ANZICS
Outcomes Audit and Research

Graeme Hart
Chair
Core Management Committee

Australian and New Zealand Intensive Care Society
ANZICS CORE Management Committee

- Responsibility for the three components of the ANZICS CORE Databases:
  1. ANZICS Adult Patient Database (ANZICS APD)
  2. ANZICS Critical Care Resources Database
  3. Australian and New Zealand Paediatric Intensive Care (ANZPIC) Registry

Hong Kong signing on for 2 yrs
## Resources and Funds

<table>
<thead>
<tr>
<th>Principles</th>
<th>Principle Met</th>
<th>Conformance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Registries should receive adequate ongoing funding to allow data</td>
<td>Partially</td>
<td>Jurisdictional funding by States and Territories and NZ</td>
</tr>
<tr>
<td>collection, reporting and the institution of strong quality control</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>procedures</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Triennial funding based on a priori agreed budget and work plan
Currently ~ $800,000 pa
CORE Resources

- Manager / Epidemiologist
- Technical / SAS Programmer
- Access / SQL programmer
- Data Quality and Education
- Resources Project Officer
- ANZPIC Project Manager
- Secretarial / Admin
- PhD scholars x 2
- Committee
- Monash Uni Dept Epidemiology and Preventive Medicine (Registries / stats)
## Registry Attributes

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Standard Met</th>
<th>Conformance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collect a core minimum data set</td>
<td>Yes</td>
<td>Minimum data set of 109 variables</td>
</tr>
<tr>
<td>Utilise systematic collection processes</td>
<td>Yes</td>
<td>APD data dictionary with range and data collection rules included</td>
</tr>
<tr>
<td>Epidemiologically sound data</td>
<td>Yes</td>
<td>Working group established to manage the ongoing development and integration</td>
</tr>
<tr>
<td>Simple outcome data</td>
<td>Yes</td>
<td>Hospital and ICU mortality</td>
</tr>
<tr>
<td>Collect sufficient clinical information</td>
<td>Yes</td>
<td>SAPS II, APACHE II, APACHE III-J risk of death adjustment</td>
</tr>
<tr>
<td>to allow basic risk adjustment</td>
<td>Require</td>
<td>All ICU and HDU admissions under care of intensivist</td>
</tr>
<tr>
<td>Avoid selection bias</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
• ~180 ANZ ICUs
• Adult Patient Database 137 ICUs regularly contributing - Number increasing each year
  – 85% Australian Level 3 ICUs
  – 950,000 adult episodes
• 16 Units contributing to ANZPIC
• Governance – Internal and External
Participation since 1992

Australia and New Zealand Participation since 1992

![Graph showing the number of sites and admissions from 1992 to 2007](image)
# Adult Patient Database sites

## June 2008

<table>
<thead>
<tr>
<th>Region</th>
<th>Contributing Sites</th>
<th>All Sites</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT</td>
<td>3</td>
<td>3</td>
<td>100.00%</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>28</td>
<td>32.14%</td>
</tr>
<tr>
<td>NSW</td>
<td>40</td>
<td>54</td>
<td>74.07%</td>
</tr>
<tr>
<td>NT</td>
<td>2</td>
<td>2</td>
<td>100.00%</td>
</tr>
<tr>
<td>QLD</td>
<td>31</td>
<td>36</td>
<td>86.11%</td>
</tr>
<tr>
<td>SA</td>
<td>10</td>
<td>12</td>
<td>83.33%</td>
</tr>
<tr>
<td>TAS</td>
<td>3</td>
<td>4</td>
<td>75.00%</td>
</tr>
<tr>
<td>VIC</td>
<td>27</td>
<td>36</td>
<td>75.00%</td>
</tr>
<tr>
<td>WA</td>
<td>5</td>
<td>8</td>
<td>62.50%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>130</strong></td>
<td><strong>183</strong></td>
<td><strong>71.04%</strong></td>
</tr>
</tbody>
</table>
## Data Collection

<table>
<thead>
<tr>
<th>Principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data capture close as possible to the point of care by appropriately trained data collectors</td>
</tr>
<tr>
<td>Standard definitions, terminology and specifications</td>
</tr>
<tr>
<td>Clinical registries methods should be systematic</td>
</tr>
<tr>
<td>data dictionaries</td>
</tr>
<tr>
<td>utilising existing data, where they are of high quality</td>
</tr>
<tr>
<td>linkage to other disease and procedure registries or other databases</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Principle Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partially met, external changes required</td>
</tr>
<tr>
<td>Partially met, external changes required</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No, external changes required</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conformance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data collected at clinical care level or one step removed but not all data collectors have equivalent training.</td>
</tr>
<tr>
<td>APD data dictionary has been entered into METeOR.</td>
</tr>
<tr>
<td>Model data collection forms are provided. Data collection AORTIC software APD data dictionary</td>
</tr>
<tr>
<td>Detailed data dictionary</td>
</tr>
<tr>
<td>Modelling of Administrative data</td>
</tr>
<tr>
<td>Research and current plans</td>
</tr>
</tbody>
</table>
# Data Elements

<table>
<thead>
<tr>
<th>Principle</th>
<th>Principle Met / Agreed</th>
<th>Conformance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  core minimum data set of information from individuals treated across multiple locations</td>
<td>Yes</td>
<td>Well defined APD data dictionary</td>
</tr>
<tr>
<td>2  individually identifiable information</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>3  processes of care have a strong link to outcomes and measures are simple, reliable and reproducible,</td>
<td>Yes</td>
<td>Some measures reported, composite measures KPI</td>
</tr>
<tr>
<td>4  Data epidemiologically sound i.e. simple, objective and reproducible</td>
<td>Yes</td>
<td>Outcome measure of survived/died hospital and/or ICU stay a</td>
</tr>
<tr>
<td>5  burden and cost of data collection</td>
<td>Yes</td>
<td>Governance processes in place to ensure data collection retains relevance.</td>
</tr>
</tbody>
</table>
## Risk Adjustment

<table>
<thead>
<tr>
<th>Principle</th>
<th>Principle Met</th>
<th>Conformance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective, reliable covariates for risk adjustment to enable factors outside the control of clinicians to be taken into account by appropriate statistical adjustments</td>
<td>Yes</td>
<td>SAPS II, APACHE II and APACHE III-J algorithms utilised</td>
</tr>
</tbody>
</table>
Observed & APACHE III—(R) Predicted Hospital Outcome grouped by APACHE III—(R) Score

Austin ICU: Apache 3 SMR 2007/08

Austin Hospital (ICU & CICU)

ICU admissions from Sunday, 1 July 2007 to Monday, 30 June 2008

Note: Patients aged < 16 yrs or with ICU stay < 4 hrs or with unknown outcome of their stay in hospital (including transfer out to another ICU) have been excluded.


Code to enable calculation of APACHE III—(R) mortality probabilities developed for ANZICS APD by Peter Bitzow.

(R) APACHE is a registered trademark of Genesys Corporation, Kansas City, Missouri, USA

Produced by the ANZICS Adult Patient Database
Apache 3: Comparative SMR 2007/08

Observed vs APACHE III (R) Predicted Hospital Outcome for ICU patients
Austin Hospital (ICU & CICU) and pooled data
ICU admissions from 01/07/07 to 30/06/08

Note: Patients aged < 16 yrs or with ICU stays < 4 hrs or with unknown outcome of their stay in hospital (including transfers out to another ICU) have been excluded.


Code to enable calculation of APACHE III (R) predicted mortality can be downloaded from ANZICS at www.anzics.com.

(© ANZICS is a registered trademark of Cerner Corporation Kansas City, Missouri USA

Produced by the ANZICS Adult Patient Database

Tuesday, 2 September 2009
Apache 3 Score Distribution 2007/08

Source: Data submitted to the ANZICS Adult Patient Carol Database as at Tuesday, 2 September 2009.

Code to enable calculation of APACHE III-1 (R) mortality probabilities developed for ANZCO3 APD by Peter Bratlow.
Funnel Plots

Funnel Plot of SMRs for Units by Number of Cases
2004, APACHE III J

ANZICS CORE Management Committee
Continuous Control Charts
RA EWMA

- EWMA of observed mortality rate
- EWMA of APACHE III Predicted Risk of Death with 95% confidence interval

ANZICS CORE Management Committee
## Data Security

<table>
<thead>
<tr>
<th>Principle</th>
<th>Principle met</th>
<th>Conformance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Secure access controls and secure messaging systems</td>
<td>Yes</td>
<td>Disaster recovery software, regular off site backups, firewall security, user names and password utilised. Individual patient identifiers are not currently held</td>
</tr>
<tr>
<td>2 The collection, storage and transmission of clinical registry data must be in line with institutional, state and national policies,</td>
<td>Partially Yes</td>
<td></td>
</tr>
</tbody>
</table>


## Data Quality

<table>
<thead>
<tr>
<th>Principle</th>
<th>Principle met</th>
<th>Conformance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Report as a quality measure the percentage of eligible patients recruited to the clinical registry</td>
<td>Yes</td>
<td>CCR vs Submitted</td>
</tr>
<tr>
<td>2 Quality control plan which allows ongoing monitoring of the completeness and accuracy of the data collected</td>
<td>Yes</td>
<td>Data check screening on receipt of data. Data quality reports provided back to units</td>
</tr>
<tr>
<td>3 Data checked against source records in a sample of cases.</td>
<td>Yes</td>
<td>Data audit program in place</td>
</tr>
<tr>
<td>4 Registries should incorporate data collection processes that are adequately supported by range and validity checks</td>
<td>Yes</td>
<td>AORTIC software provides range and validity checks at point of data entry</td>
</tr>
<tr>
<td>5 Registry reports should be produced according to a strict timeline and sufficient resources should be provided to facilitate this reporting</td>
<td>Yes</td>
<td>Quarterly data submission rounds with delivery of reports within four weeks of the submission deadline</td>
</tr>
</tbody>
</table>
## Data Quality

<table>
<thead>
<tr>
<th></th>
<th>APD</th>
<th>DocDat Median (IQ)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>A: Representativeness of country</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>B: Completeness of recruitment</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>C: Variables included</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>D: Completeness of data</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>E: Data collection format</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>F: Explicit definitions</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>G: Explicit rules</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>H: Reliability of coding</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>I: Independence of observations</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>J: Data validation</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>


Data collection – 2006 cross validation study underway
## Organisation & Governance, Custodianship

<table>
<thead>
<tr>
<th>Principle</th>
<th>Principle met</th>
<th>Conformance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Formalise governance structures to ensure accountability, oversee resource application, provide focus and optimise output from the clinical registry</td>
<td>Yes</td>
<td>ANZICS CORE Management Committee NICRSC</td>
</tr>
<tr>
<td>2. Registries must establish policies to manage a range of potential findings from a clinical registry and include a plan to ensure that quality of care issues are effectively addressed</td>
<td>Yes</td>
<td>Outlier Management Plan in place</td>
</tr>
<tr>
<td>3. Custodianship of data needs to be made explicit in Contract and/or Funding Agreements. Data access and reporting policies should be accessible to all interested parties</td>
<td>Yes</td>
<td>Information request and publication policies are publicly available on SAS Web Portal</td>
</tr>
</tbody>
</table>
OUTLIER MANAGEMENT POLICY

• National Intensive Care Registry Steering Committee
• Jurisdictions – Chaired CEO ACSQHC
• Promotes ongoing relationships and “peer pressure” regarding responses to outliers
• Positive and Negative outliers
Outlier Definition

A contributing Intensive Care Unit identified by analysis of data submitted to the ANZICS CORE Adult Patient Database (APD) or Paediatric Database, as having results which lie outside of a predetermined range. This pre determined range is defined to indicate a high likelihood of being within the boundaries of standard or acceptable practice and may vary over time.
Information Flow

- Contributing ICU
- Outliers identified
- Publication of Reports to Web Portal
- Error checking and processing
- CORE
The action plan

- balance governance and community safety imperatives for early identification of poor performance

- Against

- ensuring that identified units are able to address data related issues that may cause erroneous identification of poor performance.
Action Plan

Data Cause Indeterminate True Problem

Statistical Outlier Identified

Secondary Data Analysis to Support Local Investigation

Local Data Audit and correction

Notification of Local Hospital, Jurisdictional Liaison Committee
DATA ANALYSIS, REPORTING AND FOLLOW-UP ACTION PLAN

• Process phases:
  – Phase 1: Data Upload, clean, initial report
  – Phase 2: Notification & investigation of the findings to ICU / state committee
  – Phase 3: Detailed analysis of data quality, case mix, other confounders
  – Phase 4: Local Intervention

• Repeat Cycle:
Jurisdictional Responsibility

- It is the responsibility of the regional jurisdictional authority to liaise with the hospital management and the ICU Director and assume responsibility for correcting factors leading to outlier performance.
# Ethics and Privacy

<table>
<thead>
<tr>
<th>Principle</th>
<th>Principle met</th>
<th>Conformance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Institutional Ethics Committee approval must be obtained to establish the clinical registry</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>2. Consent must be obtained from participants or their next of kin prior to the collection of registry data</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
## Information Output

<table>
<thead>
<tr>
<th>Principle</th>
<th>Principle Met</th>
<th>Conformance</th>
</tr>
</thead>
<tbody>
<tr>
<td>ad hoc analysis of data to enable monitoring of clinical care</td>
<td>Yes</td>
<td>Web based reporting toolsPublished reports ad hoc analyses</td>
</tr>
<tr>
<td>capacity to verify data in a timely manner and produce risk-adjusted reports as close to real time as possible for local users</td>
<td>Yes</td>
<td>submit data on a quarterly basis.</td>
</tr>
<tr>
<td>Registries must produce a publicly accessible aggregated annual report detailing clinical and corporate findings</td>
<td>Partially Yes</td>
<td>CCR Report annual CORE annual report. ANZPIC Annual Report Peer reviewed publications Jurisdiction reports</td>
</tr>
<tr>
<td>Data from clinical registries should be used to evaluate quality of care by identifying gaps in best practice and benchmarking performance</td>
<td>Yes</td>
<td>APD provides benchmark reporting to units on quarterly basis.</td>
</tr>
</tbody>
</table>
2007-08: 96% return

Influenza Pandemic
June – September 2009
Interim Update
Isolation resources,
Staff Impact and shortages,
Surge capability and sustainability
ANZPJC Report

Australian and New Zealand Paediatric Intensive Care Registry 2006

Jan Alexander, Shelley Tregea & Anthony Slater
The BIG Picture
Australia

- ~ AUD 750 million spent pa#.
- 140,000 patients receive ICU / HDU care
- 4.76% all non same day acute admissions
- 167 Australian public and private sector ICUs.
- ~ 25% episodes in Private sector

# based on NSW cost model 2003-4 of $2900 – $3200 per day – Does not include private medical fees, PBS funded drugs.
The BIG Picture
Australia

- 1881 ICU / HDU Beds
  - Available :1695  Ventilator: 1318

- 5500 patients (4.9 %) require readmission to ICU during a hospital admission.

- 7% ICU mortality  14-15% hospital mortality.

- APACHE 3j SMR 0.85 (tertiary sector)

- 18 % Discharged “out of hours”
  - Impact on mortality – OR 1.4
The BIG Picture

- 10,000 patients may not receive appropriate ICU care because of resource constraints.
- This exceptional care is provided by 4,122 RN FTE, 280 ICU or other specialists.
- shortfall of RNs: 7% to 20 % depending on staff type and locality.
ANZICS Web portal

Portal for ANZICS Databases

Australian Contributing sites - click on region for detail

All Australian and New Zealand Intensive care units are invited to contribute to the Patient Database. Free software is provided to units to assist in data entry. For further information, please contact us.

Project Team

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Project Officer (Health Information and systems management)

ANZICS CORE Management Committee
Patient Age Distribution 2007/08

Comparative ICU Patient Age Distributions — Austin Hospital (ICU & CICU) (01/07/07 – 30/06/08)

<table>
<thead>
<tr>
<th>Area</th>
<th>n</th>
<th>Mean</th>
<th>Std Dev</th>
<th>P10</th>
<th>P50</th>
<th>P90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austin Hospital</td>
<td>2048</td>
<td>61.04</td>
<td>17.11</td>
<td>56.20</td>
<td>62.20</td>
<td>72.20</td>
</tr>
<tr>
<td>Run/Region ICUs</td>
<td>11439</td>
<td>57.96</td>
<td>21.12</td>
<td>56.10</td>
<td>61.90</td>
<td>72.10</td>
</tr>
<tr>
<td>Metrop. ICUs</td>
<td>15180</td>
<td>59.70</td>
<td>19.86</td>
<td>58.80</td>
<td>62.70</td>
<td>72.70</td>
</tr>
<tr>
<td>Tert/Ref. ICUs</td>
<td>40285</td>
<td>68.32</td>
<td>19.52</td>
<td>66.20</td>
<td>70.20</td>
<td>80.20</td>
</tr>
<tr>
<td>Private ICUs</td>
<td>21204</td>
<td>66.25</td>
<td>15.60</td>
<td>64.10</td>
<td>69.80</td>
<td>84.20</td>
</tr>
</tbody>
</table>

Source: Data submitted to the ANZICS Outcomes Database changed as at Tuesday, 2 September 2008.
ICU Length of Stay 2007/08

Distribution of ICU Lengths of Stay - Austin Hospital (ICU & CICU) (01/07/07 - 30/06/08)

- **Austin Hospital**
  - $n = 2047$
  - $GeomMean = 33.17$
  - $ArithMean = 67.50$
  - $PSQ = 242.57$
  - $PGE = 548.73$

- **Regional ICUs**
  - $n = 11420$
  - $GeomMean = 41.72$
  - $ArithMean = 75.50$
  - $PSQ = 230.54$
  - $PGE = 539.50$

- **Metropolitan ICUs**
  - $n = 15189$
  - $GeomMean = 47.44$
  - $ArithMean = 88.36$
  - $PSQ = 280.00$
  - $PGE = 697.27$

- **Teaching Referral ICUs**
  - $n = 40662$
  - $GeomMean = 46.81$
  - $ArithMean = 91.15$
  - $PSQ = 335.80$
  - $PGE = 742.43$

- **Private ICUs**
  - $n = 21157$
  - $GeomMean = 40.16$
  - $ArithMean = 51.89$
  - $PSQ = 150.83$
  - $PGE = 491.42$

**Note:** Statistics calculated for admissions but stays > 380 hrs not shown.

**Source:** Data submitted to the ANZICS Outcomes Database as at Tuesday, 2 September 2008.
Mortality is Not Enough!

- Adult Patient Database
- ANZPIC
- Critical Care Resource Survey
  - Annual
  - Resources
    - Physical, Human, Process, ?Culture
  - Access

ANZICS CORE Management Committee
PROPOSED STRATEGY MAP FOR ANZICS CORE STRATEGIC PERFORMANCE MANAGEMENT PORTAL
Draft Version 1

ANZICS CORE Management Committee
Data Sources
1. Critical Care Resource Survey
   Unit structure / resource data
2. Adult Patient Database
   Individual patient episode data

ACCESS

Pre ICU

Existing
1. Cancelled surgical due to inadequate ICU resources, % of admission
2. Refused admission due to inadequate resources - % of admissions

Future
1. Patient transfer due to no ICU bed (NBTs/ICU admissions +NBTs)
2. Inability to admit due to bed block

Within ICU

Existing
1. ICU available beds - %Occupancy
2. RN FTE / Avail Bed Ratio
3. Intensivists FTE / per Avail bed Ratio
4. % RN vacancy FTE of Rostered RN FTE

Exit ICU

Existing
1. Bed block

Post ICU

Existing
1. MET calls
2. Early <72 hrs vs late readmission >=72 hrs

ANZICS CORE Management Committee
Research

- Private Sector
- Balanced Scorecard – validation with ICNARC
- Administrative Database use
- Data Linkage – National Long Term Outcomes and Specific links to other Registries – Trauma Cardiac Surgery
- Increased Overseas collaboration UK, HK.
- Increase Non-jurisdictional Funding
Research

• 10 plus papers pa
  – Committee, ANZIC RC, CTG, others
• Annual Reports – ANZPIC, CCR Survey
• KPI development program
  – ICCMU, and ICNARC
• Geographical Mapping
• Registry Linkage
Glucose control

- Glucose
  - Addition of High & Low Glucose values to export file
- Assessment of glucose control for baseline comparison of van den Berghe study

Mean of highest and lowest glucose in first 24 hours of ICU admission by site

ANZICS CORE Management Committee
Glucose control by Sector

APD submitted glucose
Worst in first 24 hours

<table>
<thead>
<tr>
<th>Year</th>
<th>Private</th>
<th>Regional</th>
<th>Metropolitan</th>
<th>Tertiary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>8.00</td>
<td>8.50</td>
<td>9.00</td>
<td>9.50</td>
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<td>2000</td>
<td>10.00</td>
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<td>2001</td>
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<tr>
<td>2004</td>
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</tbody>
</table>
# Effect of After Hours ICU Discharge

<table>
<thead>
<tr>
<th>ICU discharge shift</th>
<th>D: 0700-1400</th>
<th>E: 1400-2200</th>
<th>N: 2200-0700</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (% ICU-survivors)</td>
<td>4671 (41%)</td>
<td>5579 (49%)</td>
<td>1077 (10%)</td>
<td>&lt;0.01*</td>
</tr>
<tr>
<td>Crude mortality (%)</td>
<td>192 (4.1%)</td>
<td>377 (6.8%)</td>
<td>67 (6.2%)</td>
<td>&lt;0.0001#</td>
</tr>
<tr>
<td>APACHE III-J SMR Median (95% CI)</td>
<td>0.80 (0.64-1.16)</td>
<td>0.84 (0.63-1.08)</td>
<td>1.38 (0.89-1.96)</td>
<td>&lt;0.001*</td>
</tr>
</tbody>
</table>

*N compared to D and E. # D compared to E and N

References.
Risk Adjusted Mortality

Number of Patients and Risk Adjusted Mortality

Dr D Pilcher, CORE
ICU Hour of Discharge

Figure 15: Time of discharge from ICU for each public hospital

Victorian Data Review Committee
ANZICS CORE Management Committee
Readmission to ICU

- 3.3% to 19.5%, depending on the case mix and location of the intensive care unit.
- Increase in mortality associated with readmission.
  - Two to almost ten-fold.
  - Hospital and ICU length of stays are also longer and associated with higher in-hospital cost.
- Higher readmission rate in patients initially admitted from general wards.
- Non-operative patients have also been shown to have higher readmission rates than operative patients.
Victorian ICU Patient Age Distribution

Figure 2: Mean age of patients at time of ICU admission by financial year

Figure 3: Percentage of admissions in each different age group for all Victorian public hospital admissions to ICU during 2002-03
Hospital Mortality After ICU vs Age (Vic)

Figure 9: Mortality rate by age group

<table>
<thead>
<tr>
<th>Age group</th>
<th>% mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;70</td>
<td>10.2%</td>
</tr>
<tr>
<td>71-80</td>
<td>13.4%</td>
</tr>
<tr>
<td>81-90</td>
<td>22.8%</td>
</tr>
<tr>
<td>&gt;91</td>
<td>30.8%</td>
</tr>
</tbody>
</table>
Asthma Outcomes over 8 years

Observed Mortality Compared to Predicted Mortality (using APACHE II score)

Log Percent Mortality

100%
10%
1%
0%

Year

APACHE II Predicted Mortality
95% Confidence Interval for Predicted Mortality
Observed Mortality

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(for the ANZICS Database Management Committee) – submitted Chest 2006
3rd International Conference on Safety, Quality, Audit & Outcomes Research in Intensive Care 2009