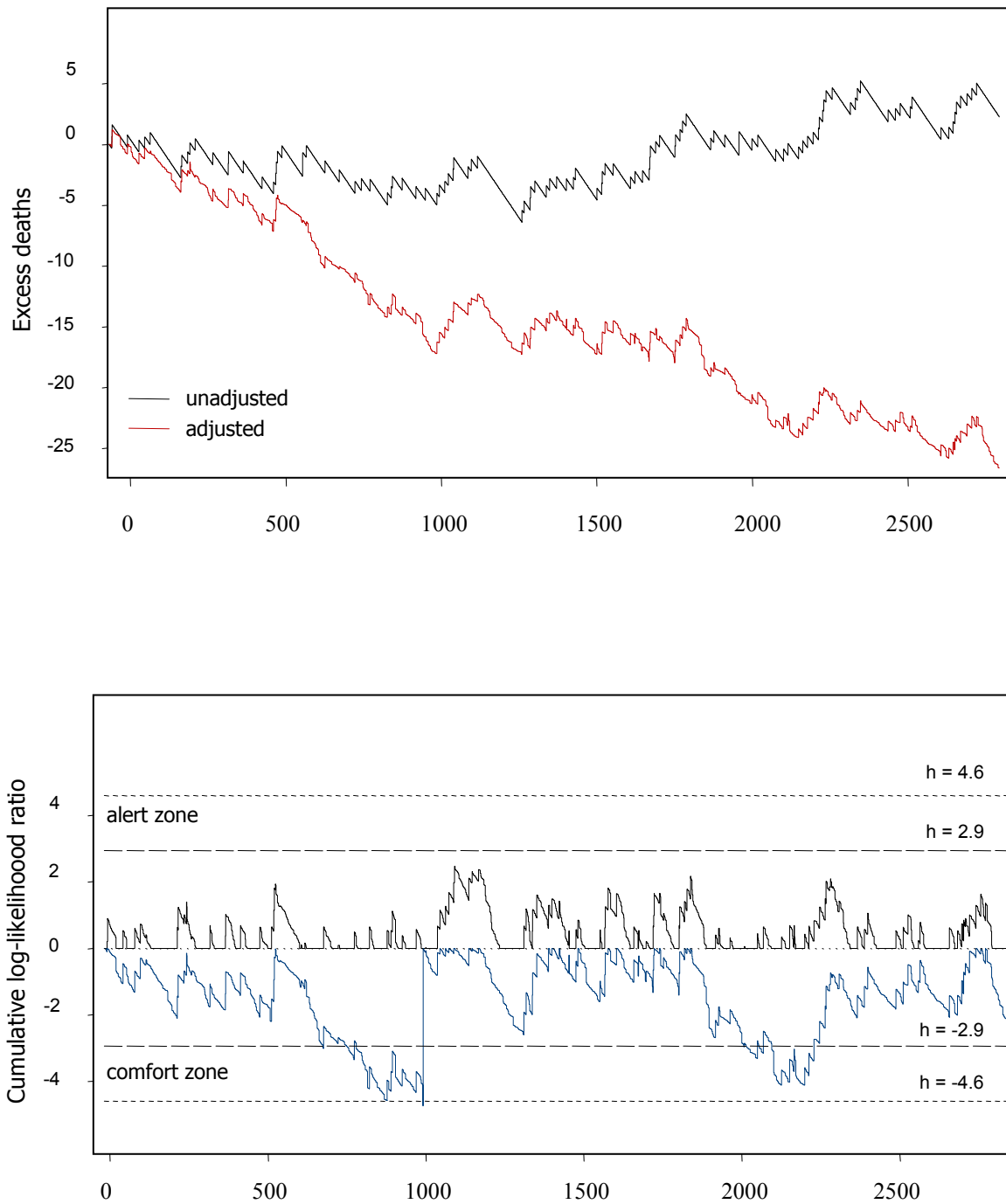


Figure 6.4.3 Sequential cumulative sum control chart for doubling and halving the odds of death for PICU C, 2004 - 2005.

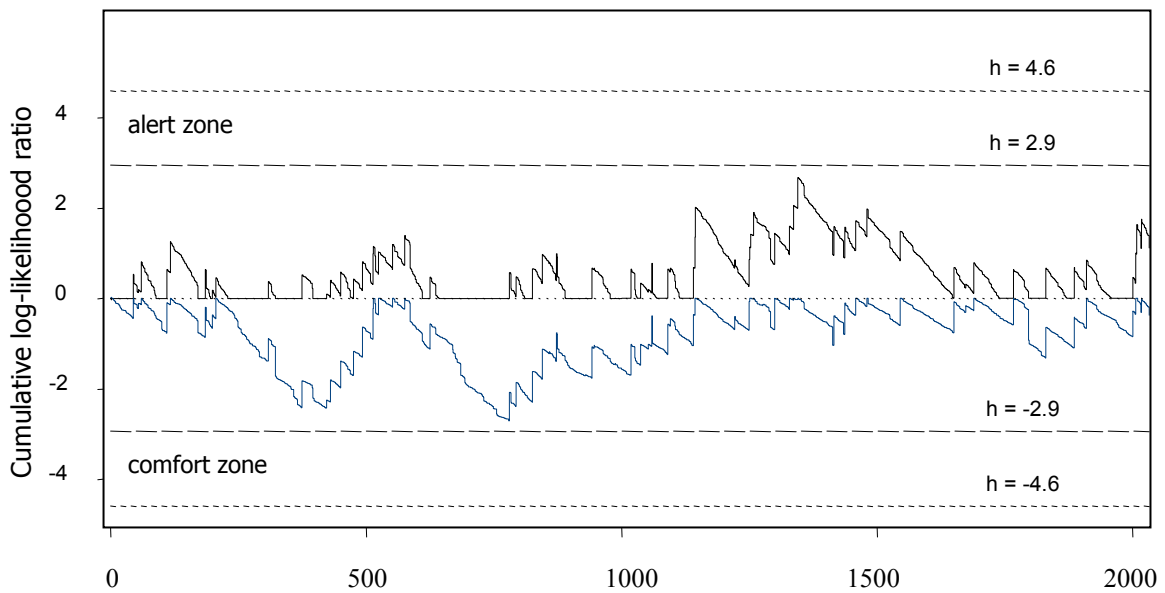
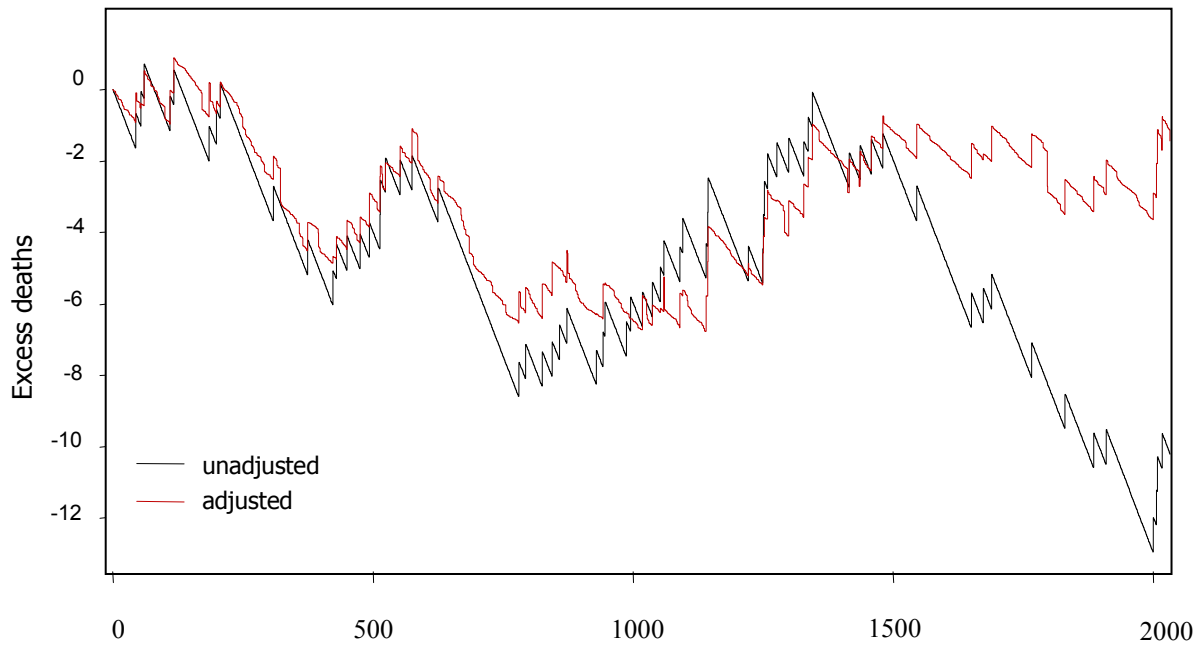


Figure 6.4.4 Sequential cumulative sum control chart for doubling and halving the odds of death for PICU D, 2004 - 2005.

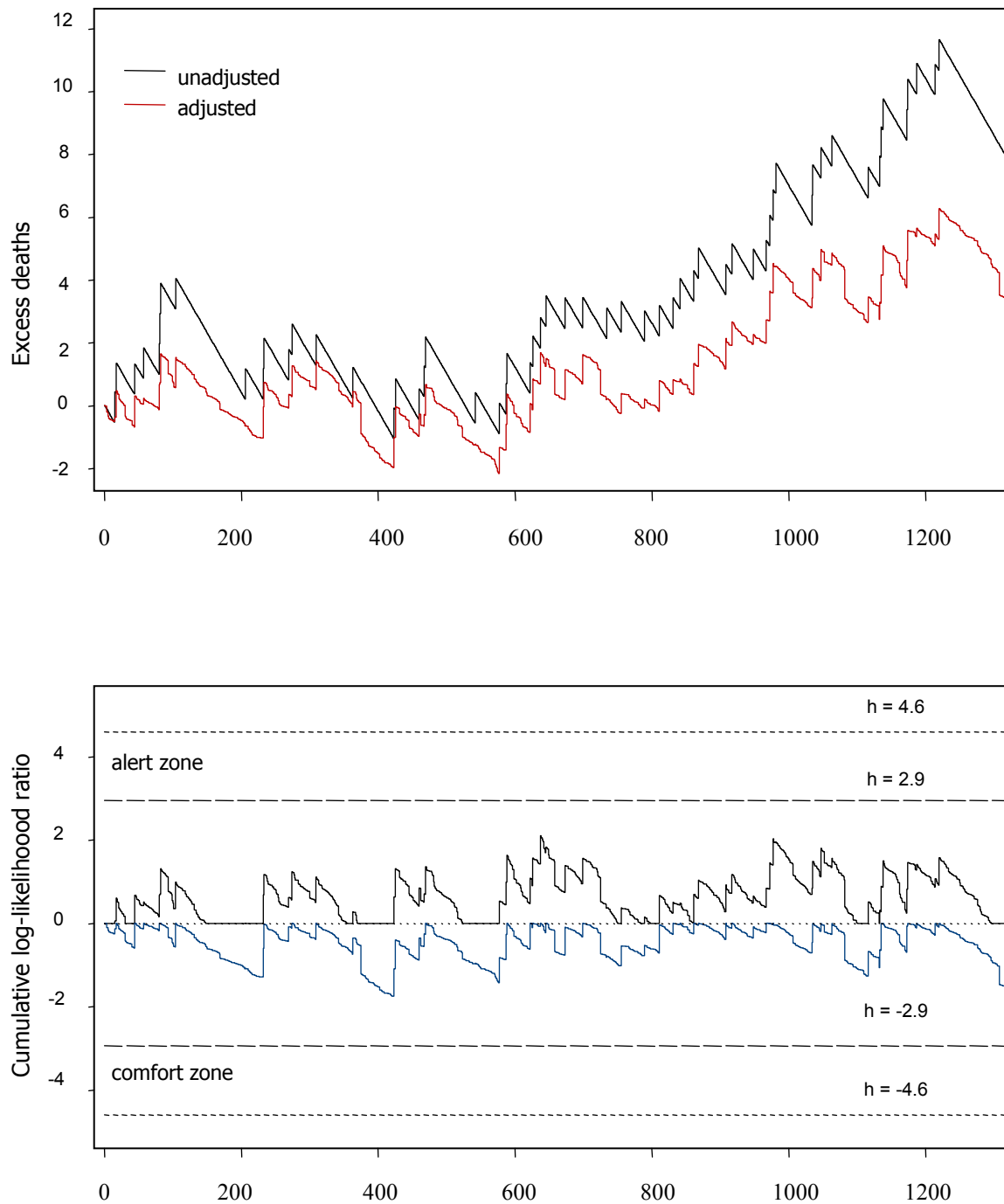


Figure 6.4.5 Sequential cumulative sum control chart for doubling and halving the odds of death for PICU E, 2004 - 2005.

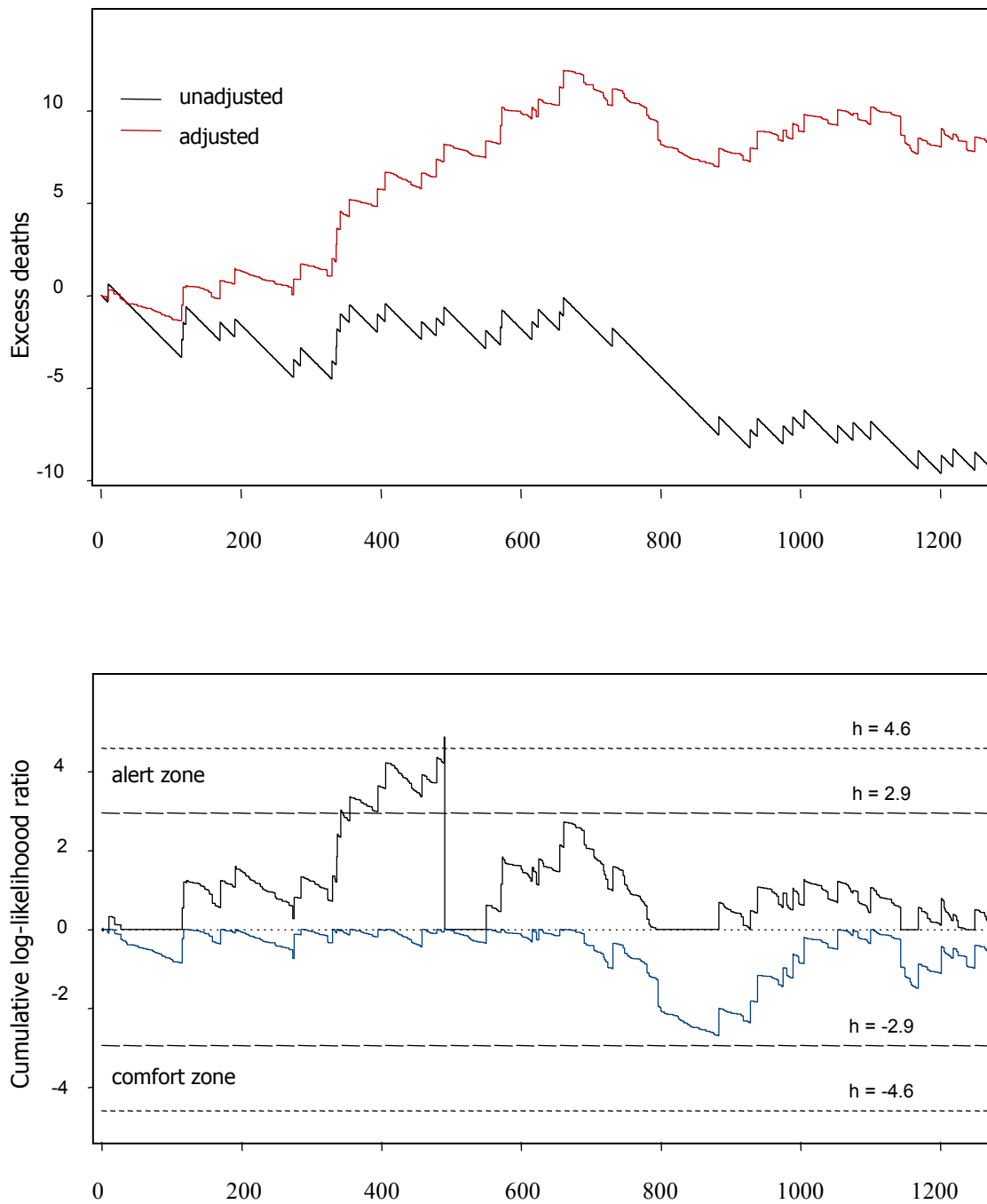


Figure 6.4.6 Sequential cumulative sum control chart for doubling and halving the odds of death for PICU F, 2004 - 2005.

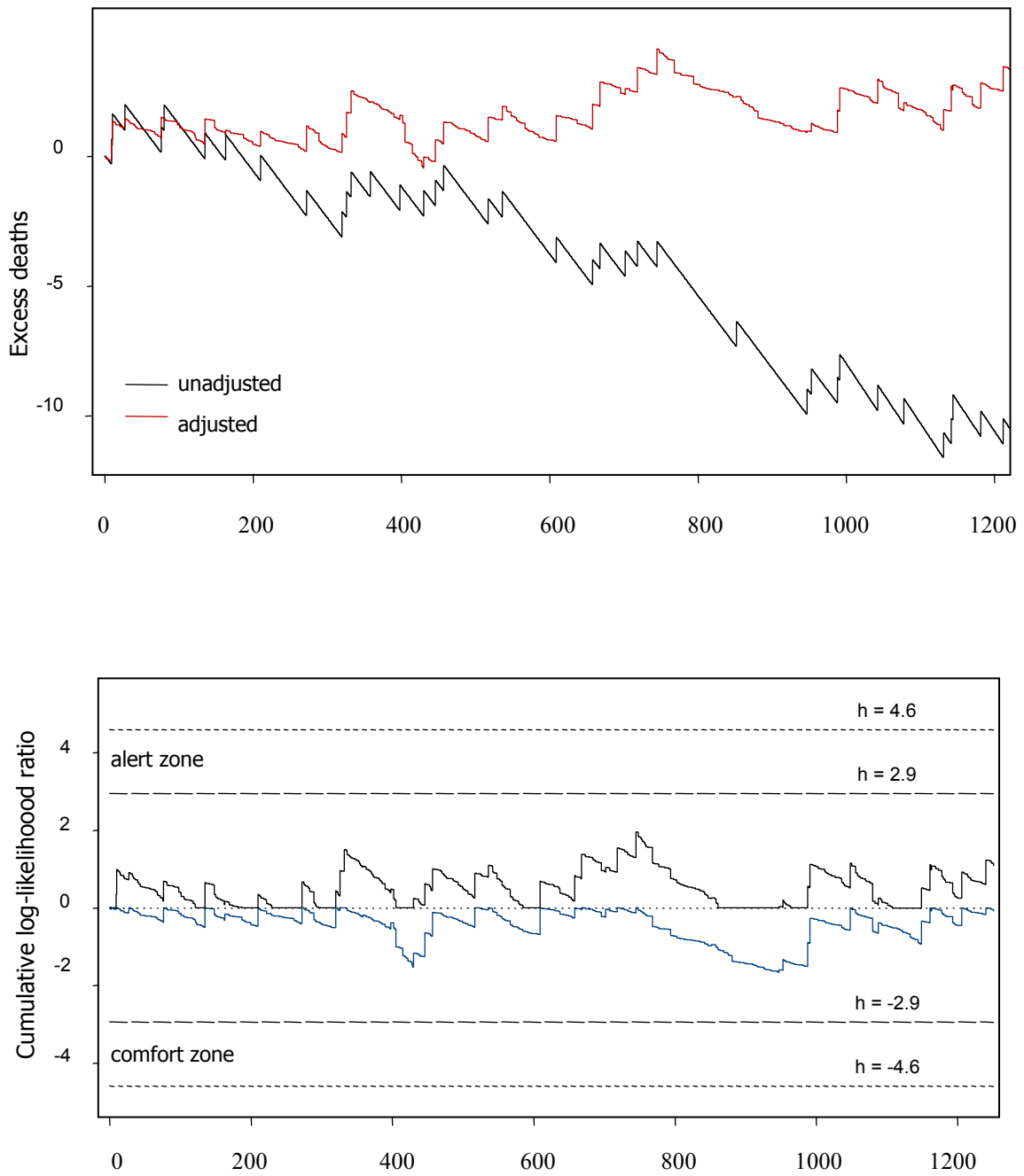


Figure 6.4.7 Sequential cumulative sum control chart for doubling and halving the odds of death for PICU G, 2004 - 2005.

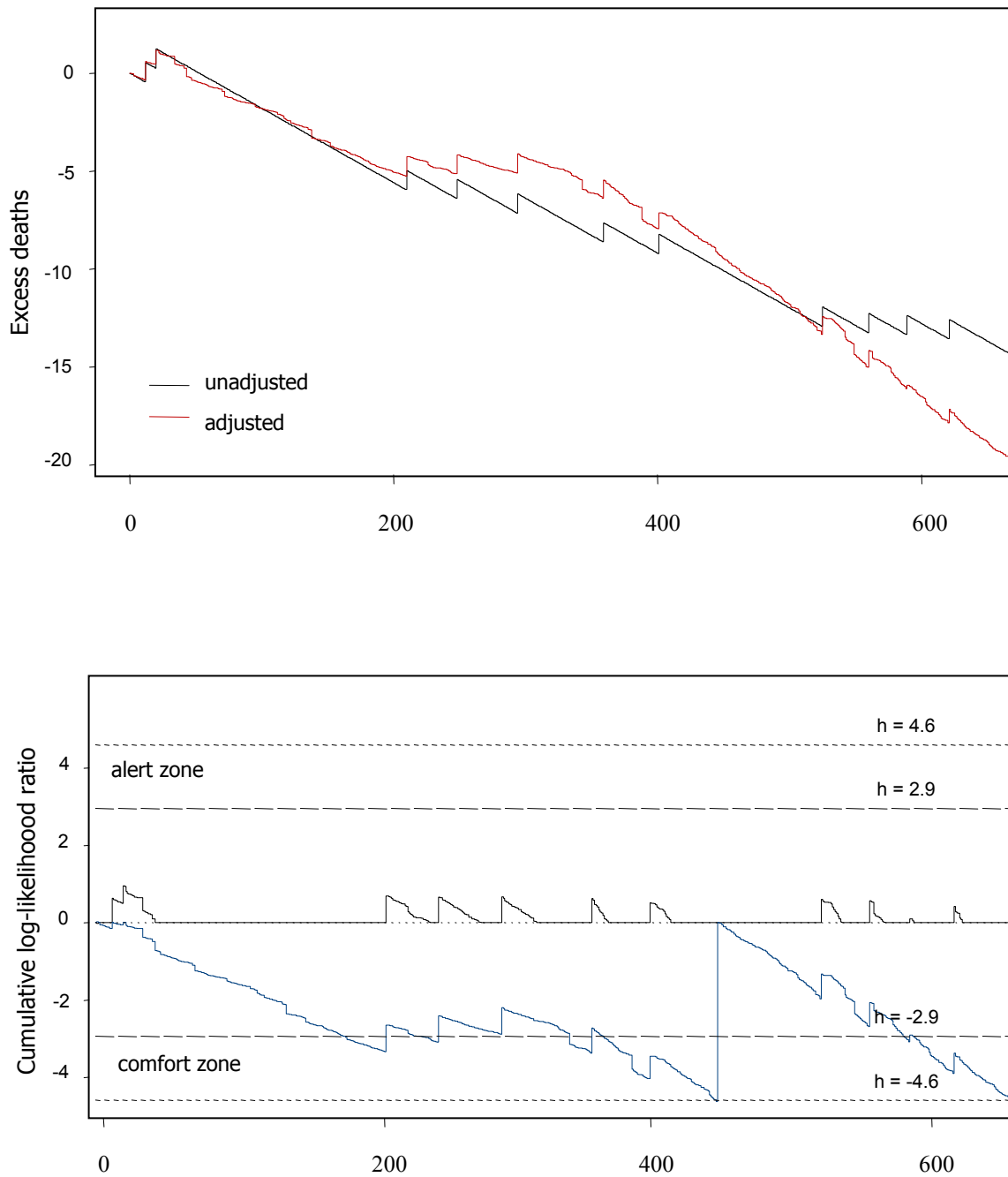


Figure 6.4.8 Sequential cumulative sum control chart for doubling and halving the odds of death for PICU H, 2004 - 2005.

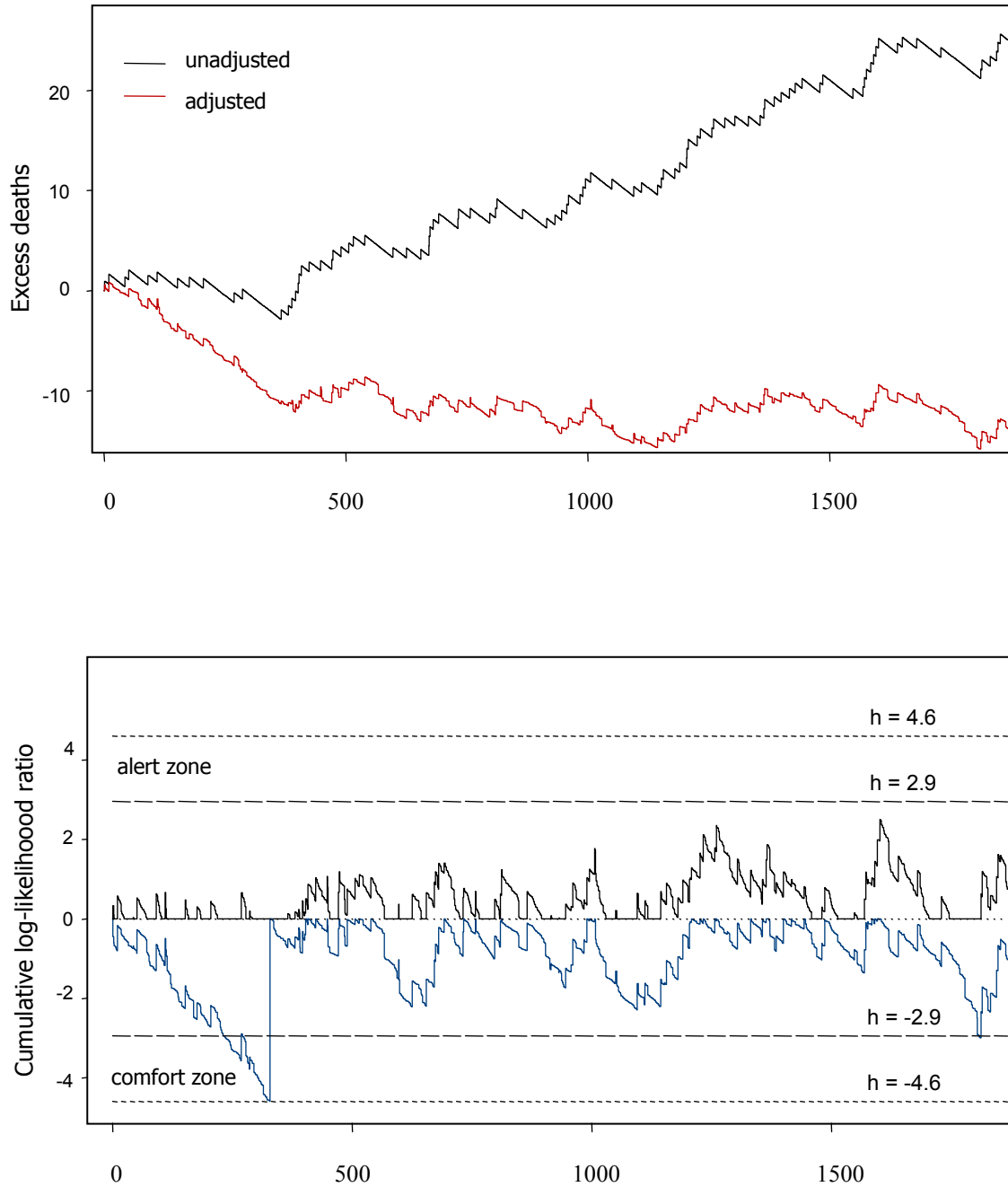


Figure 6.4.9 Sequential cumulative sum control chart for doubling and halving the odds of death for PICU I, 2004 - 2005.

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Appendix I

Minimum data set variables

Date of Birth

Date of Birth of the patient
dd/mm/yy

Gender

Gender of the patient

M Male
F Female

Ethnicity

Ethnic origin of the patient, as identified by the patient next of kin

- 1 Caucasian - of Caucasoid heritage (includes European, Russian, Middle Eastern, and Arabic)
- 2 Aboriginal - of Aboriginal or Torres Strait Islander (TI) descent, who identifies as an Aboriginal or TI, and is accepted as such by the community with which the patient is associated.
- 3 Maori - determined by patient/next of kin self identification.
- 4 Pacific Peoples - patient whose ethnic background originates from the countries of Pacific Oceania, excluding Maori
- 5 Asian - patient whose ethnic background originates from the countries of Asia, South East Asia, and Indian subcontinent.

Weight

The weight of the patient on admission, measured in kilograms (Kg).

Post Code

Post Code of patient's home address.

Hospital Admission Source

Patients location prior to admission to hospital

- 1 Home/scene - admitted from home or the scene of an injury
- 2 Other Hospital - Emergency Department - patient transferred from the emergency department of another hospital
- 3 Other Hospital - OT/Recovery - patient transferred from the operating theatre or recovery room of another hospital
- 4 Other Hospital - ICU/NICU - patient transferred from the intensive care unit or the neonatal intensive care unit of another hospital
- 5 Other Hospital - Ward - patient transferred from any other in patient area of another hospital
- 6 Inborn - patient was born at this hospital

Retrieval

Describes the mechanism whereby a patient is transported to the hospital by a specialist paediatric IU transport team or equivalent

0 No
1 Yes

ICU Admission Source

Patients location immediately prior to admission to the ICU

- 1 OT/Recovery - patient admitted to ICU from the operating theatre or recovery room
- 2 Emergency Department - patient admitted to ICU from the emergency department
- 3 Ward - patient admitted to ICU from any other inpatient area
- 4 Other ICU/NICU same Hospital - patient admitted to ICU from another ICU or NICU within the same hospital
- 5 Direct ICU Admission - patient admitted directly to ICU, for example following a retrieval

Previous ICU Admission During this Hospital Admission

Has the patient been previously admitted to intensive care during this episode of care

- 0 No
- 1 Yes - Readmitted within 48 hours post ICU Discharge
- 2 Yes - Readmitted after 48 hours post ICU Discharge

ICU Admission Date and Time

The date and time on which the patient commenced an episode of ICU care.

dd/mm/yy hh:mm

ICU Discharge Date and Time

The date and time on which the patient completes an episode of ICU care.

dd/mm/yy hh:mm

Principal ICU Diagnosis

Code the diagnosis most directly responsible for the ICU admission. Use the ANZPIC Registry diagnoses codes (Appendix II). For patients admitted primarily for recovery after a procedure, use a Post Procedural Diagnosis for the principal diagnosis. Do not use an infection code or mechanism of injury code for Principal Diagnosis

Principal underlying diagnosis

The underlying diagnosis which has contributed to the need for ICU admission

For example, an ex-premature infant with bronchiolitis will have a principal ICU diagnosis of bronchiolitis with an Underlying diagnosis of prematurity

Associated Diagnoses

The presence of any other conditions in addition to that listed as the principal diagnosis. For patients having an operative procedure during the ICU admission, a Post Procedural Diagnosis should be listed as an associated diagnosis.

Total Hours of Intubation During this Admission

Intubation refers to ETT or Tracheostomy

Total Hours of Respiratory Support During this Admission

Respiratory Support refers to ventilation, CPAP, BiPAP or NPV delivered by ETT, Tracheostomy, nasopharyngeal airway, mask, nasal prongs, or Curass (i.e.. any form of mechanical assistance).

Outcome

The patients destination on completion of the ICU episode of care.

- 1 Discharged to ward (includes transfer to another hospital ward) or home
- 2 Died in ICU
- 3 Transferred to another ICU (includes NICU)
- 4 Still in ICU

ICU/NICU Transferred to

Name of the hospital to which the patient is transferred

Paediatric Index of Mortality Variables

Record the first value of each variable measure at or about the time of first face to face contact between the patient and a doctor from your ICU (or a specialist paediatric retrieval team). Use the first values measured within the period from shortly before first contact to one hour after arrival in your own ICU. The first contact may be in the ICU, the emergency department, another inpatient area of the hospital, or in another hospital (for example on a retrieval). If the variable was not measured record 999.

Elective

An ICU admission or an operation is considered elective if it could be postponed for more than six hours without an adverse effect.

- 0 Non-elective - all other admissions
- 1 Elective - include admission after elective surgery, for an ICU procedure (for example central line insertion), for diagnostic monitoring or review of a home ventilation patient.

Recovery from surgery

Includes a radiology procedure or cardiac catheter. Do not include patients admitted from the operating theatre where recovery from surgery is not the main reason for ICU admission (for example, a patient with a head injury who is admitted from theatre after insertion of an ICP monitor, in this patient the main reason for ICU admission is the head injury).

- 0 No
- 1 Yes

Admitted following cardiac bypass

Also code as recovery from surgery.

- 0 No
- 1 Yes

Mechanical ventilation

Record whether the patient was mechanically ventilated within the first hour of admission to ICU. Mechanical ventilation refers to both invasive (ETT or tracheostomy), and non-invasive (nasopharyngeal airway, mask or nasal prongs) methods of augmenting work of breathing. Using conventional mechanical ventilation (CVM), continuous positive airway pressure (CPAP), biphasic positive airway pressure (BiPAP), or negative pressure ventilation (NPV).

- 0 No
- 1 Yes

Systolic Blood Pressure

Measure in mmHg. If not measured within one hour of admission record 999.

Pupillary Responses to bright light

Pupillary reactions to bright light are used as an index of brain function. Do not record abnormal findings due to drugs, toxins, or local eye injury.

- 0 All other responses including unknown
- 1 Both fixed and > 3mm

PaO₂

The arterial oxygen tension, mmHg, as measured in an arterial blood gas sample.

At time of PaO₂ if oxygen via ETT or headbox (unknown = 999)

Base Excess

The base excess measured in arterial or capillary blood, in mmol/l.

FiO₂

The fraction of inspired oxygen being delivered to the patient via endotracheal tube (ETT) or headbox. Measure at the same time as the PaO₂.

PIM2 Low risk diagnosis

Specific conditions associated with reduced mortality risk

- 0 None
- 1 Asthma is the main reason for ICU admission
- 2 Bronchiolitis is the main reason for admission
- 3 Croup is the main reason for ICU admission
- 4 Obstructive sleep apnoea is the main reason for ICU admission include admissions following adenoidectomy &/or tonsillectomy in whom OSA is the main reason for ICU admission
- 5 Diabetic keto-acidosis is the main reason for ICU admission

High risk diagnosis

Specific conditions associated with reduced mortality risk

- 0 None
- 1 Cardiac arrest out of hospital - requires either documented absent pulse or the requirement for external cardiac massage (do not include past history of cardiac arrest)
- 11 Cardiac arrest in hospital - preceding ICU admission requires either documented absent pulse or the requirement for external cardiac massage (do not include past history of cardiac arrest)
- 2 Severe combined immune deficiency - requires the documented diagnosis of SCID
- 3 Leukaemia or lymphoma after 1st induction
- 4 Spontaneous cerebral haemorrhage - haemorrhage must be spontaneous (for example, from an aneurysm or AVM) (do not include traumatic cerebral haemorrhage or intracranial haemorrhage that is not intracerebral)
- 5 Cardiomyopathy or myocarditis - requires the documented diagnosis of myocarditis or cardiomyopathy
- 6 Hypoplastic left heart syndrome - include only cases where a Norwood procedure, or equivalent is required to sustain life
- 7 HIV infection - requires the document diagnosis of HIV

- 8 IQ <35, (i.e. worse than Downs)
- 9 Neurodegenerative disorder - requires a history of progressive loss of milestones or a diagnosis were this will inevitably occur
- 10 Liver failure - acute or chronic, include patients admitted for recovery following liver transplantation for acute or chronic liver failure

Place of first face to face contact

Place of first face to face contact between the patient and a doctor from your ICU (or a doctor from a specialist paediatric transport team).

- 1 Your ICU,
- 2 In your hospital but outside ICU
- 3 Outside your hospital

Are the values recorded above those made at or about the time of first face to face contact?

- 0 No
- 1 Yes

Intubation commenced date and time

The date and time on which the patient was intubated. Intubation refers to ETT or tracheostomy. Two separate episodes of intubation can be recorded.
dd/mm/yyyy hh:mm

Intubation ceased date and time

The date and time on which the patient was extubated, or discharged, if the patient has a tracheostomy. Two separate episodes of extubation can be recorded.
dd/mm/yyyy hh:mm

Intubation additional hours

If more than 2 episodes of intubation occur during a patients ICU admission further episodes are recorded as additional hours of intubation. Alternatively the total number of intubation hours for all episodes can be calculated and recorded in this field.

Respiratory support commenced date and time

The date and time on which the patient commenced respiratory support. Respiratory support refers to CMV, CPAP, BiPAP or NPV. Two separate episodes of respiratory support can be recorded.
dd/mm/yyyy hh:mm

Respiratory support ceased date and time

The date and time on which the patient ceased respiratory support. Two separate episodes of respiratory support can be recorded.
dd/mm/yyyy hh:mm

Respiratory support additional hours

If more than 2 episodes of respiratory support occur during a patients ICU admission further episodes are recorded as additional hours of respiratory support. Alternatively the total number of respiratory support hours for all episodes can be calculated and recorded in this field.

Mode of Death

Mode of death of patient

- 1** Brain death
- 2** Death with maximal support
- 3** Death with therapy limited but not withdrawn
- 4** Death with therapy withdrawn

External Cardiac Massage

External cardiac massage performed as the terminal event

- 0** no
- 1** yes

Limitation of Therapy

Limitation of therapy order in the notes

- 0** no
- 1** yes

Date of Limitation Order

Date of limitation of therapy order was documented in the patients case notes. If more than one order, record date of first order if order preceded ICU admission, record ICU admission date dd/mm/yyyy.

Organ Donation

- 1** Brain death not present (NBHD not considered)
- 2** Brain death, organ donor
- 3** Brain death, contraindication to organ donation
- 4** Brain death, consent not requested
- 5** Brain death, consent requested and refused
- 6** Non beating heart donor
- 7** Non beating heart donation consent requested and refused

Specific Therapies

To be completed at the time of patient discharge from ICU.

CVVH or CVVHD

Specifies whether the patient received renal therapy support in terms of continuous haemodialysis at any time during their admission to ICU.

- 0** no
- 1** yes

Haemodialysis

Specifies whether the patient received renal therapy support in terms of intermittent haemodialysis at any time during their admission to ICU.

- 0** no
- 1** yes

Peritoneal dialysis

Specifies whether the patient received renal therapy support in terms of peritoneal dialysis at any time during their admission to ICU.

0 no,
1 yes

Plasma filtration

Specifies whether the patient received renal therapy support in terms of plasma filtration at any time during their admission to ICU.

0 no
1 yes

HFO

Specifies whether the patient received high frequency oscillation (HFO) therapy at any time during their admission to ICU.

0 no
1 yes

Inhaled nitric oxide

Specifies whether the patient received inhaled nitric oxide therapy at any time during their admission to ICU.

0 no
1 yes

ECMO

Specifies whether the patient received extra corporeal membrane oxygenation (ECMO) therapy at any time during their admission to ICU.

0 no
1 yes

Ventricular assist device

Specifies whether the patient received support from a ventricular assist device (VAD) at any time during their admission to ICU.

0 no
1 yes

ICP Monitoring

Specifies whether the patient had an intra cranial pressure monitor inserted at any time during their admission to ICU.

0 no
1 yes Complete specific therapy data at the time of ICU discharge

Appendix II ANZPIC Diagnostic Codes

Australia and New Zealand Paediatric Intensive Care Registry, 2005

<u>INJURY</u>	<u>NEUROLOGICAL</u>	<u>RENAL</u>
100 Injury - Other	300 Neurological – Other	500 Renal - Other
101 Anaphylaxis	301 Botulism	501 Haemolytic Uraemic Syndrome
102 Burns	302 Brain Abscess	502 Nephrotic and/or Nephritic Syndrome
103 Carbon Monoxide Poisoning	303 Brain AV Malformation	505
104 Drug Toxicity - Iatrogenic	304 Brain Death	503 Previous Renal Transplant
105 Electrocutation	305 Brain Infarction or Stroke	504 Renal Failure - Acute
106 Envenomation	306 Brain Tumour	506 Renal Failure - Chronic
107 Hanging or Strangulation	324 Cerebral Aneurysm	Urinary Tract Infection
108 Hyperthermia	307 CSF Shunt Malfunction or Infection Encephalitis	<u>GASTROINTESTINAL</u>
109 Hypothermia	308 Encephalopathy, Acute – Hypoxic	600 Gastrointestinal – Other
110 Immersion (Near Drowning)	309 Ischaemic	601 Biliary Atresia
111 Ingestion	310 Encephalopathy, Acute – Other	621 Bowel Obstruction
112 Smoke Inhalation	311 Encephalopathy, Chronic Degenerative (eg Leigh's Syndrome)	602 Bowel Perforation
113 Trauma - Other	312 Encephalopathy, Chronic Static (eg Cerebral Palsy)	603 Colitis
114 Trauma - Abdominal	313 Guillain Barre Syndrome	604 Gastroenteritis
115 Trauma - Chest	314 Hydrocephalus	605 Gastrointestinal Haemorrhage
116 Trauma - Facial	315 Intracranial Haemorrhage – Spontaneous	606 Gastroschisis or Exomphalos
117 Trauma - Head	316 Intracranial Hypertension (Raised ICP)	622 Hepatitis
118 Trauma - Skeletal	317 Meningitis	607 Hirschsprung's Disease
119 Trauma - Spinal	318 Meningocele or Spina Bifida	608 Intussusception
<u>INJURY MECHANISM¹</u>	325 Muscular Dystrophy	609 Liver Disorder – Other
150 Injury Mechanism – Other Crush	326 Myasthenia Gravis	610 Liver Failure – Acute
162 Injury	319 Myopathy	611 Liver Failure – Chronic
151 Cyclist	320 Neuropathy	623 Necrotising
152 Fall	321 Seizures	612 Enterocolitis
153 Farm Equipment	322 Spinal Cord Lesion	624 Neonatal Jaundice
154 Firearm Injury	327 Tetanus	613 Oesophageal Atresia
161 Motor Bike Rider / Passenger	323 Venous Sinus Thrombosis	614 Oesophageal Foreign Body
155 MVA – Passenger		625 Pancreatitis
156 MVA – Pedestrian	<u>RESPIRATORY UPPER AIRWAY</u>	626 Peritonitis Portal Hypertension
157 Non Accidental Injury	400 Upper Airway – Other	615 Previous Liver Transplant
158 Self Injury	401 Choanal Atresia or Stenosis	616 Pyloric Stenosis
159 Sports Injury	402 Epiglottitis	617 Short Gut Syndrome
160 Stab Injury	403 Foreign Body – Inhaled	618 Ulcer – Duodenal
<u>CARDIOVASCULAR²</u>	404 Laryngotracheobronchitis (Croup)	619 Ulcer – Gastric or Gastritis
200 Cardiovascular - Congenital - Other	405 Obstructive Sleep Apnoea	627 Varices – Oesophageal or Gastric Volvulus
201 Absent Pulmonary Valve	406 Pierre Robin Syndrome	
202 Anomalous Coronary Artery	407 Retropharyngeal Abscess	<u>INFECTION¹</u>
203 Aortic Insufficiency	413 Subglottic Haemangioma	700 Infection – Other
204 Aortic Stenosis	408 Subglottic Stenosis	701 Adenovirus
224 AP Window	409 Tracheitis	702 Bacterium – Other
205 ASD	410 Upper Airway Obstruction – Other	703 Bacterium – Gram Negative -Other
225 AV Malformation	411 Upper Respiratory Infection – Other	704 Bacterium – Gram Positive - Other
206 AVSD (AV Canal)	412 Vocal Cord Paresis	705 Candida
207 Coarctation	<u>LOWER AIRWAY</u>	706 Clostridium
208 Cortriatriatum	Lower Airway – Other	707 CMV
226 Double Outlet Right Ventricle	430 Asthma	708 EBV
209 Ebstein's Anomaly	431 Bronchiolitis	730 E Coli
210 Hypoplastic Left Heart Syndrome	432 Chronic Lung Disease (Includes BPD)	709 Enterovirus
211 Interrupted or Hypoplastic Aortic Arch	433 Malacia - Trachea and/or Bronchi	710 Fungus – Other
227 LV Outflow Obstruction	434 Mediastinal Mass	711 Haemophilus Influenzae Type b
212 Mitral Insufficiency	435 Stenosis - Trachea and/or Bronchi	712 Hepatitis – Viral
213 Mitral Stenosis	436 Tracheo-oesophageal Fistula	713 Herpes Simplex Virus
214 PDA	437 Vascular Ring	714 HIV
215 Pulmonary Atresia or Stenosis	438 <u>OTHER</u>	715 Influenza Virus
228 Pulmonary Insufficiency	450 Respiratory – Other	731 Klebsiella
229 RV Outflow Obstruction	451 Air Leak Syndrome	716 Legionella
216 Single Ventricle	452 Apnoea – Central	732 Malaria
217 APVD	453 ARDS	735 Measles Virus
218 Tetralogy of Fallot	454 Aspiration	717 Meningococcus
219 Transposition of Great Arteries (dTGA)	455 Chylothorax	718 Mycoplasma
220 Tricuspid Atresia or Stenosis	456 Congenital Diaphragmatic Hernia	719 Parainfluenzae Virus
221 Tricuspid Insufficiency	457 Congenital Lung Anomaly	720 Pertussis
222 Truncus Arteriosus	458 Cystic Fibrosis	721 Pneumococcus
223 VSD	459 Empyema	722 Pneumocystis Carinii
<u>AQUIRED</u>	460 Hyaline Membrane Disease	733 Pseudomonas
250 Cardiovascular – Acquired – Other	461 Hypoventilation – Central	723 Rotavirus
251 Cardiac Failure	469 Lower Respiratory Infection – Other	724 RSV
252 Cardiac Tumour	462 Lung Abscess	725 Salmonella
253 Cardiomyopathy	463 Meconium Aspiration Syndrome	726 Staphylococcus
254 Dysrhythmia – Supraventricular	470 Pertussis Syndrome	734 Streptococcus Group B
255 Dysrhythmia – Ventricular	464 Pleural Effusion	727 Streptococcus – Other
256 Endocarditis	465 Pneumonia or Pneumonitis	728 Varicella
257 Hypertension – Pulmonary	471 Previous Lung Transplant	729 Virus – Other
258 Hypertension – Systemic	466 Pulmonary Hypoplasia	799 No Organism Identified
259 Kawasaki's Disease	467 Pulmonary Oedema	
260 Pericardial Effusion or Tamponade	468 Respiratory Failure	
263 Previous Heart Lung Transplant	472 Transient Tachypnoea of the Newborn	
264 Previous Heart Transplant		
261 Vascular Thrombosis		
262 Vasculitis		

¹ DO NOT USE FOR PRINCIPAL DIAGNOSIS

² CONGENITAL

Australia and New Zealand Paediatric Intensive Care Registry, 2005

<u>MISCELLANEOUS</u>		<u>POST PROCEDURAL DIAGNOSES</u> <u>MISCELLANEOUS / ANAESTHETIC</u>	<u>THORACIC SURGERY</u>
801 Acute Life Threatening Event			
802 Cardiac Arrest - In Hospital	1100	Post Procedure - Other	1400 Thoracic Surgery - Other
803 Cardiac Arrest – Out of Hospital	1101	Anaesthetic Complication	1401 Diaphragm Plication
804 Chromosomal Anomaly	1106	Cardiac Catheter – Balloon Sep- tostomy	1402 Diaphragm Repair
805 Coagulopathy	1102	Cardiac Catheter – Diagnostic	1403 Lung Biopsy
839 Craniosynostosis	1107	Cardiac Catheter – Interventional	1404 Lung Decortication
806 Dehydration	1103	Ex-prem, Post GA	1405 Oesophageal Atresia Repair
807 Dermatological Disorder	1104	Invasive Radiology Procedure	1406 Pneumonectomy or Lobectomy
808 Diabetes Insipidus	1105	Massive Intraop Transfn (> 1 blood vol)	1407 Thoracic Tumour Resection
809 Diabetes Mellitus with Ketoacidosis		<u>CARDIAC SURGERY</u>	1408 Tracheo-oesophageal Fistula Repair
810 Diabetes Mellitus without Ketoacidosis		<u>CLOSED</u>	1409 Tracheopexy
811 Electrolyte Disorder	1200	Cardiac Surgery Closed – Other	
812 Endocrine Disorder	1201	Coarctation Repair	<u>ENT SURGERY</u>
813 Gas Gangrene	1202	PA Band	1500 ENT - Other
847 Haematological Disorder	1203	Pacemaker Insertion or Revision	1501 Adenoidectomy and/or Tonsillectomy
814 Home Ventilation Patient	1204	PDA Ligation	1502 Choanal Atresia Repair
815 Hypoglycaemia	1205	Systemic-Pulmonary Shunt	1503 Cricoid Split
816 ICU Diagnostic Monitoring - Elective	1206	Valvotomy – Closed	1504 Laryngeal Reconstruction
817 ICU Procedure (eg CVC Insertion)		<u>OPEN</u>	1505 Laryngobronchoscopy
818 Immunodeficiency - Congenital	1230	Cardiac Surgery Open – Other	1506 Tracheostomy
819 Immunosuppression - Acquired	1231	Aortic Arch Reconstruction	
820 Inborn Error of Metabolism	1232	Arterial Switch	<u>ABDOMINAL / GENERAL SURGERY</u>
821 Leukaemia or Lymphoma	1233	ASD Repair	
822 Necrotising Fasciitis	1234	AVSD Repair (AV Canal)	1600 General Surgery – Other
840 Neonate – Hydrops Fetalis	1235	Cardiac Tumour Resection	1601 Abdominal Tumour Resection
841 Neonate – Infant of Diabetic Mother	1236	Cavo-Pulmonary Shunt	1602 Appendicectomy
842 Neonate – IUGR	1252	Conduit Repair or Replacement	1603 Bladder Extrophy Repair
823 Neutropenia	1253	Coronary Artery Repair	1604 Burns Surgery
848 Organ Donor	1237	Fontan	1605 Fundoplication
824 Pancytopenia	1238	LV Outflow Reconstruction	1606 Gastroschisis or Exomphalos Repair
825 Pheochromocytoma	1254	MAPCA's Surgery	1607 GI Endoscopy and/or Sclerotherapy
826 Prematurity	1239	Norwood - Stage I	1608 Intussusception Repair
843 Previous Bone Marrow Transplant	1240	PA Plasty or Repair	1609 Kasai
827 Respiratory Arrest - In Hospital	1241	RV Outflow Reconstruction	1610 Laparotomy
828 Respiratory Arrest - Out of Hospital	1242	Senning	1615 Laparotomy – Bowel Obstruction
844 Scoliosis	1243	TAPVD Repair	1616 Laparotomy – Bowel Perforation
829 Sepsis	1244	Tetralogy of Fallot Repair	1617 Laparotomy – GI Haemorrhage
830 Shock – Cardiogenic	1245	Transplant – Heart	1618 Laparotomy – Necrotising Enterocolitis
831 Shock – Hypovolaemic	1246	Transplant – Heart Lung	1619 Laparotomy – Peritonitis
832 Shock – Septic	1247	Transplant – Lung	1620 Laparotomy – Trauma
833 SIRS	1248	Truncus Repair	1611 Transplant – Kidney
834 Solid Neoplasm – Malignant (not Lymphoma)	1249	Valve Repair or Replacement	1612 Transplant – Liver
835 Solid Neoplasm – Non Malignant	1250	Valvotomy – Open	1613 Transplant - Small Bowel
836 Syndrome or Malformation (not Chromosomal)	1251	VSD Repair	1614 Urogenital Surgery – Other
837 Toxic Shock Syndrome		<u>NEUROSURGERY</u>	<u>CRANIOFACIAL SURGERY</u>
838 Transplant - Bone Marrow	1300	Neurosurgery – Other	
845 Tumor Lysis Syndrome	1301	Craniotomy – Anterior Fossa	1700 Craniofacial Surgery – Other
846 Wound Infection	1302	Craniotomy – Posterior Fossa	1706 Cleft Palate Repair
	1303	CSF Shunt Insertion or Revision	1701 Cranial Vault Reshaping
	1304	Decompression - Cranial	1702 Dental Surgery
	1305	Decompression - Spinal Cord	1703 Facial Cleft Repair
			1801 Fracture Fixation
			1802 Spinal Instrumentation

Instructions for using the ANZPIC registry diagnostic codes

Code the reason most directly responsible for ICU admission as the *Principal Diagnosis*.

Code up to 5 *Associated Diagnoses*.

For patients admitted primarily for recovery after a procedure, use a *Post Procedural Diagnosis* for *Principal Diagnosis*.

For patients having an operative procedure during the admission code the *Post Procedural Diagnosis* as an *Associated Diagnosis*.

Do not use *Injury Mechanism* or *Infection* codes for the *Principal Diagnosis* (eg for RSV bronchiolitis code bronchiolitis as the *Principal Diagnosis* and RSV as an *Associated Diagnosis*).

If new information (eg a test result) becomes available during the admission that allows more accurate coding, amend the original codes but ensure that the *Principal Diagnosis* still indicates the reason most directly responsible for ICU admission.

¹ DO NOT USE FOR PRINCIPAL DIAGNOSIS

² CONGENITAL

Appendix III Participating ICUs Contact Details

Australian Capital Territory

The Canberra Hospital

PO Box 11
Woden, ACT, 2606
P: +61 2 6244 3423

Director

Imogen Mitchell (imogen.mitchell@act.gov.au)

Data Manager

Jelena Gissane (jelena.gissane@act.gov.au)

New South Wales

Sydney Children's Hospital

High St
Randwick, NSW, 2031
P: +61 2 9382 1919

Director

Barry Duffy (b.duffy@unsw.edu.au)

Data Manager

Janelle Young (youngja@sesahs.nsw.gov.au)

The Children's Hospital at Westmead

Locked Bag 4001
Westmead, NSW, 2145
P: +61 2 9845 1171

Director

Stephen Jacobe (stephej2@chw.edu.au)

Tamworth Base Hospital

PO Box 83
Tamworth, NSW, 2340
P: + 61 2 6761 9542

Director

Phil Hungerford (phungerford@doh.health.nsw.gov.au)

Data Manager

Tim Constable (tconstable@doh.health.nsw.gov.au)

Queensland

Queensland Paediatric Intensive Care Service Campuses

Mater Misericordiae Children's Hospital

Private Bag
South Brisbane, QLD, 4101
P: +61 7 3840 8269

The Prince Charles Hospital

Rode Rd
Chermside, QLD, 4032
P: +61 7 3350 8672

Data Manager
Janelle Johnson (Janelle_johnson@health.qld.gov.au)

Royal Children's Hospital Brisbane

Herston Road
Herston, QLD, 4029
P: +61 7 3636 7957

Director
Anthony Slater (Anthony_Slater@health.qld.gov.au)

The Townsville Hospital

Eyre St
Townsville, QLD, 4810

Director
Michael Corkeron (michael_corkeron@health.qld.gov.au)
Data Manager
Gail Henson (gail_henson@health.qld.gov.au)

South Australia

Women's and Children's Hospital

72 King William Rd
North Adelaide, SA, 5006
P: +61 8 8161 6265

Director
Neil Matthews (matthewsn@wch.sa.gov.au)

Victoria

Royal Children's Hospital Melbourne
Flemington Rd
Parkville, Victoria, 3052
P: +61 3 9345 5224

Director
Frank Shann (frank.shann@rch.org.au)
Data Manager
Mary Merriman/Carmel Delzoppo

Western Australia

Princess Margaret Children's Hospital
PO Box D184
Perth, WA, 6840
P: +61 8 9340 8447

Director
Alan Duncan (alan.duncan@health.wa.gov.au)

New Zealand

Starship Children's Hospital
Private Bag 92024
Auckland, NZ
P: +64 9 9307 4903

Director
John Beca (JohnBeca@adhb.govt.nz)

Wellington Hospital
Private Bag 7902
Wellington, NZ

Director
Peter Hicks (Peter.Hicks@ccdhb.org.nz)

ANZPIC Registry

Royal Children's Hospital Brisbane
Level 2 Surgicals Building
Herston Rd, Herston, 4029
P: +61 7 3636 9419

Project Manager Christie Turton (Christie_Turton@health.qld.gov.au)