Appendix 5: Support Projects

This chapter provides summaries of the three support projects that were undertaken in parallel with the National Indicators Project. The first was an analysis of OECD patient safety indicators to establish their suitability for national and international reporting using Australian data. The second study examined the feasibility of developing national indicators for in-hospital mortality which are calculated using data extracted from the NHMD. The third study provided further detail on the subset of the national indicators which relate to primary health care to inform the consultation process.

OECD patient safety indicators

The AIHW has analysed 15 indicators of patient safety proposed by the Organisation for Economic Cooperation and Development (OECD) for international reporting (Drösler 1998). The OECD methodology was examined using Australian data and its suitability for national and international reporting on patient safety was assessed.

The OECD began the Health Care Quality Indicators project in 2001 to assist it to investigate differences in the quality of health care across countries. Patient safety was one of five priority areas, the others being cardiac care, diabetes mellitus, mental health and health promotion, prevention and primary care.

The OECD piloted 15 indicators of patient safety to be used for international comparison in several countries including Australia. The indicators and their assessed suitability for reporting at a national and international level are set out in Table A5.1 (on next page).

The evaluation covered the period from 2003–04 to 2005–06. It covered all 15 indicators except one (iatrogenic pneumothorax) which could not be evaluated because it could not be calculated using Australian data.

Three of the remaining 14 indicators (transfusion reaction, foreign body left in during procedure, and Obstetric trauma – caesarean section) were considered unsuitable for reporting within Australia because the rate of adverse events being measured were too small for the indicator to be useful in monitoring national trends. It was, nevertheless, recommended that these three indicators be retained for international comparisons.

As part of the assessment, values for the indicator were calculated for the public and private hospital sectors and between groupings of similar types of hospitals within the public hospital system (peer groups). For most indicators, these calculated values were different for the two sectors and for the peer groups – for some, markedly different. Typically, the rates were higher for the public hospital sector than for the private sector. Case mix complexity is likely to have contributed to these differences. Different patterns of length of stay in hospitals may also have been contributing factors for some indicators. Consequently, caution needs to be exercised in using these indicators for comparisons between sectors or between the peer groups of public hospitals.

A total of 4 of the 14 OECD patient safety indicators have been incorporated in the recommended national set of safety and quality indicators outlined in this report. These are:

- Birth trauma – injury to neonate
- Accidental puncture/ laceration (technical difficulty with procedure)

- Post operative pulmonary emobolism (PE) or deep vein thrombosis (DVT)
- Decubitus ulcer

Table A5.1: Patient safety indicators and applicability for national and international reporting

Indicator	International Reporting	National Reporting
Infection due to medical care	Yes	Yes
Decubitus ulcer	Yes	Yes
Complications of anaesthesia	Yes	Yes
Postoperative hip fracture	Yes	Yes
Postoperative pulmonary embolism or deep vein thrombosis	Yes	Yes
Postoperative sepsis	Yes	Yes
Technical difficulty with procedure	Yes	Yes
Postoperative respiratory failure	Yes	Yes
Iatrogenic pneumothorax	No	No
Transfusion reaction	Yes	No
Foreign body left in during procedure	Yes	No
Birth trauma – injury to neonate	Yes	Yes
Obstetric trauma – vaginal delivery with instrument	Yes	Yes
Obstetric trauma – vaginal delivery without instrument	Yes	Yes
Obstetric trauma – caesarean section	Yes	No

Measuring and reporting mortality

The study examined the feasibility of developing national indicators for in-hospital mortality which are calculated using data extracted from the NHMD. It was designed to support the selection of national indicators.

The study had two components:

- a literature review focussing on methods for analysing and reporting in-hospital mortality
- a modelling project aimed at identifying national indicators of hospital mortality that could be implemented now, and in the future.

Literature review

The methods used to measure in-hospital mortality have been widely discussed in the literature. There is an emerging international consensus on a measure (the risk-adjusted Hospital Standardised Mortality Ratio, (HSMR)), on factors to be included in risk-adjustment models, on modelling methods, and on types of cases to exclude (for example, palliative care cases). The measures could be developed using administrative data. In-hospital mortality rates are now reported regularly and publicly in several countries or jurisdictions within countries (United Kingdom, The Netherlands, Canada, and Queensland, Australia). Three

main methods for presenting in-hospital mortality data are used: tables, caterpillar plots and funnel plots. Longitudinal analysis of in-hospital mortality is an emerging and powerful new theme in the literature.

Analysis

Data from the Australian NHMD were analysed. Cross-sectional analysis used one year of hospital separations data. A method used in Canada, England and the Netherlands was applied (called the Risk-Adjusted Canadian referred Mortality (RACM) model). Logistic regression modelling of in-hospital mortality, including principal diagnosis, age, sex, co-morbidity, length of stay, admission status and transfer status as covariates, allows the expected mortality to be derived. This is compared with observed deaths to calculate risk-adjusted HSMRs. This method was used for most of the analysis undertaken. Tests of model discrimination and explanatory power were performed. The hospital peer group classification developed by the AIHW was used to group hospitals for comparisons.

HSMR analysis was conducted on three groups of cases, which exemplify types of general purpose indicators of in–hospital mortality:

1. High-risk cases (less than 20% of cases including 80% of in-hospital deaths),
2. Lower risk cases (all other in-scope cases)
3. All cases and all in-hospital deaths.

Longitudinal analysis was done using three years of data. This was a two step process. The first was to calculate risk-adjusted HSMRs in a similar way to the cross sectional analysis. The second step was two-stage multi-level logistic regression.

Results

The overall results obtained are similar to those reported in the international literature. The model demonstrated good discrimination (the large size of the dataset contributes to this). Some differences in the strength of the model were apparent when applied to the three mortality groups (80%, 20% and 100%) with discriminatory power stronger for the 20% and 100% groups.

Single year analysis (2005–06)

The single year analysis resulted in the production of summary HSMRs and confidence intervals by peer group. Three methods of presentation findings are demonstrated in the report; HSMR ranked tables, funnel plots and caterpillar plots.

Longitudinal analysis (2004–05 to 2006–07)

Most of the variation in risk-adjusted HSMRs was between different hospitals, much less of it being between repeated measurements for the same hospital. The lack, on the whole, of large variation between measures of adjusted HSMR for the same hospital suggests that values are largely reflecting the phenomenon of interest, and are not dominated by 'noise' in the data. This is less true for peer groups of small hospitals.

The results presented for the longitudinal analysis demonstrate a modest decline in overall risk-adjusted mortality during the three year period. This is similar to the findings of a recent Dutch study using the same method. While replication of analysis and refinement of the method used should be undertaken before too much weight is placed on this finding, the possibility remains that it is a true decline. If so, perhaps an increased emphasis on hospital safety in recent years is beginning to have a demonstrable effect on in-hospital mortality.

Conclusions

Indicators of in-hospital mortality could be produced using NHMD data. Indicators based on the three mortality groups specified above were produced for different hospitals and hospital peer groups.

It is recommended that the indicators be used as screening tools. Variations in hospital mortality per se do not necessarily reflect differences in the levels of safety or quality. However, they could signal a potential problem for which further investigation is required.

The analysis could be extended to include deaths up to 30 days after discharge after discharge from hospital. To do this, data matching would be required between the NHMD and the National Death Index. It would also be necessary to undertake data linkage of inpatient data by person, which require data linkage of hospital separations. Currently, this is not available nationally but can be undertaken in some states. The lack of an institution identifier for many private hospitals prevented analysis of this sector.

Emerging data developments (national coding of conditions 'present on admission', and extension of health data linkage) and analytical innovations (for example, use of Bayesian regression, especially for data from small hospital) are likely to improve results.

Primary care

This report was a supplement to the Towards National Indicators of Safety and Quality in Health Care discussion paper which provided further detail on the proposed national indicators relating to primary health care to inform consultation.

Chapter 2 provided a survey of indicators of safety and quality in primary health and the organisations involved, both locally and internationally. The coverage of the indicators across the safety and quality domains and primary health care settings was assessed.

In addition, brief discussion of current work relevant to safety and quality in primary health care in Australia was included, such as the Royal Australian College of General practitioners quality framework and accreditation standards.

Chapter 3 presented a review of Australian data sources which could potentially be used to report on the subset of indicators proposed in the discussion paper which related to primary health care.

Chapter 4 provided a more detailed discussion of the proposed primary care indicators, which was designed to augment rather than replace the indicator summaries included in the discussion paper. This included information on the use of the indicator (both locally and internationally), data sources and data quality, issues with the interpretation of the indicator and developments which could improve reporting for each indicator.

Chapter 5 provided examples of the different methods used to disaggregate and present indicators to provide information about specific population or provider groups.

Finally, Chapter 6 used readily available data for a selection of the primary health care safety and quality indicators to demonstrate how these can be reported.