20 Years of ICU Outcomes in the UK

Dr Andrew Norton, FRCA, FFICM, DEAA
Consultant in Anaesthesia and Intensive Care Medicine
Pilgrim Hospital, Boston, UK

Objectives

• A personal view of longstanding participation in a major national audit
• Outline the structure, organisation and process of ICU audit and evaluation in the UK
• Present some national and local results
• Benefits and disadvantages of involvement
• Not covering areas such as collaborative research, Intensive Care Funding

Pilgrim Hospital
Pilgrim Hospital ICU

- 12 bed general adult intensive care unit
- New facility opened January 2012
- Electronic medical records live from 2013
- Paperless environment – all orders, documentations, tests, imaging are electronic
- Only exception is printed discharge summary when patients leave
- Pilgrim Hospital is part of United Lincolnshire Hospitals NHS Trust:
  - Boston

South East Lincolnshire

South East Lincolnshire

Ingoldmells

More caravans (mobile homes) per square metre than anywhere else on the planet!!
The Boston Stump

Largest parish church in England and a 14th Century Lighthouse

Guildhall Museum

In 1607 Pilgrim Fathers briefly imprisoned here before being bailed, then escaping to Holland and subsequently sailing to the New World 12 years later.

The ICNARC Case Mix Program

• Centre
• The Case Mix Programme (CMP) – examines and reports on adult critical care unit outcomes
• 99% of Intensive Care Units currently participate (in England, Wales & Northern Ireland) – 100% reached in 2015
• 2015 - All ICU’s required to participate by regulator (CQC - Care Quality Commission)
• Currently 1.8 million patient episodes in the database
• Serves multiple research studies
• CMP Annual quality report – comparison of risk adjusted mortality and key quality indicators
Origins of ICNARC

- UK Intensive Care Society studies of applicability and accuracy of APACHE II (and other models such as MPM) to UK Intensive Care patient cohorts
- Higher mean APACHE scores in UK and Canadian patient cohorts than US Intensive Care Units
- US APACHE II equation did not fit UK/Ireland data well
- Predictive accuracy 75-80% in these cohorts

Milestones

- 1991 – original proposal for comparative audit and evaluation of Intensive care outcomes in the UK
- 1993 – Initial government funding (2 years) obtained
- 1994 – ICNARC Case Mix Program (CMP) established
- 1995 – First group of ICU’s join CMP
  - (Pilgrim Hospital joined CMP in 1996)

Milestones (II)

- 1999 – Grant obtained to develop model for optimal case mix and outcome in UK ICU’s
- 2002 – PAC Man trial - first non commercial multicentre ICU randomised controlled trial
- 2006 – 500,000 patients in CMP database (9yrs)
- 2007 – ICNARC prediction model published *
- 2011 – 1,000,000 patients in CMP database (5yrs)
- 2012 – Clinical Trials Unit awarded full accreditation by UKCRC
- 2014 -1,500,000 patients in CMP database (3yrs)

* 2007;35(4):1091-1098
ICNARC organisation

- Charity registered with the UK Charity Commission, also a limited company.
- Initial government funding
- Since 2000, funded principally by ICU subscriptions and Research grants
- Annual cost to Pilgrim ICU £6k ($10k)
- 2014 – 37 staff, Income and Expenditure approx £2.8m ($4.3m)

The ICNARC data process

- Unit collects data on all admitted patients
- Quarterly secure online data submission (XML file format)
- ICNARC validation checks
- DVR’s (data validation reports) to units
- Comparison and analysis with other units
- Quarterly Data Analysis Reports supplied to Unit

Data Collection

- Data Collection Manual – 140 data items
- Precisely defined rule based data
- Data collection systems
- Progress over time from Access to dedicated software with local reporting
- Currently validating automatic data collection from ICU information system
ICNARC Coding Method

- 5 level poly heirarchical system
- 1. Surgical / non surgical
- 2. System
- 3. Anatomical site
- 4. Process
  - 4 diagnostic fields allowed
    - Primary & Secondary reason for admission.
- 5. Past Medical History.
- 6. Ultimate primary diagnosis

Code groups have a weighting coefficient in outcome prediction model.
ICNARC reporting

- quarterly reports
- Initially large folio of paper reports
- Recent years – all electronic – published as pdf files
- Detailed unit report is titled “Quality Indicators and Outcomes”
- Open public reporting was commenced in 2010
- “Annual Quality report” is the public reporting tool
- National comparative data published on website

Public domain data

Public domain mortality data (ICNARC model) for United Lincolnshire Hospitals 2011/12

Open access reporting tool on ICNARC website – can compare from national to individual hospitals, including critical care networks and regional health authorities
ICNARC report files

Content of Unit Reports

• Data validation and completeness
• Mortality, crude and adjusted
• Mortality ratios based on APACHE and ICNARC prediction models
• Patient group outcomes (sepsis, pneumonia, surgical emergencies)
• Process of care
• Identification of cases for local audit
Trends in timely patient discharge

Data displayed if for 2015 Q2
To allow for improvement in mortality over time, risk prediction models are regularly recalibrated.
Peer group mortality comparison

Suggested cases for clinical review

Problems with ICNARC

• Labour intensive
• Delay in reporting
• Criticism of timeliness and relevance
• Mortality always draws most attention
• Relative lack of morbidity data
• Tracks and updates for ultimate hospital discharge, but not longer term outcomes
• Drawing conclusions from the mortality data can be difficult, multifactorial and contentious
Advantages

• Continuous monitoring
• Meeting regulatory requirements
• National and peer group comparison
• Public confidence and reputation
• Useful for identifying issues and supporting continuous quality improvement

Conclusions

• We have for many years been convinced of the advantages
• Provides public, commissioner and regulatory confidence in Pilgrim Hospital’s ICU service
• The cost and data collection burden are proportionate and good value for the benefits

Thank you