

# Queensland Audit of Surgical Mortality

## **2007–2015 Report**



ROYAL AUSTRALASIAN  
COLLEGE OF SURGEONS



Queensland  
Government

**QASM**  
Queensland Audit of Surgical Mortality

**ANZASM**  
Australian and New Zealand  
Audit of Surgical Mortality

A stylized map of Australia and New Zealand, with the text 'ANZASM' overlaid on the map.

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This Report has been prepared by the Royal Australasian College of Surgeons Queensland Audit of Surgical Mortality Management Committee. This is a declared quality improvement committee under the Hospital and Health Boards Act 2011 and the Regulation 2012.

The Australian and New Zealand Audit of Surgical Mortality, including the Queensland Audit of Surgical Mortality also has protection under the Commonwealth Qualified Privilege Scheme. It is covered under Part VC of the Health Insurance Act 1973 (Gazetted 23 August 2011).

# CONTENTS

|   |           |  |           |
|---|-----------|--|-----------|
| <b>TABLES</b>   | <b>5</b>  | <b>QASM SURGEONS 2007-2015</b>               | <b>17</b> |
| <b>FIGURES</b>  | <b>5</b>  | Surgeon participation in Fellows' Interface  | 17        |
| <b>QASM CLINICAL DIRECTOR'S REPORT 2007-2015</b>                          | <b>6</b>  | Surgical case forms                          | 17        |
| <b>SHORTENED FORMS</b>  | <b>7</b>  | Operations                                   | 17        |
| <b>QUEENSLAND AUDIT OF SURGICAL MORTALITY EXECUTIVE SUMMARY 2007-2015</b> | <b>8</b>  | Different actions                            | 18        |
| Clinical incidents  | 8         | Second-line assessments                      | 19        |
| Audit participation   | 8         | <b>QASM HOSPITALS 2015</b>                   | <b>20</b> |
| <b>QASM INTRODUCTION 2007-2015</b>  | <b>9</b>  | Participation                                | 20        |
| Background  | 9         | Types of hospitals and predictions of death  | 20        |
| Audit governance  | 9         | Transfers                                    | 21        |
| <b>QASM EDUCATION ACTIVITIES FOR SURGEONS 2007-2015</b>                   | <b>10</b> | Hospital admissions                          | 21        |
| <b>QASM METHODOLOGY 2007-2015</b>   | <b>11</b> | Timing of operations                         | 21        |
| Audit inclusion and exclusion criteria                                    | 11        | Delays in main surgical diagnosis            | 21        |
| Audit process   | 11        | Surgical cases and operations                | 22        |
| Audit provision of feedback   | 11        | Surgical cases with no operations            | 22        |
| <b>DATA MANAGEMENT</b>  | <b>13</b> | Time in hospital before death                | 23        |
| Data analysis   | 13        | Assessors' concerns with management          | 23        |
| Data cleaning   | 13        | Critical Care Units                          | 23        |
| <b>RESULTS FROM DATA ANALYSIS</b>   | <b>14</b> | Medical records                              | 24        |
| QASM clinical incidents 2007-2015   | 14        | Postoperative complications                  | 24        |
| Preventability of clinical incidents                                      | 14        | Postoperative Septicaemia                    | 25        |
| Associations of preventable clinical incidents                            | 15        | Unplanned return to theatre                  | 25        |
| Clinical incidents and types of hospitals                                 | 16        | Fluid Balance                                | 25        |
| Elective cases and clinical incidents 2007-2015                           | 16        | Deep vein thrombosis prophylaxis             | 26        |
| Comparison of surgeons' and assessors' reporting of clinical incidents    | 16        | No DVT Prophylaxis                           | 26        |
|   |           | Risk of death before operation               | 27        |
|   |           | Management of surgical patients              | 27        |
|   |           | <b>QASM PATIENTS 2007-2015</b>               | <b>28</b> |
|   |           | Age distribution                             | 28        |
|   |           | American Society of Anaesthetologists grades | 29        |
|   |           | Deaths associated with anaesthesia           | 29        |
|   |           | Malignancy                                   | 30        |
|   |           | Comorbidities                                | 30        |
|   |           | Infections                                   | 30        |
|   |           | Elective patients                            | 31        |

---

|  |           |
|--|-----------|
| <b>QASM SPECIAL REPORTS</b>  | <b>32</b> |
| Report on obstetrics and gynaecology surgical patients who died 2012 to 2015 financial years         | 32        |
| Report on the surgical care of aboriginal and torres strait islander persons in queensland 2014-2015 | 32        |
| Report on falls (2012-2015)  | 34        |
| Report on domestic violence  | 34        |
| QASM recommendations from previous reports   | 35        |

---

|  |           |
|--|-----------|
| <b>QASM RECOMMENDATIONS FOR IMPROVED SURGICAL CARE IN QUEENSLAND</b> | <b>36</b> |
|--|-----------|

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|   |           |
|---|-----------|
| <b>QASM AUDIT LIMITATIONS 2007-2015</b> | <b>37</b> |
|---|-----------|

---

|   |           |
|---|-----------|
| <b>QASM APPENDICES 2007-2015</b>  | <b>38</b> |
| Appendix 1: Surgical specialties  | 38        |
| Appendix 2: Postoperative complications by specialty  | 39        |
| Appendix 3: When surgeons are asked; "In retrospect, would you have done anything differently?" | 39        |
| Appendix 4: Hospitals participating in QASM   | 40        |
| Appendix 5: QASM seminars   | 41        |
| Appendix 6: <i>Lessons from the Audit – titles and themes</i>                                   | 41        |
| Appendix 7: QASM presentations 2012-2015  | 42        |
| Appendix 8: QASM publications   | 43        |

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|                        |           |
|------------------------|-----------|
| <b>QASM REFERENCES</b> | <b>43</b> |
|------------------------|-----------|

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|                                   |           |
|-----------------------------------|-----------|
| <b>QASM ACKNOWLEDGMENTS</b>       | <b>44</b> |
| QASM Steering Committee 2014/2015 | 44        |
| QASM Staff 2014/2015              | 44        |

# TABLES

|  |    |   |    |
|--|----|---|----|
| <b>Table 1:</b> Most frequent clinical incidents by group  | 14 | <b>Table 10:</b> Unplanned returns to theatre by financial year (2007-2015) (n=5,968)   | 25 |
| <b>Table 2:</b> Elective cases with clinical incidents by financial year   | 16 | <b>Table 11:</b> Fluid balance issues by financial year (n=5,952, missing = 346 cases)  | 25 |
| <b>Table 3:</b> Consultants performing the operation by specialty across all hospitals (2007-2015) (n=4,858 patients and 6,298 operations) | 18 | <b>Table 12:</b> Anaesthetic-related deaths by year   | 30 |
| <b>Table 4:</b> Second-line assessments referred by financial year   | 19 | <b>Table 13:</b> Percentage of patients who had a clinically significant infection at death (2011-2015) (n=3,236)   | 30 |
| <b>Table 5:</b> Comparison of patients from public, private and co-location hospitals (n=6,298)  | 20 | <b>Table 14:</b> Length of stay in hospital in days by infection status (2011-2015) (n=3,799)   | 31 |
| <b>Table 6:</b> Proportion of QASM surgical patients transferred by year (2007-2015) (n=6,180)   | 21 | <b>Table 15:</b> Comparison of patients' characteristics by emergent status (2007-2015) (n=6,472, missing = 66)   | 31 |
| <b>Table 7:</b> Delays in surgical diagnoses by year 2007 to 2015 (n=6,213)  | 21 | <b>Table 16:</b> Distribution of Aboriginal and Torres Strait Islander surgical patients by hospital (2014- 2015) (n=110)   | 32 |
| <b>Table 8:</b> Length of stay by year: median and IQR   | 23 | <b>Table 17:</b> Comparison of management issues seen in Aboriginal and Torres Strait Islander patients compared with non-Indigenous patients (2012-2015) (n=110) | 33 |
| <b>Table 9:</b> Management issues noted by second-line assessors (2007-2015)   | 23 |   |    |

# FIGURES

|   |    |  |    |
|---|----|--|----|
| <b>Figure 1:</b> QASM governance structure  | 9  | <b>Figure 14:</b> Distribution of risk of death before operation as perceived by surgeons, 2007-2015 (n=4,773, missing = 80 cases)                             | 27 |
| <b>Figure 2:</b> Trend in all clinical incidents by year (n=6,648)  | 14 | <b>Figure 15:</b> Surgeons' opinions of the percentage of patients who could have had improved preoperative care by year (n=4,834, missing = 90 cases)         | 27 |
| <b>Figure 3:</b> Percentage of preventable serious clinical incidents by year   | 15 | <b>Figure 16:</b> Number of all QASM cases by financial year (n=7,681)   | 28 |
| <b>Figure 4:</b> Duration of operations in hours as percentages of all operations (2007-2015) (n=3,917)   | 18 | <b>Figure 17:</b> Age distribution of patients (2007-2015) (n=7,550, 1 age missing)  | 28 |
| <b>Figure 5:</b> Percentage of surgical patients having operations by year (2007-2015) (n=6,298)  | 22 | <b>Figure 18:</b> Proportion of QASM patients aged 70 years or older (2007-2015) (n=7,550)   | 28 |
| <b>Figure 6:</b> Percentage of cases that would have benefited from ICU or HDU care but did not receive it, according to assessors, by year (n=4,338) | 23 | <b>Figure 19:</b> ASA grade distribution of QASM patients (2007-2015) (n=6,251, missing = 266)   | 29 |
| <b>Figure 7:</b> State of record keeping of case summaries to general practitioners, as reviewed by second-line assessors (n=740)                     | 24 | <b>Figure 20:</b> Prevalence of comorbidities in QASM patients (n=6,118)   | 30 |
| <b>Figure 8:</b> Postoperative complications by type (n=4797, missing data = 55)  | 24 | <b>Figure 21:</b> Percentage of cases in which the patient acquired an infection during the last admission (2011-2015) (n=3,758)                               | 31 |
| <b>Figure 9:</b> Percentage of cases with postoperative complications by year   | 24 | <b>Figure 22:</b> Percentage of infected cases in which the surgeon considered that the antibiotic course was appropriate (2011-2015) (n=3,620, missing = 224) | 31 |
| <b>Figure 10:</b> Percentages of procedure-related septicaemia cases by year (n=1,542, missing = 59 cases)  | 25 | <b>Figure 23:</b> Distribution of American Society of Anesthesiologists (ASA) grades of Aboriginal and Torres Strait Islander patients (2014-2015) (n=110)     | 33 |
| <b>Figure 11:</b> Percentage of cases with deep vein thrombosis prophylaxis by financial year (n=4,662, missing = 55 cases)                           | 26 | <b>Figure 24:</b> Distribution of sites of falls (n=807)   | 34 |
| <b>Figure 12:</b> Distribution of types of Deep Vein Thrombosis prophylaxis for 2007-2008 to 2014-2015 (n=4,662, missing = 55 cases)                  | 26 |  |    |
| <b>Figure 13:</b> Distribution of reasons for the non-provision of DVT prophylaxis in operated patients, 2007-2015 (n=794, missing data = 7 cases)    | 26 |  |    |

# CLINICAL DIRECTOR'S REPORT 2007-2015

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As Clinical Director of the Queensland Audit of Surgical Mortality (QASM), I must thank the QASM team who, as faithful staff members, have persistently committed themselves to the audit process.

Our aim has been to collect the data, interrogate the data and through publishing, presentation and various other modalities, learn from the data. We trust that QASM has made this learning process easier for all who consider the data and outcomes of surgical process in Queensland, in both private and public hospital facilities.

The audit process is a dynamic team-based activity involving all surgeons and all hospitals in Queensland. We believe that all health professionals can benefit through the acquisition of knowledge, improvement of skills and in consideration regarding resources. The data confirms that teamwork in the diagnostic process is critical. Healthcare providers, healthcare administrators and healthcare funders must facilitate this teamwork. Communication and collaboration between all medical specialities in delivering high-quality and safe healthcare is a critical part of the audit recommendation.

The QASM believes that education will be critical for improving performance, not only in the diagnostic process, but in clinical reasoning, teamwork and communication with patients, their families and other healthcare professionals.

From QASM data (2007 - 2015), we can note an overall downward trend in serious clinical incidents. The proportion of cases that required high levels of care and did not receive it has also steadily declined. .

Several interesting facts from this report are provided below.

- ▶ In general surgical patients with delays in diagnoses, the most frequent cause of delay was misinterpretation of the results (30.7%; 79/257).
- ▶ In postoperative patients with complications, 11.0% (201/1,827) suffered procedure-related septicaemia.
- ▶ One-quarter (198/813) of all the QASM patients were treated in private hospitals in 2014/2015.

I would ask you to consider carefully, as you read this report, the importance of surgical input into the data set and I would thank the surgeons for their continuing support of and completion of surgical case forms (SCFs). I would also thank the assessors for their comprehensive support of this process.

May I continue to suggest this is a learning process through a peer-reviewed, de-identified activity that will allow improved safety and quality in the surgical care we deliver to patients over the coming years.

**Dr John North**  
**Clinical Director, QASM**

## SHORTENED FORMS

|        |  |
|--------|--|
| ACTASM | Australian Capital Territory Audit of Surgical Mortality       |
| AMDIG  | Australasian Mortality Data Interest Group                     |
| ANZASM | Australian and New Zealand Audits of Surgical Mortality        |
| ASA    | American Society of Anesthesiologists                          |
| ASC    | Annual Scientific Congress                                     |
| ACS    | American College of Surgeons                                   |
| ASM    | Annual Scientific Meeting                                      |
| CHASM  | Collaborating Hospitals Audit of Surgical Mortality            |
| CI     | confidence interval  |
| CPD    | continuing professional development                            |
| DOMSAC | Directors of Medical Services Advisory Committee               |
| DVT    | deep vein thrombosis   |
| HDU    | high dependency unit   |
| ICU    | intensive care unit  |
| IQR    | interquartile range – the range for the middle 50% in a series |
| NHS    | National Health Service  |
| NSQIP  | National Surgical Quality Improvement Program (US)             |

|        |   |
|--------|---|
| NTASM  | Northern Territory Audit of Surgical Mortality                        |
| O&G    | obstetrics and gynaecology  |
| QASM   | Queensland Audit of Surgical Mortality                                |
| QLD    | Queensland  |
| RACS   | Royal Australasian College of Surgeons                                |
| RBWH   | Royal Brisbane and Women's Hospital                                   |
| RR     | risk ratio  |
| SAAPM  | South Australian Audit of Perioperative Mortality                     |
| SASM   | Scottish Audit of Surgical Mortality                                  |
| SCF    | surgical case form  |
| SET    | surgical educating and training                                       |
| SPSS   | Statistical Package for Social Sciences                               |
| STAIRS | Surgical training in acute illness or injury recognition for students |
| TASM   | Tasmanian Audit of Surgical Mortality                                 |
| VASM   | Victorian Audit of Surgical Mortality                                 |
| WAASM  | Western Australian Audit of Surgical Mortality                        |

# QUEENSLAND AUDIT OF SURGICAL MORTALITY EXECUTIVE SUMMARY 2007-2015

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## CLINICAL INCIDENTS

- ▶ There has been a downward trend in serious clinical incidents in Queensland (see definitions: page 11).
- ▶ A clinical incident occurred in 9.4% (591/6,298) of surgical patients who died between 2007 and 2015.
- ▶ Two-thirds of clinical incidents were considered preventable.
- ▶ Emergency patients, compared with elective patients, had lower rates of preventable serious clinical incidents. A serious clinical incident is an area of concern or an adverse event.

## AUDIT PARTICIPATION

- ▶ All hospitals and all surgeons in Queensland are participating in QASM.
- ▶ At the date of census in 2015 the following data was noted:
  - 7,551 deaths reported to QASM.
  - 6,298 surgical cases closed.\*
  - 96.7% of SCFs returned for the entire audit period.(\*This does not include those cases waiting for surgical case forms, first-line assessment forms, second-line assessment forms, excluded cases (terminal care or error), lost to follow up, or surgical case rejected.)
- ▶ 30 public hospitals (100%) and 36 private hospitals (100%) where surgery is performed in Queensland participate in QASM.
- ▶ Patients from private hospitals comprised 24.4% of audit patients in 2014/2015 (198/813).
- ▶ The proportion of cases in which the patient needed high levels of care, but did not receive it, has steadily declined.
- ▶ Elective patients, compared with emergency patients, had longer hospital stays and a higher rate of unplanned readmissions to hospital. There were also a higher proportion of elective cases with postoperative complications.

# QASM INTRODUCTION 2007-2015

## KEY POINTS

- ▶ The QASM is an external, independent peer-reviewed audit of the process of care associated with all surgically-related deaths in Queensland.
- ▶ This report covers the period 1 July 2007 to 31 June 2015.
- ▶ The QASM's main role is to inform, educate, facilitate change and improve quality of practice.

## BACKGROUND

Audit is an essential part of modern surgical quality control. The Queensland Audit of Surgical Mortality (QASM) is an external, independent peer-review audit of the process of care associated with surgically-related deaths in Queensland.

The Queensland Department of Health funds QASM. QASM's methodology is based on the Scottish Audit of Surgical Mortality (SASM). In 2005, the RACS formed the Australian and New Zealand Audits of Surgical Mortality (ANZASM). Its purpose was to extend the mortality audit to all states and territories.

The QASM started on 1 July 2007. All Australian states and territories are currently participating in the national audit: Western Australian Audit of Surgical Mortality (WAASM), Victorian Audit of Surgical Mortality (VASM), Northern Territory Audit of Surgical Mortality (NTASM), South Australian Audit of Perioperative Mortality (SAAPM), Tasmanian Audit of Surgical Mortality (TASM), New South Wales (Collaborating Hospitals Audit of Surgical Mortality), Australian Capital Territory Audit of Surgical Mortality (ACTASM) and QASM. The New South Wales audit is managed by the Clinical Excellence Commission and has representation on the ANZASM Steering Committee.

All states use the same methodology and data collection tools.

Information about each of these audits is available on the RACS website at [www.surgeons.org/for-health-professionals/audits-and-surgical-research/anzasm/](http://www.surgeons.org/for-health-professionals/audits-and-surgical-research/anzasm/)

## AUDIT GOVERNANCE

The audit governance structure is illustrated in Figure 1. The QASM has protection under both state and federal legislation. The QASM Steering Committee is registered under section 31 of the Health Services Act 1991 (QLD). It operates under the Hospital and Health Boards Act 2011 and Regulation 2012.

ANZASM has protection under the Commonwealth Qualified Privilege Scheme, under Part VC of the *Health Insurance Act 1973* (gazetted 6 November 2006).

In accordance with section 31 of the Health Services Act 1991 (QLD), RACS-QASM has been gazetted as an 'approved quality assurance committee'.

Section 62M of the Health Services Act 1991 and the Hospital and Health Boards Act 2011 with Regulation 2012 provide a specific exception to the s 62A statutory duty of confidentiality.

Figure 1: QASM governance structure



RACS: Royal Australasian College of Surgeons; QLD: Queensland; QASM: Queensland Audit of Surgical Mortality.

# QASM EDUCATION ACTIVITIES FOR SURGEONS 2007-2015

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Since its inception, the QASM has contributed strongly to the RACS education processes.

To date, the QASM has;

- ▶ reported 6,448 first-line assessments by assessors to surgeons
- ▶ reported 972 second-line assessments by assessors to surgeons
- ▶ published 16 volumes of *Lessons from the Audit*, containing over 150 case studies (see Appendix 6), for:
  - surgeons
  - trainees
  - international medical graduates
  - hospital administration departments
  - hospital departments of safety and quality through the Patient Safety Officers Network
  - hospital anaesthetics and emergency departments
  - hospital departments of medical records
  - hospital nurses distribution network
  - private hospitals via the Private Health Regulatory Unit
  - clinical networks
- ▶ published seven annual reports with extensive data relating to surgeons, hospitals and cases
- ▶ presented audit findings at a variety of meetings and conferences – conferences (see Appendix 7)
- ▶ registered all publications with Queensland State Library
- ▶ published seven papers in international peer-reviewed journals (see Appendix 8)

# QASM METHODOLOGY 2007-2015

## AUDIT INCLUSION AND EXCLUSION CRITERIA

The QASM includes all deaths that occurred in a participating hospital when:

- ▶ the patient was under the care of a surgeon (surgical admission) whether or not an operation was performed, or
- ▶ the patient was under the care of a physician (medical admission) and subsequently underwent a surgical procedure.

If a case does not fulfil either of the above-listed criteria, it is excluded from the audit by the notifying hospital. If the QASM is notified of a death and decides it does not fall within the inclusion criteria, the death is excluded.

Terminal care patients, who don't have an operation, are excluded from the full audit process.

The 2007-2015 report covers deaths reported to the QASM from 1 July 2007 to 31 June 2015, censored on 2 July 2015. Due to the nature of the audit some cases are still under review and those cases will be included in the next report.

## AUDIT PROCESS

The QASM is notified of in-hospital deaths directly via the surgical departments or the medical records departments of hospitals. All cases in which a surgeon was involved in the care of the patient are included in the audit.

The consultant surgeon associated with the case is sent a structured SCF for completion. The completed SCF is returned to the QASM where it is de-identified and then assessed by a first-line assessor. This will be a different surgeon but of the same specialty. The first-line assessor will either close the case, or recommend that the case undergo further assessment in the form of a second-line assessment (case note review).

Cases may be referred for a second-line assessment if:

- ▶ areas of concern or adverse events are thought to have occurred during clinical care that warrant further investigation
- ▶ there is insufficient information on the SCF for the assessor to come to a conclusion
- ▶ a report could usefully draw attention to lessons to be learned. This could be either for the clinicians involved in the case or for wider distribution.

Second-line assessors are different consultant surgeons from the same specialty as the surgeon associated with the case. The assessor works in a different hospital to that in which the death occurred. In the case of some specialties the second-line assessor is from a different state or territory.

## AUDIT PROVISION OF FEEDBACK

One of the main aims of the QASM is to provide feedback to inform, educate, facilitate change and improve practice.

Individual surgeons receive feedback on their cases from assessors.

The QASM provides feedback in the following ways.

1. All surgeons receive annual reports, newsletters, and *Lessons from the Audit*.
2. Hospitals receive reports on aggregated, de-identified data relating specifically to their hospitals in the form of a clinical governance report.
3. Annual reports are available on the QASM website at [http://www.surgeons.org/for-health-professionals/audits-and-surgical-research/anzasm/qasm/#Reports and publications](http://www.surgeons.org/for-health-professionals/audits-and-surgical-research/anzasm/qasm/#Reports%20and%20publications)
4. With the exception of reports provided to individual surgeons on their own cases, the data in all of the reports is aggregated and anonymous.
5. Individual surgeons can receive up-to-date reports on their cases and assessments from the Fellows' Interface, <https://asm.surgeons.org/mortaudit/>

The QASM is notified of surgical deaths in all hospitals and, in cases in which a surgeon was involved, the death is included in the audit. The QASM then sends a SCF to the surgeon for self-completion. Events are reported against the following criteria:

*area for consideration* – where the clinician believes an area of care could have been improved or different, but recognises that this may be debated

*area of concern* – where the clinician believes that an area of care should have been better

*adverse event* – an unintended 'event' caused by medical management, rather than the disease process. This event is sufficiently serious to contribute to or cause death. (Bosma, 2011).

A report on the impact of the incident on the outcome is included in the report. The incidents are categorised as follows:

- ▶ made no difference to the outcome
- ▶ may have contributed to death
- ▶ caused the death of a patient who would otherwise have been expected to survive.

A report on the preventability of the incident is also included, using the following categories:

- ▶ definitely preventable
- ▶ probably preventable
- ▶ probably not preventable
- ▶ definitely not preventable.

The report indicates who the assessor believes the incident or event was associated with:

- ▶ audited surgical team
- ▶ another clinical team
- ▶ hospital
- ▶ other.

First- and second-line assessors complete the same assessment matrix.

# DATA MANAGEMENT

Data obtained from the QASM forms is a rich source of information and provides a snapshot of surgical care in Queensland.

Data is entered and stored in a specifically designed database: the Bi-National Audits of Surgical Mortality. This database was written in Structured Query Language designed for managing data in a relational database management system. It stores data using secure encryption.

As well as storing data securely, it is able to support the creation of email, letters and reports. The system was prepared for the RACS by Alcidion Corporation, based in Adelaide. It is now managed by the RACS IT department.

The system employs a very high level of security to safeguard the data from unauthorised access.

Data is entered into the database by the audit staff or online by surgeons.

The QASM staff cleans the data using logic testing before analysis. Variables are checked for extreme or illogical values and corrections are made to the original data. Once cleaned, the data are downloaded again before analysis. Twenty-eight tables are downloaded in Excel and then uploaded into Statistical Package for Social Sciences (IBM-SPSS) version 19.0 for analysis. There is a key variable that is common to all tables that can be used to combine tables.

## DATA ANALYSIS

Data obtained from the QASM activities must be analysed professionally in order to generate accurate and up-to-date information.

In general, simple frequencies and cross tabulations are used to create the QASM reports. Graphs are produced using either SPSS or Excel.

Comparisons against baseline data (all surgical admissions) are possible with cooperation from the Queensland Department of Health statistics department.

When indicated, data are checked against the original SCFs and assessment forms. Medical records, surgeons and the coroner's office are resources used by the QASM to maintain data integrity.

Qualitative analysis is done using standard techniques. The project manager and clinical director independently classify all qualitative information into groups. These groupings are then compared and any differences are discussed until consensus is reached.

The QASM primarily focuses on areas of concern and adverse events. Data regarding areas for consideration are collected, but they are classified as less serious events, and have little impact on the overall care of the patient. Areas for consideration are generally excluded from the analysis because they are assessed as having made no difference to the patient's outcome.

In the following report the numbers in parentheses in the text (n) represent the number of cases analysed. As not all data points were completed, the total number of cases used in the analyses varies. Information on the total number of cases analysed is provided for all tables and figures in the report.

## DATA CLEANING

All QASM forms must have the data entry checked before any analysis can take place. The project manager and one of the project officers are qualified in medical terminology usage for checking.

Once the data have been cleaned, and logic testing has been performed, the data are downloaded for analysis. An investigation into the quality of data the QASM uses for analysis, showed that most errors were caused by:

- ▶ lack of information on forms
- ▶ incorrect coding for operations or surgical diagnoses
- ▶ inability to read writing for question 9: "Please describe the course to death"

Many data entry problems are eliminated by the use of the QASM online, which provides the original surgeon with complete control over the data being recorded for the case. Coding is still undertaken by the audit staff.

# RESULTS FROM DATA ANALYSIS

## KEY POINTS

There was an overall downward trend in the numbers of serious clinical incidents.

- ▶ 1 in 10 patients who died had a serious clinical incident.
- ▶ 2 in 3 clinical incidents were considered preventable.
- ▶ Emergency patients were less likely than elective patients to have serious clinical incidents.

## QASM CLINICAL INCIDENTS 2007-2015

There are about 200,000 surgical episodes of care in Queensland public hospitals each year. It is estimated that from 2007 to 2015 financial years there were 1,600,000 surgical admissions.

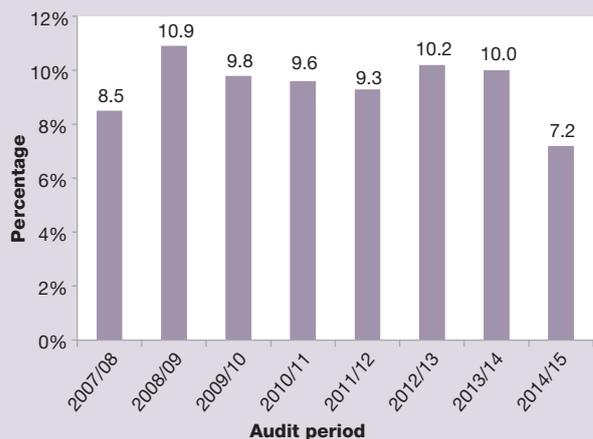
Serious clinical incidents are those that were classified as either an area of concern or adverse event. There were 591 cases with at least one clinical incident in the 6,298 cases audited, when preventability was not taken into account. This gives a clinical incidence rate of 9.4% in patients who died (591/6,298). The range of types of clinical incidents was wide, but the most frequent group of incidents was about assessment problems – see Table 1.

Table 1: Most frequent clinical incidents by group

| Incident                       |   |
|--------------------------------|---|
| <b>Assessment problems:</b>    | Decision to operate                     |
|                                | Delay to surgery                        |
|                                | Better to have done different operation |
|                                | Delay in diagnosis                      |
|                                | Assessment problems in general          |
|                                | Delay in transfer to tertiary hospital  |
| <b>Inappropriate staffing:</b> | Surgeon too junior                      |
| <b>Radiological:</b>           | Inadequate postoperative assessment     |
| <b>Communication:</b>          | Communication failures                  |
| <b>Transfer problems:</b>      | Transfer should not have occurred       |

There was an overall downward trend in clinical incidents in Queensland (see Figure 2). This is a very positive result and hopefully maintains its direction as more results come in for 2014/2015.

Figure 2: Percentage of clinical incidents by year (n=6,648)



Note: Although 89.1% of all eligible cases from 2014/2015 were closed by the end of 2015, 1.1% (n=14) of the cases for that year were awaiting second-line assessments and 3.0% (n=37) were awaiting first-line assessments. The remainder (6.8%) were SCF pending, SCF incomplete, FLA pending, FLA complete, FLA submitted and lost to follow up.

The proportion of cases with clinical incidents is comparable with that of SASM, in which clinical incidents were identified in 8% of deaths (McFarlane, 2009).

## PREVENTABILITY OF CLINICAL INCIDENTS

**Preventability** is an important consideration in the monitoring of serious clinical incidents. Assessors concluded that the majority of serious clinical incidents were preventable (56.7%; 842/1486).

There were 319 patients with preventable areas of concern and 118 patients with preventable adverse events over the eight years of the audit. Several cases had more than one preventable serious clinical incident.

*Areas of concern* encompass issues that are specific to surgical care and may relate to hospital or handling concerns. They are events or factors that are thought to be suboptimal and should have been improved. (Vogel, 2010)

Over a quarter of the preventable incidents (29.7%; 130/437 incidents) were related to **assessment** issues. These were most frequently:

- ▶ the decision to operate
- ▶ a delay in diagnosis
- ▶ better to have done different operation or procedure
- ▶ inadequate preoperative assessment.

The second-largest group of preventable incidents were associated with **suboptimal therapy** 18.1% (79/437). These were most frequently:

- ▶ unsatisfactory postoperative care
- ▶ unsatisfactory medical management
- ▶ unsatisfactory fluid balance control

The third-largest group of clinical incidents was the **delays** group. This group comprised 16.5% (72/437) of the total number of clinical incidents. These were most frequently:

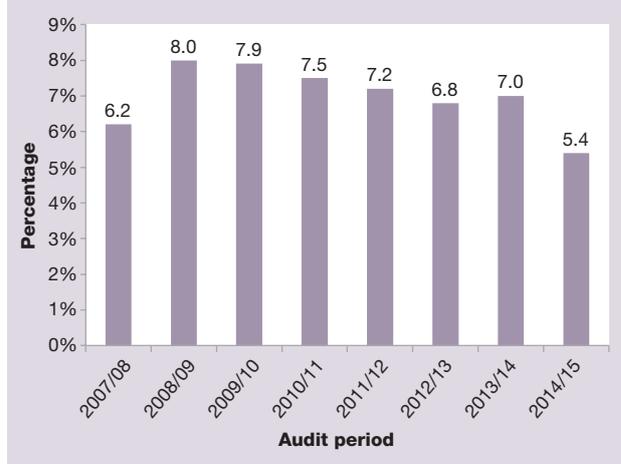
- ▶ delay to surgery
- ▶ delay in transfer to surgical unit
- ▶ delay in recognising complications.

Clinical incidents using READ codes are classified as one of the following five groups.

- ▶ Assessment problems
- ▶ Inappropriate staffing
- ▶ Radiological surgical – technical
- ▶ Communication failures
- ▶ Transfer problems

The numbers of preventable serious clinical incidents that occur in a year are taken as a surrogate marker of the level of surgical care for that year (see Figure 3).

**Figure 3: Percentage of preventable serious clinical incidents by year**



Note: Although 89.1% of all eligible cases from 2014/2015 were closed by the end of 2015, 1.1% (n=14) of the cases for that year were awaiting second-line assessments and 3.0% (n=37) were awaiting first-line assessments. The remainder (6.8%) were SCF pending, SCF incomplete, FLA pending, FLA complete, FLA submitted and lost to follow-up

There appears to be an overall downward trend by year in the percentage of preventable serious clinical incidents in QASM.

## ASSOCIATIONS OF PREVENTABLE CLINICAL INCIDENTS

Preventable serious clinical incidents were most frequently associated with:

- ▶ the surgical team (43.4%; 181/417)
- ▶ another clinical team (43.2%; 180/417)
- ▶ other associations (8.4%; 35/417)
- ▶ the hospital (5.0%; 21/417)

“Other” associations included:

- ▶ referring hospitals
- ▶ anaesthetics
- ▶ general practitioners
- ▶ ambulances
- ▶ ICUs
- ▶ retrieval services

## CLINICAL INCIDENTS AND TYPES OF HOSPITALS

The decision to operate was the most frequent preventable clinical incident in **private** hospitals according to assessors. It was associated with nearly one-third (29.7%; 30/101) of clinical incidents.

The decision to operate was also the most frequent issue in **public** hospitals, according to assessors, although the proportion of clinical incidents associated with this issue was lower (12.7%; 203/1,595).

In the **co-location** hospitals there were eight different issues that were each mentioned once by assessors:

- ▶ cardiac preoperative assessment inadequate
- ▶ drugs-related complication
- ▶ diagnosis-related complication
- ▶ delay in transfer to surgical unit
- ▶ delay to surgery
- ▶ incorrect therapy
- ▶ operation would have been better delayed
- ▶ postoperative fluid balance unsatisfactory

## ELECTIVE CASES AND CLINICAL INCIDENTS 2007-2015

Elective patients are an important proportion of surgical patients. They form 12.8% (826/6,473) of all QASM patients. The rest were emergency admissions. Of those elective patients there were differences in the rate of preventable clinical incidents compared with the emergency admissions, according to assessors. More elective patients had preventable clinical incidents than emergency patients.

The incidence of preventable serious clinical incidents was twice as high in elective patients (12.6%) compared with emergency patients (6.9%) (RR 1.82, 95% CI 1.49 to 2.22).

There were 825 closed elective surgical cases who died in the 8 years of the audit (see Table 2).

Of those cases involving an elective patient:

- ▶ 68 cases had at least one preventable area of concern
- ▶ 36 cases had at least one preventable adverse event

Table 2: Elective cases with clinical incidents by financial year

| Financial Year | Preventable areas of concern | Preventable adverse events | Percentage of elective cases with serious clinical incident |
|----------------|------------------------------|----------------------------|---|
| 2007/2008      | 5/78                         | 3/78                       | 8/78 (10.3%)  |
| 2008/2009      | 7/90                         | 8/90                       | 15/90 (16.7%)   |
| 2009/2010      | 12/96                        | 5/96                       | 17/96 (17.7%)   |
| 2010/2011      | 4/93                         | 4/93                       | 8/93 (8.6%)   |
| 2011/2012      | 4/84                         | 5/84                       | 9/84 (10.7%)  |
| 2012/2013      | 9/79                         | 2/79                       | 11/79 (13.9%)   |
| 2013/2014      | 21/193                       | 5/193                      | 26/193 (13.5%)  |
| 2014/2015      | 6/112                        | 4/112                      | 10/112 (8.9%)   |
| <b>Total</b>   | <b>68/825</b>                | <b>36/825</b>              | <b>104/825 (12.6%)</b>                                      |

The most common preventable clinical incidents in elective patients were similar to emergency patients. The most frequent preventable clinical incidents were:

- ▶ *the decision to operate (n=14)*
- ▶ *postoperative care was unsatisfactory (n=11)*
- ▶ *better to have done different operation or procedure (n=6).*

## COMPARISON OF SURGEONS' AND ASSESSORS' REPORTING OF CLINICAL INCIDENTS

Surgeons reported areas of consideration, concern or adverse events in 21.2% (1,337/6,298) of cases while assessors reported areas of consideration, concern or adverse events in 28.0% (1,765/6,298) of cases.

Surgeons were significantly less likely to report clinical incidents compared with the independent assessors (RR 0.76, 95% CI 0.71 to 0.80).

# QASM SURGEONS 2007-2015

## KEY POINTS

- ▶ All surgeons in Queensland are participating in the QASM.
- ▶ 15.8% (975/6,175) of surgeons said they would have done something differently for the patients who died.

There were 1,034 surgeons listed as participating in the QASM at the end of the 2014/2015 financial year. This includes all active surgeons working in Queensland (n=929) as well as surgeons from other states who do assessments for the QASM.

Surgeons are able to participate in QASM as assessors for 3 years after leaving active operating duties. There were 117 surgeons who are registered as participating but have either retired or moved.

(Source: Royal Australian College of Surgeons Activities Report for the period 1 January to 30th December 2014, p38 Active Fellows by Location and Specialty, accessed 08/07/2015).

All of the surgeons acting as assessors have Fellowships of the RACS.

There are some surgeons who do not have the FRACS qualification but are working under supervision e.g. international medical graduates. These are 1.5% (16/1,034) of all surgeons. These surgeons do not act as assessors.

## SURGEON PARTICIPATION IN FELLOWS' INTERFACE

The Fellows' Interface is web-based software. It was developed by the RACS specifically for its audits of surgical mortality. The Fellows' Interface was used by 52.9% of the QASM's participating surgeons (547/1,034).

This system makes it easier for surgeons to fill out their forms. It is more efficient and economical than the previous paper-based form system.

## SURGICAL CASE FORMS

Surgeons engaged in the QASM process are exceptionally good at returning their surgical case forms (SCF). This high return rate means that the audit data is rigorous.

In the 2014/2015 financial year, 3.0% (27/886) of surgeons returned their SCFs within one day of receiving the request.

Overall, 94.7% of SCFs were returned within a two month period (839/886). By corollary, 5.3% of SCFs were not returned within a two month period (47/886).

The median length of time taken to return a SCF was 28 days (with a minimum of less than one day and a maximum of 352 days).

These results show a substantial improvement on previous years and signify that the findings in our data are rigorous. There are a few reasons for this:

- ▶ Active pursuing of outstanding forms by the QASM clinical director and the QASM administration officer.
- ▶ The RACS mandating participation by all surgeons.
- ▶ The linking of compliance with filling out SCFs and Continuing Professional Development (CPD) points by the RACS.

Consultants filled out 70.5% (4,443/6,298) of forms. The proportion of forms filled out by consultants has remained constant across the years of the audit.

Surgical Education and Training (SET) trainees filled out 19.7% (1,241/6,298) of SCFs.

## OPERATIONS

Most of the participating public hospitals in Queensland are level 1 teaching hospitals. As such, **consultant** input into the surgical management of patients is very strong.

- ▶ 91.9% of operations were performed following a consultant surgeon making the decision to operate (4,465/4,858).
- ▶ 59.4% of operations were performed by a consultant (2,884/4,858).
- ▶ 7.8% of operations had a consultant surgeon assisting (379/4,858).
- ▶ 13.9% of operations had a consultant present in theatre (674/4,858).
- ▶ 95.7% of operations had a consultant anaesthetist present (4,450/4651).

The proportion of cases in which the consultant performed the operation depend on the particular speciality and the level of complexity of each operation.

The surgical specialty with the highest number of deaths is General Surgery and in that specialty Consultants perform nearly three quarters of the operations (see Table 3).

Oral/Maxillofacial Surgery specialty had the fewest deaths audited by QASM.

**Table 3: Consultants performing the operation by specialty across all hospitals (2007-2015) (n=4,858 patients and 6,298 operations)**

| Specialty (number of patients)*             | Percentage of operations performed by Consultants |
|---|---|
| General Surgery (n=1,771)                   | 72.2%   |
| Vascular Surgery (n=457)                    | 68.1%   |
| Urology (n=144)                             | 50.0%   |
| Neurosurgery (n=789)                        | 39.7%   |
| Orthopaedic Surgery (1,081)                 | 37.3%   |
| Otolaryngology Head and Neck Surgery (n=55) | 58.2%   |
| Paediatric Surgery (n=25)                   | 88.0%   |
| Cardiothoracic Surgery (n=477)              | 88.7%   |
| Obstetrics and Gynaecology (n=17)           | 76.5%   |
| Plastic and Reconstructive Surgery (n=36)   | 37.8%   |
| Oral/Maxillofacial Surgery (n=2)            | 50.0%   |
| Total (n=4,854 patients)                    | 60.2%   |

*\*Some patients had multiple operations*

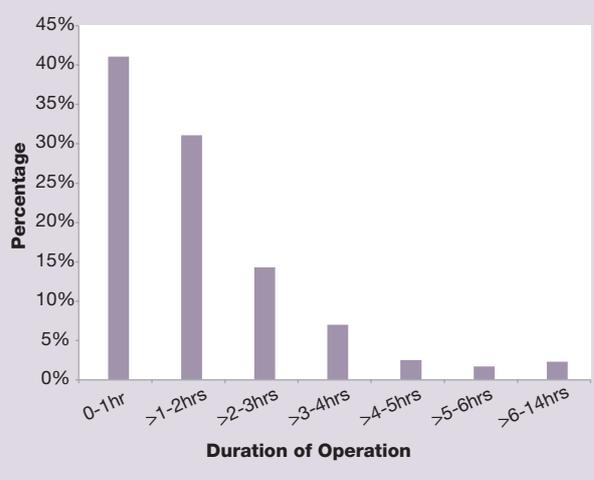
The length of time of an operation is an important predictor of death – the longer and more complicated the operation, the more likely there will be problems. (Kable, 2008).

The median operation duration in this audit was 1.5 hours. The minimum time for an operation was less than one hour while the maximum was 14 hours.

There were 3.9% (157/4,076) of operations that lasted between six and 14 hours, which as noted from the graph below, is extraordinarily long (see Figure 4).

The length of time of operation was not listed for 3,408 operations as the question was not asked from the beginning of the audit.

**Figure 4: Duration of operations in hours as percentages of all operations (2007-2015) (n=3,917)**



## DIFFERENT ACTIONS

On the SCF the surgeon is asked to consider whether, in retrospect, they would have handled anything differently (“In retrospect, would you have done anything differently?”).

This question, with the benefit of hindsight, provides surgeons with an opportunity to reflect on their cases which resulted in 15.8% (975/6,175) of surgeons indicating that they would have done something differently.

(See Appendix 3 for examples of comments from surgeons on whether they would have done anything differently).

## SECOND-LINE ASSESSMENTS

Some cases need reviewing at a forensic level and are referred for second-line assessment.

This need for review may be because:

- ▶ the information supplied is inadequate for the first-line assessor to be able to make a judgement,
- ▶ an assessor considers that a matter needs to be investigated further OR
- ▶ the clinical director considers that the case could contribute to the *Lessons from the Audit* documents.

The overall rate of second-line assessments over eight years was 12.2% of cases (see Table 4).

| <b>Financial Year</b> | Cases referred for second-line assessment (n) | Total cases  | Cases referred for second-line assessment (%) |
|-----------------------|---|--------------|---|
| 2007/2008             | 76  | 628          | 12.1%   |
| 2008/2009             | 123   | 833          | 14.8%   |
| 2009/2010             | 120   | 930          | 21.9%   |
| 2010/2011             | 76  | 816          | 9.3%  |
| 2011/2012             | 137   | 997          | 13.7%   |
| 2012/2013             | 125   | 944          | 13.2%   |
| 2013/2014             | 156   | 1,175        | 13.3%   |
| 2014/2015             | 96  | 1,121        | 8.6%  |
| <b>Total</b>          | <b>909</b>                                    | <b>7,444</b> | <b>12.2%</b>                                  |

The second-line assessor provides a comprehensive report, considered a valid learning tool, and it is sent under Qualified Privilege to the surgeon. Once de-identified, these reports form the basis of the *Lessons from the Audit*, which are very popular documents according to reports.

*Note: Please see Appendices 1 and 2 for numbers of patients by specialty; age of patients by specialty; and proportion of patients who had complications by specialty.*

# QASM HOSPITALS 2015

## KEY POINTS

- ▶ All public and private hospitals in Queensland are participating in the QASM.
- ▶ The most frequent cause of delay to diagnosis was misinterpretation of results.

All surgical cases come from hospitals where surgery has occurred. Queensland Health notifies the QASM of all surgically-related deaths. Notifications are usually provided by medical records departments or, more rarely, by mortality review committees in each participating hospital. Each of these bodies is aware of the QASM's inclusion and exclusion criteria.

## PARTICIPATION

All 30 (100%) public hospitals in Queensland participate in the QASM.

Three-quarters of cases were from **public** hospitals (74.5%; 606/813).

1.1% of patients were co-located (9/813). There was no hospital status information available for 308 cases.

In 2014/2015 one-quarter of patients were from private hospitals (24.4%; 198/813).

Although the audit covers the whole of Queensland, 52.1% (584/1,121) of deaths in 2014/2015 came from six hospitals: Princess Alexandra Hospital, Royal Brisbane and Women's Hospital, The Townsville Hospital, The Wesley Hospital, The Prince Charles Hospital and the Gold Coast University Hospital.

The remaining 47.8% (536/1,121) of deaths occurred in smaller metropolitan, and rural and remote hospitals.

(See Appendix 4 for a list of hospitals participating in the QASM).

## TYPES OF HOSPITALS AND PREDICTIONS OF DEATH

Postoperative complications, unplanned readmissions to hospital and unplanned returns to theatre are well recognised predictors of death.

To date, the number of patients reviewed by the QASM has been much lower from private hospitals than public hospitals because private hospitals were not part of the audit when it started in 2007. However, it is already apparent that there are differences between public hospitals, private hospitals and co-located hospitals (see Table 5).

We need to monitor these differences to see if patterns are maintained as the numbers from private hospitals increase with time. In the future, we will be able to analyse by yearly groups to more accurately interpret the data.

**Table 5: Comparison of patients from public, private and co-location hospitals (n=6,298)**

| Hospital type             | Length of stay: median (IQR) | Postoperative Complications | Unplanned Readmissions to hospital | Unplanned returns to theatre |
|---------------------------|------------------------------|-----------------------------|------------------------------------|------------------------------|
| <b>Public (n=5,775)</b>   | 8 days (IQR 3-18)            | 32.7%                       | 2.6%                               | 10.9%                        |
| <b>Private (n=463)</b>    | 12 days (IQR 5-24)           | 40.4%                       | 3.2%                               | 17.0%                        |
| <b>Co-location (n=29)</b> | 14 days (IQR 3-28)           | 33.3%                       | 3.7%                               | 22.2%                        |

IQR reported is the 25th and 75th percentiles of the ranked data. G. Argyrous, Statistics for Social and Health Research, 2002, p503. Missing data = 31

## TRANSFERS

Queensland is the most decentralised state and Queensland has the highest proportion of transferred patients in Australia, with 32.0% (1,979/6,180) of cases involving a transfer.

In 2013 nationally, 26.8% (3,613/13,458) of cases involved a transfer.

In recent years there has been a slight decrease in the proportion of transferred cases in Queensland (see Table 6).

| Financial Year    | Percentage transferred (%) |
|-------------------|----------------------------|
| 2007/2008         | 36.0%                      |
| 2008/2009         | 35.4%                      |
| 2009/2010         | 34.7%                      |
| 2010/2011         | 32.2%                      |
| 2011/2012         | 34.5%                      |
| 2012/2013         | 32.9%                      |
| 2013/2014         | 24.9%                      |
| 2014/2015         | 28.5%                      |
| Overall 2007/2015 | 32.0%                      |

## HOSPITAL ADMISSIONS

Surgical patients admitted as emergencies in hospitals are at a higher risk of death than those admitted electively.

Emergency admissions accounted for 87.5% (5,450/6,232) of all cases and elective surgical admissions comprised 12.5% (782/6,232) of cases.

## TIMING OF OPERATIONS

The majority of patients (81.6%; 3,744/4,589) were classified as having undergone an immediate or emergency operation rather than an elective operation.

- ▶ 19.8% (910/4,589) of patients underwent an immediate operation (<2 hours post admission)
- ▶ 31.0% (1,422/4,589) of patients underwent an emergency operation (<24 hours post admission)
- ▶ 30.8% (1,412/4,589) of patients underwent a scheduled emergency operation (>24 hours post-admission)
- ▶ 18.4% (845/4,589) of patients underwent an elective operation.

This distribution has not changed over the eight years of the audit.

## DELAYS IN MAIN SURGICAL DIAGNOSIS

Emergency surgical patients need rapid access to surgeons to decide and define their courses of treatment. They also need access to operating theatres as quickly as possible.

Overall, there were delays in surgical diagnosis for 8.6% (534/6,213) of the QASM patients (see Table 7).

| Financial Year | Delays in surgical diagnosis (n) | Percentage of patients with a delay in surgical diagnosis (%) | Total cases (n) |
|----------------|----------------------------------|---|-----------------|
| 2007/2008      | 42                               | 8.3%  | 505             |
| 2008/2009      | 73                               | 10.3%   | 710             |
| 2009/2010      | 77                               | 9.7%  | 790             |
| 2010/2011      | 69                               | 8.8%  | 788             |
| 2011/2012      | 73                               | 8.5%  | 857             |
| 2012/2013      | 66                               | 7.9%  | 832             |
| 2013/2014      | 92                               | 8.7%  | 1,060           |
| 2014/2015      | 42                               | 6.3%  | 671             |
| Total          | 534                              | 8.6%  | 6,213           |

Missing data: n=85 cases.

Over half of the delays in diagnosis occurred in General Surgery (55.8%; 298/534) cases; however, General Surgery patients comprise only 38.8% (2,441/6,295) of all audit patients. General Surgery patients were twice as likely to have a delay in their diagnosis compared with patients associated with the other surgical specialties RR 2.00 (95% CI 1.70 to 2.36).

There may be many reasons for delays including the time to optimise a patient's medical condition and the availability of the operating room resources (Lefavre, 2009).

Delays in surgical diagnoses were most commonly associated with the following sources:

- ▶ medical units (n=183)
- ▶ surgical units (n=119)
- ▶ emergency departments (n=46)
- ▶ General practitioners (n=44)
- ▶ Other: ambulance service, atypical presentation, correctional services, computed tomography broken, gastroenterology, fractured neck of femur missed, medical imaging, no operating time, nursing home delays, pathology, patient request, psychiatry.

The most common **reasons** for delays, irrespective of the source, were:

- ▶ 23.8% (123/516) were due to inexperienced staff
- ▶ 23.5% (122/520) were due to unavoidable factors
- ▶ 21.0% (106/505) were due to misinterpretation of results
- ▶ 15.6% (78/500) were due to a failure to do the correct test
- ▶ 3.5% (17/485) were due to results not being seen
- ▶ 46.3% (239/516) were due to other reasons.

Other: Atypical presentation, communication, delay in getting endoscopy, emergency department, failure to notify, frail patient, patient refused colonoscopy, patient not examined, transferred in poor state grossly dehydrated, unsure if they recognised necrotic wounds.

A quarter of the delays in diagnosis were due to unavoidable factors.

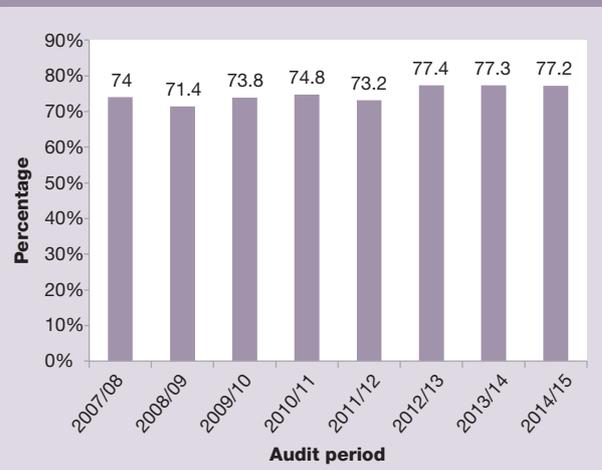
In 12.4% (298/2,400) of General Surgery patients, they experienced a delay in their surgical diagnoses. The most frequent reason for delay was due to "misinterpretation of results" – 30.7% (79/257). (North, 2013)

## SURGICAL CASES AND OPERATIONS

Most surgical patients who are admitted to hospital do have operations. However not all surgical patients admitted have operations. The data in Figure 5 shows that in the eight years of the audit:

- ▶ 75% (4,717/6,288) of patients had operations
- ▶ 6,298 surgical patients were reviewed by the QASM and the cases were closed
- ▶ The percentage of surgical patients having operations increased in 2012, and has remained steady since then. This is probably influenced by the inclusion of private hospital patients since that time (see Figure 5).

Figure 5: Percentage of surgical patients having operations by year (2007-2015) (n=6,298)



## SURGICAL CASES WITH NO OPERATIONS

For some surgical patients surgeons consider that surgery is not the best option for them.

A quarter of surgical admissions did not have operations. There were 25.0% (1,571/6,288) cases that had no operations from 2007 to 2015.

A patient may not have undergone an operation for a variety of reasons. (Note: not all questions were answered).

- ▶ It was an active decision not to operate in 45.4% (677/1,490) of cases. The consultant made the decision not to operate in 96.0% (631/657) of these cases.
- ▶ The patient's problem was not a surgical problem in 18.5% (264/1,424) of cases.
- ▶ Death occurred rapidly in 12.9% (178/1,384) of cases.
- ▶ The patient refused the operation in 9.1% (127/1,389) of cases.

## TIME IN HOSPITAL BEFORE DEATH

The length of time spent in hospital is a strong predictor of death.

The median length of stay for patients from 2007 to 2015 was 8 days (interquartile range [IQR] 3 days to 19 days). However 2014/2015 has a longer median length of stay with wider IQR.

The most common length of stay (i.e. the mode) was one day or less.

The minimum length of stay was less than one day and the maximum length of stay was 902 days.

There has been no reduction in the overall length of stay in hospital in surgical patients who died, when one reviews the data by year (see Table 8).

| Financial Year                     | Closed cases (n) | Median time in hospital (days) | IQR* (days) |
|------------------------------------|------------------|--------------------------------|-------------|
| 2007/2008                          | 628              | 7                              | 2-17        |
| 2008/2009                          | 833              | 7                              | 2-18        |
| 2009/2010                          | 931              | 8                              | 3-20        |
| 2010/2011                          | 816              | 8                              | 3-17        |
| 2011/2012                          | 873              | 8                              | 3-18        |
| 2012/2013                          | 839              | 8                              | 3-19        |
| 2013/2014                          | 1,068            | 8                              | 3-19        |
| 2014/2015                          | 675              | 9                              | 4-20        |
| <b>Total 2007/2015 – all years</b> | <b>7,551</b>     | <b>8</b>                       | <b>3-19</b> |

\*IQR reported is the 25th and 75th percentiles of the ranked data.

## ASSESSORS' CONCERNS WITH MANAGEMENT

Assessment is a core part of the QASM's function. Assessors' reports are feedback sent to the surgeons in charge of the patients, to enable learning.

Areas of patient management that second-line assessors felt could or should have been improved. Second-line assessors review cases with the full set of medical records available from the patient's last admission.

Assessors considered that management problems uncommonly occurred in the operating theatre but sometimes occurred in the preparatory stages before theatre, and the recovery stages after theatre (see Table 9).

Table 9: Management issues noted by second-line assessors (2007-2015)

| Area where management could, or should, have been better | Percentages of management areas noted by second-line assessors* (n=972) |
|--|---|
| Preoperative management                                  | 28.2% (231/820)   |
| Postoperative care                                       | 21.5% (174/810)   |
| Timing of operation                                      | 19.1% (157/822)   |
| Intraoperative management                                | 14.9% (122/819)   |
| Decision to operate                                      | 14.6% (120/822)   |
| Choice of operation                                      | 13.3% (109/820)   |
| Grade of surgeon operating                               | 5.6% (46/816)   |
| Grade of surgeon deciding                                | 5.5% (45/814)   |

\* Not all surgeons answered all the questions

Cases that undergo second-line assessment are generally the more difficult cases.

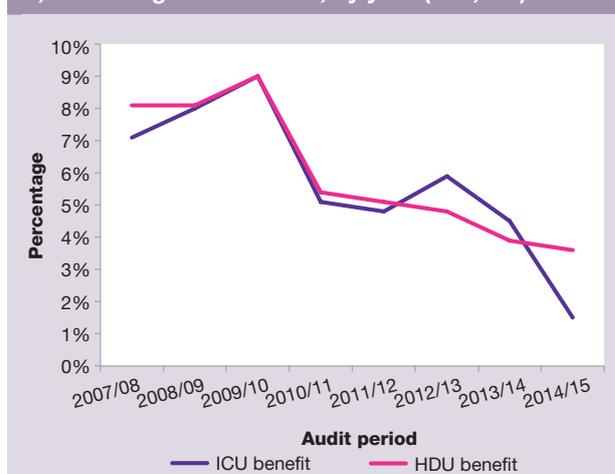
Assessors had access to patients' full medical records in order to prepare their reports.

## CRITICAL CARE UNITS

Over the eight years of the audit, 72.8% (3,157/4,338) of patients who had operations were treated in critical care units.

Comments by assessors indicated that an additional 5.7% (128/2,256) of patients should have been treated in a critical care unit (either CCU or high dependency unit) (see Figure 6).

Figure 6: Percentage of cases that would have benefited from ICU or HDU care but did not receive it, according to assessors, by year (n=4,338)



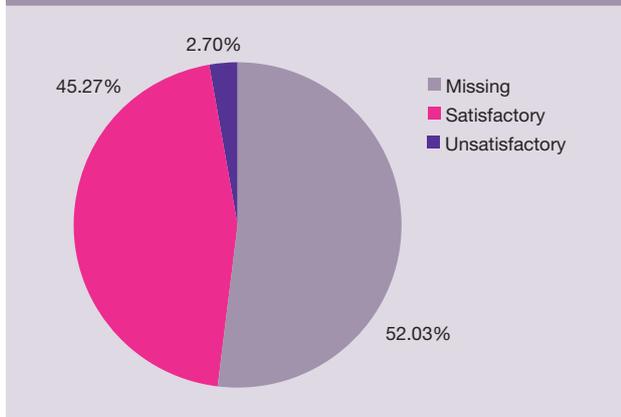
ICU: Intensive Care Unit; HDU: High Dependency Unit

## MEDICAL RECORDS

Over the eight years of the audit, the QASM second-line assessors have reviewed the medical records of 881 cases as part of the second-line assessment process.

The level of professionalism seen in these notes varies. Admission notes were generally satisfactory, as were the medical follow up notes. The procedure notes, which were of major importance to surgeons, were also of a good standard. The case summaries to General Practitioners however were seriously deficient (see Figure 7).

**Figure 7: State of record keeping of case summaries to general practitioners, as reviewed by second-line assessors (n=740)**



Only 45.27% (335/740) of case summaries were satisfactorily reported to GPs, 2.70% (20/740) were unsatisfactory, and 52.03% (385/740) were missing. The large proportion of missing data highlights an important area for improvement in case reporting.

It is clear that the standard of reporting of case summaries to General Practitioners has been inadequate.

## POSTOPERATIVE COMPLICATIONS

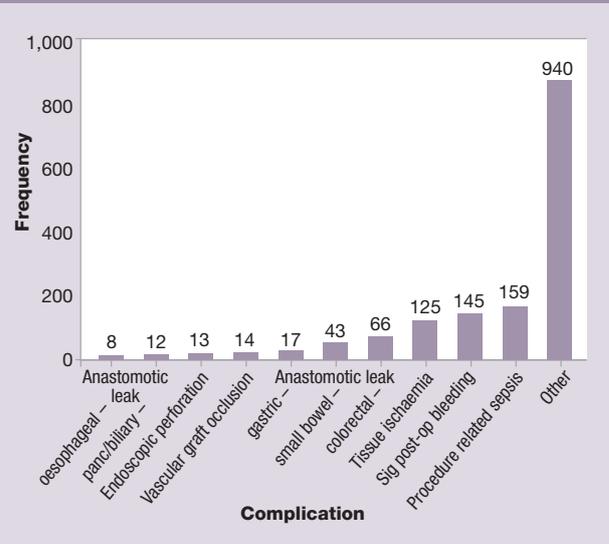
Although most surgery is free of complications, complications do sometimes occur, which may lead to the patient's death.

One-third of patients had a postoperative complication (33.4%; 1,601/4,797) between 2007/2008 and 2014/2015. Two-thirds of patients had no complications – 66.6% (3,196/4,797).

There was a delay in recognising complications in 6.9% (96/1,386) of those cases.

Where there were complications, the most frequent causes are listed in Figure 8. Procedure related sepsis, the scourge of hospitals around the world, is still the most frequent postoperative complication.

**Figure 8: Postoperative complications by type (n=4797, missing data = 55)**

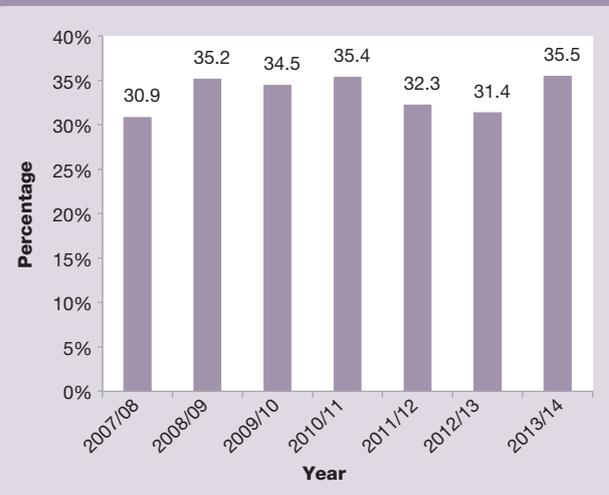


The largest classification of postoperative complication was “other” complications – 61.0% (n=940/1,542). The most common “other” complications in order of frequency were:

- ▶ acute myocardial infarction
- ▶ cerebrovascular accidents
- ▶ respiratory failure
- ▶ pneumonia
- ▶ renal failure
- ▶ pulmonary emboli
- ▶ multiple organ failure

There is an irregular distribution of the incidence rate for postoperative complications in QASM patients over the eight years of the audit (see Figure 9).

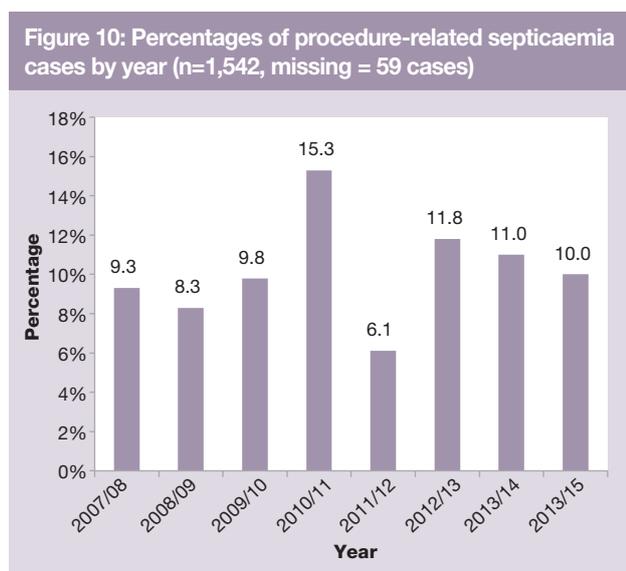
**Figure 9: Percentage of cases with postoperative complications by year**



## POSTOPERATIVE SEPTICAEMIA

Procedure-related septicaemia was the most frequently occurring postoperative complication. It has a high cost impact on both the risk of death to the patient and on the health care budget (Vaughan-Sarrazin, 2011)

There is no obvious pattern to the incidence rate of procedure-related septicaemia (see Figure 10).



Of the patients who had a postoperative complication, 11.0% (201/1,827) had procedure-related septicaemia.

## UNPLANNED RETURN TO THEATRE

Unplanned returns to theatre are strong predictors of death.

The rate of unplanned returns to theatre has remained relatively constant over the eight years of the audit. Table 10 shows closed cases that had been to theatre at least once.

**Table 10: Unplanned returns to theatre by financial year (2007-2015) (n=5,968)**

| Financial Year               | Cases with unplanned returns to theatre (%) | Proportion of total cases (n) |
|------------------------------|---|-------------------------------|
| 2007/2008                    | 9.1%  | 45/492                        |
| 2008/2009                    | 9.1%  | 61/672                        |
| 2009/2010                    | 12.5%                                       | 95/758                        |
| 2010/2011                    | 11.1%                                       | 83/750                        |
| 2011/2012                    | 11.2%                                       | 93/831                        |
| 2012/2013                    | 12.9%                                       | 103/800                       |
| 2013/2014                    | 12.8%                                       | 130/1,017                     |
| 2014/2015                    | 11.4%                                       | 74/648                        |
| <b>Total years 2007-2015</b> | <b>11.5%</b>                                | <b>684/5,968</b>              |

## FLUID BALANCE

Fluid balance issues are a constant problem in hospital patients, particularly in elderly patients. It is often a very complicated matter managing fluid balance adequately in older patients with failing renal function. In these cases they have added physiological stress of necessary operations (see Table 11).

The incidence of fluid balance issues was not geographically dependent, as is sometimes suggested, as the overall prevalence in the combined data from hospitals in northern Queensland (Townsville, Cairns and Mackay hospitals) was 9.8% (103/1,053). This was not significantly different from the overall prevalence rate of fluid balance issues – RR 0.94 (95%CI 0.77-1.15).

**Table 11: Fluid balance issues by financial year (n=5,952, missing = 346 cases)**

| Financial Year               | Cases with fluid balance issues (%) | Proportion of total number of patients (n) |
|------------------------------|-------------------------------------|--|
| 2007/2008                    | 11.1%                               | 54/485                                     |
| 2008/2009                    | 9.6%                                | 64/670                                     |
| 2009/2010                    | 10.9%                               | 83/759                                     |
| 2010/2011                    | 11.5%                               | 86/749                                     |
| 2011/2012                    | 11.2%                               | 93/830                                     |
| 2012/2013                    | 13.8%                               | 110/799                                    |
| 2013/2014                    | 7.6%                                | 77/1,014                                   |
| 2014/2015                    | 9.1%                                | 59/646                                     |
| <b>Total years 2007-2015</b> | <b>10.5%</b>                        | <b>626/5,952</b>                           |

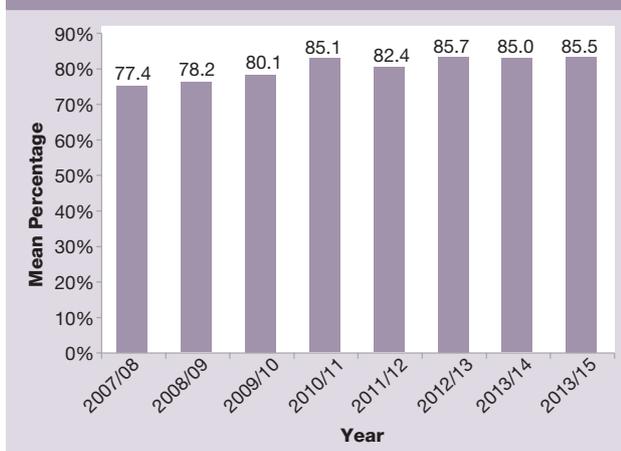
## DEEP VEIN THROMBOSIS PROPHYLAXIS

Deep vein thrombosis (DVT) prophylaxis is recommended by both RACS and Queensland Health for surgical patients when appropriate.

The percentage of operated cases having DVT prophylaxis increased in 2010 in Queensland hospitals during the course of the audit, as shown by Figure 11.

This data is of closed cases and the patients had had at least one operation.

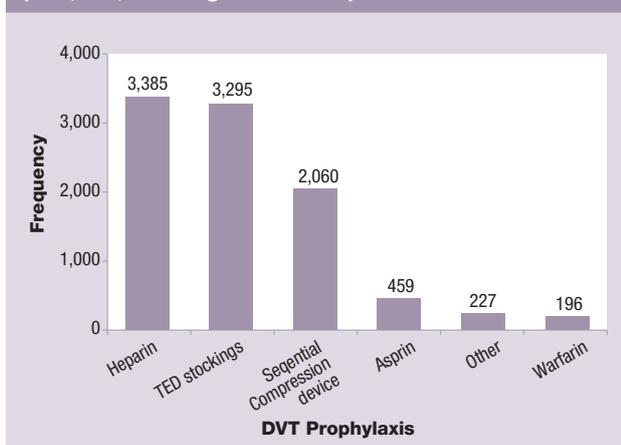
**Figure 11: Percentage of cases with deep vein thrombosis prophylaxis by financial year (n=4,662, missing = 55 cases)**



Overall, 83.1% (4,152/5,002) of patients who underwent an operation received DVT prophylaxis.

The frequency of use of the various types of DVT prophylaxis is shown in Figure 12. Most patients had more than one type of prophylaxis used.

**Figure 12: Distribution of types of Deep Vein Thrombosis prophylaxis for 2007-2008 to 2014-2015 (n=4,662, missing = 55 cases)**



TED = Thromboembolic disease

There were 144 “other” forms of DVT prophylaxis used, including:

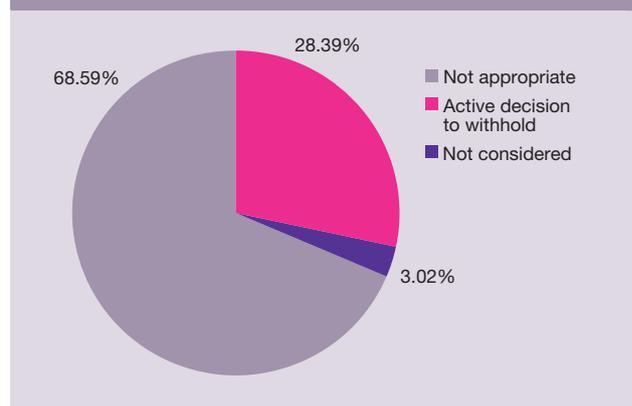
- ▶ aspirin given initially
- ▶ changed when on renal replacement
- ▶ Clexane (low molecular weight Heparin)
- ▶ clopidogrel
- ▶ early mobilisation
- ▶ intravenous catheter filter.

## NO DVT PROPHYLAXIS

There was no DVT prophylaxis given in 17.0% (794/4,662) of operated cases.

The reasons for not giving DVT prophylaxis were given for 87.3% (693/794) of cases in which the patient did not receive it (see Figure 13).

**Figure 13: Distribution of reasons for the non-provision of DVT prophylaxis in operated patients, 2007-2015 (n=794, missing data = 7 cases)**



The most frequently given reason for the non-provision of DVT prophylaxis was that it was considered inappropriate for that patient at that time.

Comments on why DVT prophylaxis was not used included:

- ▶ coagulopathic already due to liver failure
- ▶ bleeding
- ▶ clinical pathway of dying
- ▶ coagulopathic and septic
- ▶ baby – not routinely used
- ▶ bleeding actively
- ▶ cerebral haemorrhage
- ▶ cardiopulmonary resuscitation on arrival in theatre. Died in theatre
- ▶ high international normalised ratio
- ▶ grossly coagulopathic.

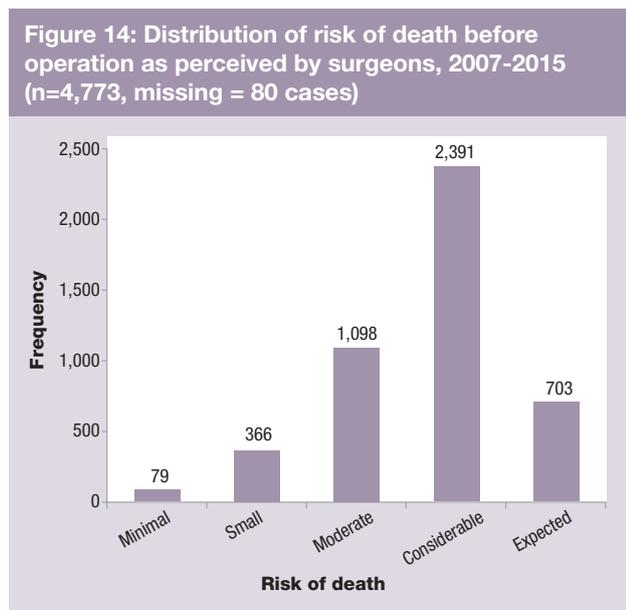
For three patients who had “thrombosis” listed as their causes of death:

1. one patient had received DVT prophylaxis
2. one patient had no data on their DVT prophylaxis status
3. one patient had the comment: “No need for DVT prophylaxis as fully heparinised”.

## RISK OF DEATH BEFORE OPERATION

The risk of death for surgical patients is a judgement made by surgeons when considering whether to take a patient to theatre. The three main factors that are usually considered are:

- ▶ American Society of Anesthesiologists (ASA) grade
- ▶ emergency admission
- ▶ complexity of the required operation.



Surgeons considered that the patient had at least a moderate risk of death in 90% (4,300/4,773) of cases (see Figure 14).

Patients who were considered to have a minimal or small risk of death were most frequently General Surgery patients (35.7%; 169/473).

Patients who were viewed as having a **lower** risk of death prior to surgery had a higher risk of developing complications RR 1.72 (95% CI 1.56 to 1.89). Their complication rate was (53.5%; 252/471) compared with patients who had a moderate or higher risk of death (31.1%; 1,323/4,251). We need to do more work in this area to determine the factors that lead to complications with surgery.

## MANAGEMENT OF SURGICAL PATIENTS

The management of surgical patients can be divided into three main stages of care: preoperative, intraoperative and postoperative. Each of the three stages of patient care is carefully reviewed.

### PREOPERATIVE MANAGEMENT

The area of patient care that surgeons most frequently identified as requiring improvement was **preoperative care**.

Surgeons considered that 8.3% (400/4,835) of patients had inadequate preoperative management that contributed to the deaths of patients (see Figure 15).

**Figure 15: Surgeons' opinions of the percentage of patients who could have had improved preoperative care by year (n=4,834, missing = 90 cases)**

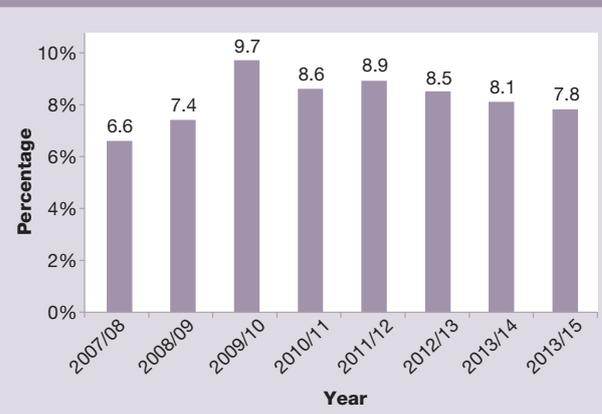


Figure 15 demonstrates a positive change in the last four years, with a decrease in the percentage of patients viewed by surgeons as having received inadequate preoperative care.

However, assessors had stronger and more negative views. Assessors considered that preoperative care could have been improved in 10.9% (608/5,563) of cases. This shows a statistically significant difference between assessors and surgeons about opinions on standards of preoperative care RR 1.3 (95% CI 1.2 to 1.5).

### POSTOPERATIVE MANAGEMENT

Surgeons felt that the patient should have received better postoperative care in 5.2% (245/4,748) of their cases.

Assessors had stronger and more negative opinions about postoperative management. They considered that 9.4% (590/6,295) of cases would have benefited from improved postoperative care.

A first-line assessor (395/4,468) was nearly twice as likely the surgeon (245/4,748) to conclude that postoperative care could have been improved – RR 1.8 (95% CI 1.6 to 2.1).

# QASM PATIENTS 2007-2015

## KEY POINTS

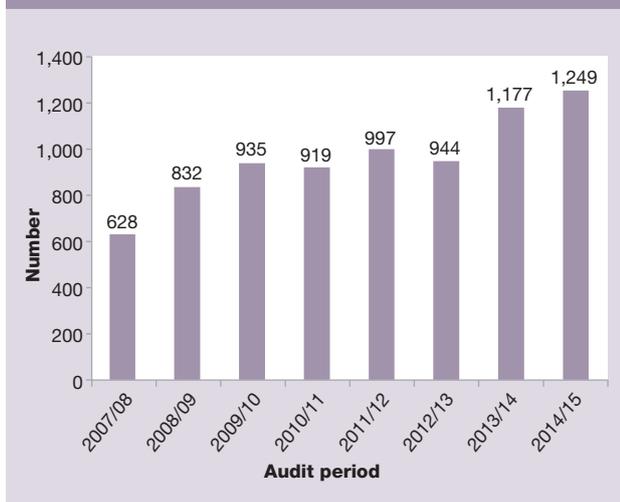
- ▶ 7,681 deaths were reported to QASM.
- ▶ Nearly all the QASM patients were elderly.
- ▶ Nearly all the QASM patients had multiple comorbidities.
- ▶ 12.5% (782/6,232) of the closed QASM cases were elective patients. (66 cases were missing this answer)

The QASM reviews every case where a surgical patient dies in Queensland.

There has been a steady increase in the number of patients reviewed by the QASM.

The most significant increase in the number of patients reviewed by the QASM occurred in 2013/2014 (see Figure 16). It was at this time that the private hospitals started to participate in the audit.

**Figure 16: Number of all QASM cases by financial year (n=7,681)**



Note: some 2014/2015 cases have not yet completed the full audit process. These cases will be included in future reports.

Figure 16 shows an overall positive trend with an increase in the number of QASM cases reviewed over eight years.

## AGE DISTRIBUTION

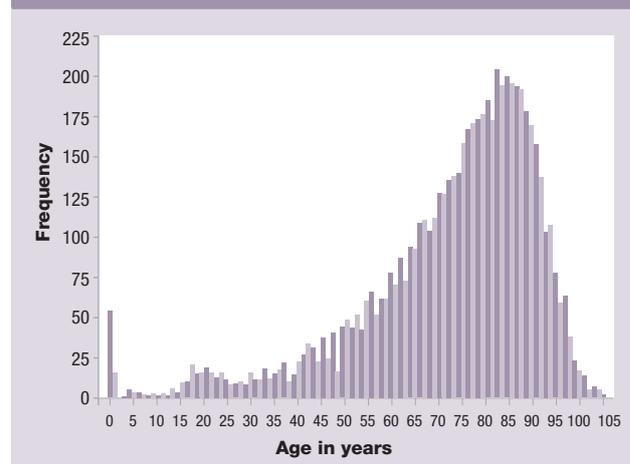
As our society ages, surgeons will increasingly be faced with treating older patients (Story, 2010).

The median age at death was 76 years for all the years of the audit (IQR 63 years to 84 years).

Two thirds of patients (64.2%; 4,849/7,550) in the QASM were 70 years or older. Surgery is a challenge for older patients. Age greater than 70 years is strongly predictive of an adverse event in surgical admissions (Kable, 2008).

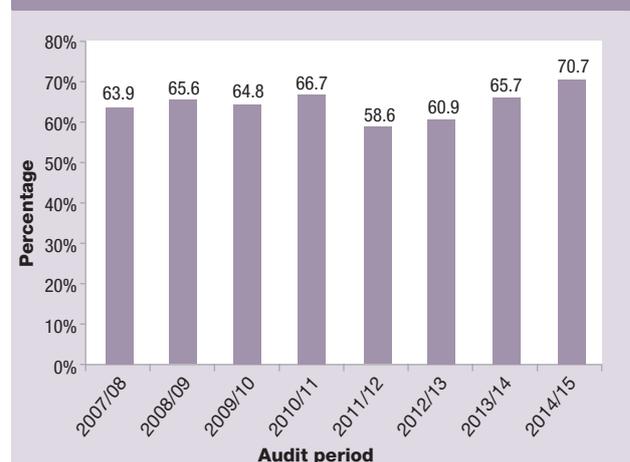
Septuagenarians comprised 24.7% (1,866/7,550) of patients, while octogenarians were 29.0% (2,191/7,550) of patients, and nonagenarians were 10.2% (771/7,550). Centenarians composed 0.3% (20/7,550) of all QASM patients (see Figure 17).

**Figure 17: Age distribution of patients (2007-2015) (n=7,550, 1 age missing)**



## PATIENTS 70 YEARS OR OLDER

**Figure 18: Proportion of QASM patients aged 70 years or older (2007-2015) (n=7,550)**



While the overall trend is towards an increasing proportion of patients being 70 years or older, this trend is not uniform (see Figure 18).

It is probably because the increase in proportion of older patients in recent years occurred with the inclusion of private hospitals in the audit.

## PATIENTS 80 YEARS OR OLDER

A high proportion of the QASM patients are very elderly.

- ▶ 39.5% (2,982/7,550) of patients who died were aged 80 years or older.

In this elderly age group the confirmed clinical presentations were most commonly:

- ▶ fracture of neck of femur
- ▶ small bowel obstruction
- ▶ ischaemic bowel
- ▶ perforated duodenal ulcer

Surgical care for this elderly group is not at the same level of intensity as for other age groups (Allen, 2015).

Patients of this elderly age group underwent emergency admission at a higher rate (91.1%; 2,257/2,478) compared with the younger age groups (85.1%; 3,193/3,754). The difference between the groups was small but statistically significant RR 1.07 (95% CI 1.05 to 1.09).

The median length of stay of these older patients was less than the younger group. Patients in this age group had a median length of stay of 7 days (IQR 3 days to 16 days). The younger patients who died had a median length of stay of 9 days (IQR 3 days to 20 days).

## AMERICAN SOCIETY OF ANESTHESIOLOGISTS GRADES

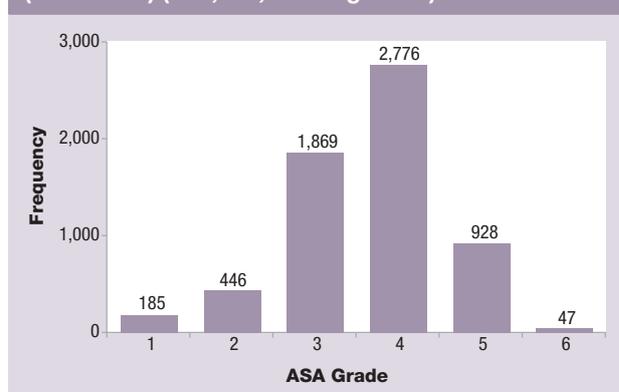
ASA grade is an important indication of the overall health status of a patient. It informs surgeons of the probable ability of the patient to withstand the challenges of surgery.

- ASA 1 A normal healthy patient
- ASA 2 A patient with mild systemic disease
- ASA 3 A patient with severe systemic disease which limits activity, but is not incapacitating
- ASA 4 A patient with an incapacitating systemic disease that is a constant threat to life
- ASA 5 A moribund patient who is not expected to survive 24 hours with or without an operation
- ASA 6 A brain-dead patient for organ donation

Most patients who died had an ASA grade of at least 3 and had, at minimum, severe systemic disease (see Figure 19).

Patients who did not have operations did not receive an ASA grading.

**Figure 19: ASA grade distribution of QASM patients (2007-2015) (n=6,251, missing = 266)**



The majority of patients (89.9%; 5,620/6,251) had an ASA grade of at least 3, indicating the presence of, at minimum, severe systemic disease.

Patients with ASA grade 6 (n=47) underwent procedures relating to:

- ▶ subdural haematomas
- ▶ serious cardiac disease
- ▶ bowel perforations
- ▶ multi-trauma
- ▶ gangrene
- ▶ endocarditis
- ▶ gunshot wound
- ▶ inoperable cancer
- ▶ lacerated liver
- ▶ necrotizing enterocolitis
- ▶ septic shock
- ▶ cardiac arrest

Patients with as ASA grade 1 were mostly trauma patients with severe brain injuries.

## DEATHS ASSOCIATED WITH ANAESTHESIA

There were very few anaesthetic-related deaths in the QASM audit, according to surgeons (see Table 12).

Most surgical patients who died did so within two days of receiving an anaesthetic.

In the Scottish Audit of Surgical Mortality data, total anaesthetic-related deaths were 0.6% of all admissions. {McFarlane, 2009 #282}.

The QASM's results are higher, with surgeons considering that there was an anaesthetic component to the patient's death in 1.2% (58/4,801) of cases. Also, surgeons felt that there had been the possibility of an anaesthetic component to the death in 5.2% (251/4,801) of cases.

**Table 12: Anaesthetic-related deaths by year**

| Financial Year | Anaesthetic-related deaths (n) | Patients who had operations (n) | Deaths related to anaesthetic (%) |
|----------------|--------------------------------|---------------------------------|-----------------------------------|
| 2007/2008      | 5                              | 377                             | 1.3%                              |
| 2008/2009      | 6                              | 514                             | 1.2%                              |
| 2009/2010      | 12                             | 599                             | 2.0%                              |
| 2010/2011      | 7                              | 583                             | 1.2%                              |
| 2011/2012      | 11                             | 636                             | 1.7%                              |
| 2012/2013      | 3                              | 646                             | 0.5%                              |
| 2013/2014      | 8                              | 834                             | 1.0%                              |
| 2014/2015      | 6                              | 612                             | 1.0%                              |
| <b>Total</b>   | <b>58</b>                      | <b>4,801</b>                    | <b>1.2%</b>                       |

## MALIGNANCY

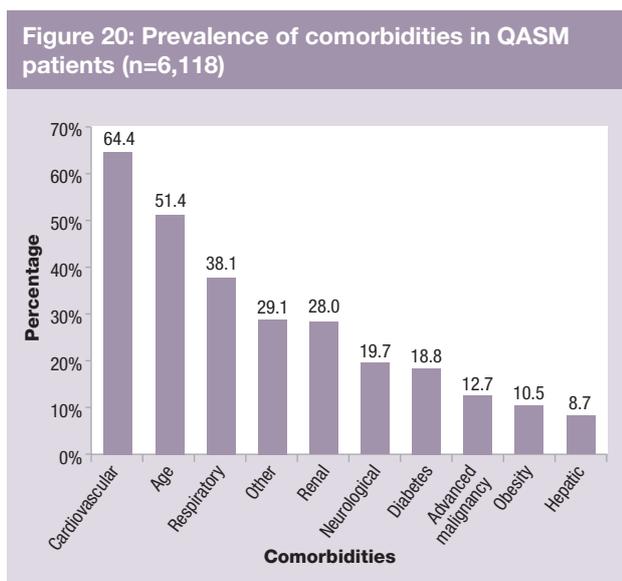
Malignancy was present in 26.4% (1,613/6,118) of cases between 2007 and 2015. However, it did not always contribute to the death of the patient.

## COMORBIDITIES

A comorbidity is a significant coexisting factor that increases the risk of death of a patient (Kable, 2008).

Nearly all patients (89.4%; 5,814/6,501) had at least one significant comorbidity. The median number of comorbidities was three (with a minimum of zero and a maximum of nine).

The most common comorbidity was cardiovascular disease. It had a high prevalence, being present in 64.4% (4,034/6,263) of QASM patients (see Figure 20).



- ▶ Only 10.6% (661/6,263) of patients had no life threatening comorbidities present.
- ▶ The median age of patients with no comorbidities was 52 years.
- ▶ Cardiovascular disease was the most common comorbidity noted in QASM patients.
- ▶ When age was listed as a comorbidity, it was most commonly for patients over 86 years of age. However, 18.5% (792/4,271) of those younger than 86 years had age listed, by the surgeon, as a comorbidity.
- ▶ “Other” comorbidities for all patients included:
  - alcohol abuse
  - Addison’s disease
  - high body mass index
  - neutropenia
  - malnutrition
  - chronic pancreatitis
  - dementia
  - frailty
  - human immunodeficiency virus
  - hepatitis C
  - high international normalised ratio
  - percutaneous endoscopic gastrostomy fed
  - previous DVT
  - rhabdomyolysis
  - sepsis
  - thrombocytopaenia.

## INFECTIONS

The data in this section was analysed in December 2015 to include all recently closed cases.

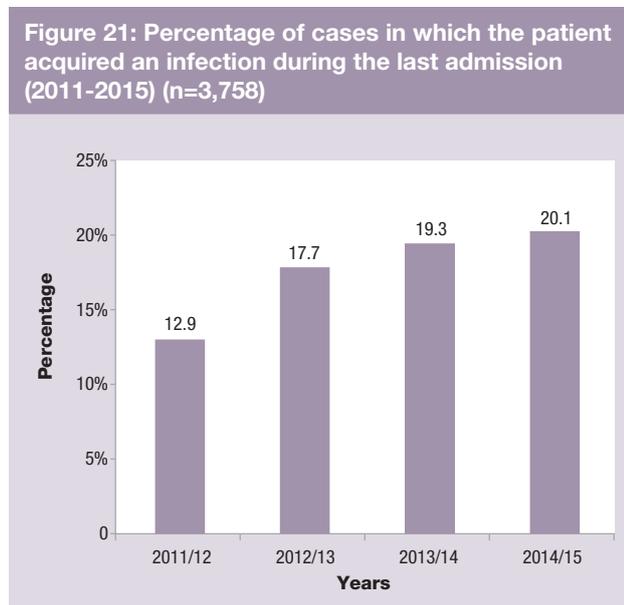
Infections are a frequent contributing cause of death in surgical patients.

Approximately one-third of patients had a clinically significant infection at death. The percentage of patients with a clinically significant infection at death has remained relatively constant over the four years of data collection (see Table 13).

**Table 13: Percentage of patients who had a clinically significant infection at death (2011-2015) (n=3,236)**

| Financial Year | Percent | n         |
|----------------|---------|-----------|
| 2011/2012      | 33.1%   | 236/712   |
| 2012/2013      | 35.0%   | 287/819   |
| 2013/2014      | 35.5%   | 372/1,049 |
| 2014/2015      | 34.2%   | 340/995   |

However, the data suggests that the percentage of patients acquiring the infection **during their admission** is increasing (see Figure 21). Data in the graph confirms the relationship between in-hospital acquired infection and surgical mortality. This data would support the importance of early recognition of and intervention in such patients. This must remain a priority for all surgical patients.



Note: Although 89.1% of all eligible cases from 2014/2015 were closed by the end of 2015, 1.1% (n=14) of the cases for that year were awaiting second-line assessments and 3.0% (n=37) were awaiting first-line assessments. The remainder were SCF pending, SCF incomplete, FLA pending, FLA complete, FLA submitted and lost to follow-up (6.8%).

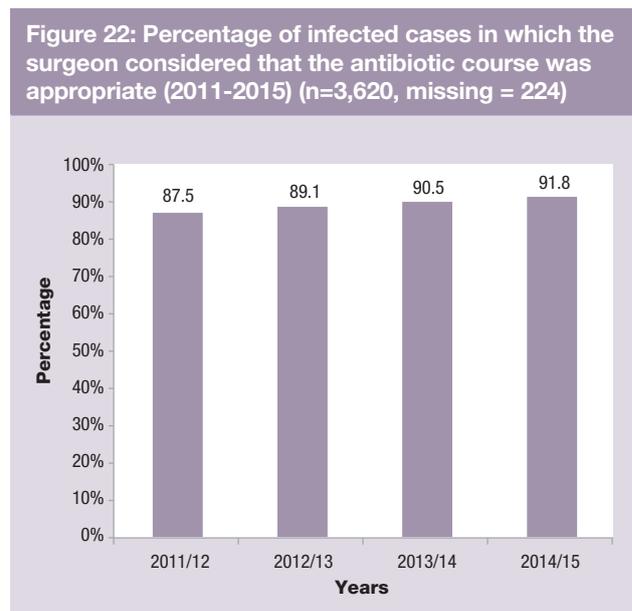
The acquisition of an infection during a hospital stay is related to an increased length of stay in hospital. See Table 14.

**Table 14: Length of stay in hospital in days by infection status (2011-2015) (n=3,799)**

| Length of stay (days) | Died without infection (n=2,488) | Died with pre-existing infection (n=496) | Died with hospital acquired infection (n=632) |
|-----------------------|----------------------------------|--|---|
| Median (IQR*)         | 7.0 (2-16)                       | 7.0 (3-18)                               | 17.0 (9.0-29.0)                               |

\*IQR reported is the 25th and 75th percentiles of the ranked data.

There is a weakly positive trend in the proportion of cases in which surgeons considered that the antibiotic course was appropriate (see Figure 22).



## ELECTIVE PATIENTS

Elective patients compared with emergency patients had:

- ▶ longer lengths of stay
- ▶ more postoperative complications
- ▶ more unplanned readmissions (see Table 15).

**Table 15: Comparison of patients' characteristics by emergent status (2007-2015) (n=6,472, missing = 66)**

|                     | Length of stay Median (IQR*) | Postoperative complications | Unplanned readmissions to hospital |
|---------------------|------------------------------|-----------------------------|------------------------------------|
| Elective (n=825)    | 11 days<br>IQR (5-24)        | 61.8%<br>(510/825)          | 4.8%<br>(40/825)                   |
| Emergency (n=5,647) | 8 days<br>IQR (3-18)         | 28.1%<br>(1,587/5,647)      | 2.2%<br>(124/5,647)                |

\*IQR reported is the 25th and 75th percentiles of the ranked data.

Elective patients were twice as likely as emergency patients to have postoperative complications— RR 2.20 (95% CI 2.06-2.35). This may be due to emergency patients being more likely to die as a consequence of their presenting in a poorer state of health rather than a postoperative complication. In contrast, the elective patients are more likely to die as a consequence of a new event.

Elective patients were also twice as likely as emergency patients to have unplanned readmissions to hospital— RR 2.21 (95% CI 1.56-3.13).

# QASM SPECIAL REPORTS

## REPORT ON OBSTETRICS AND GYNAECOLOGY SURGICAL PATIENTS WHO DIED 2012 TO 2015 FINANCIAL YEARS

To date, 320 obstetrics and gynaecology (O&G) consultants have agreed to participate in the QASM. This represents 22.8% (320/1,405) of all participating surgeons.

### DEMOGRAPHICS:

There were 18 O&G patients included in the audit. This represents 0.3% (18/6,542) of all the QASM patients.

Seven patients came from private hospitals.

The median age of O&G patients was 71 years (IQR 53 years to 81 years). The minimum age was 29 years and the maximum age was 88 years.

### CLINICAL INFORMATION:

Consultants performed 76.5% of operations.

The rate of complications was 57.1% (8/14). This is higher than the overall complication rate in QASM (33.4%; 1,601/4,797). However, as the O&G numbers are low, they may not be easily comparable.

A clinically significant infection was present in 27.8% (5/18) of patients at the time of their death. Three of those patients acquired the infection during their admission.

Areas of consideration, concern and adverse events were identified by assessors in 33.3% (6/18) of patients.

Two clinical incidents were considered to have been preventable and four were not considered to have been preventable. The clinical incidents were:

- ▶ perforation of small bowel during laparoscopic operation – *probably preventable*
- ▶ delay – *probably preventable*
- ▶ preoperative assessment inadequate at initial hospital – *probably not preventable*
- ▶ decision to operate – *probably not preventable*
- ▶ diagnosis missed by pathologist – *not preventable*
- ▶ delay in diagnosis of artery dissection – *definitely not preventable*

## REPORT ON THE SURGICAL CARE OF ABORIGINAL AND TORRES STRAIT ISLANDER PERSONS IN QUEENSLAND 2014-2015

### DEMOGRAPHICS:

Between January 2014 and June 2015 there were 110 deaths of surgical patients of Aboriginal or Torres Strait Islander (ATSI) descent. This represents 6.7% (110/1,642) of QASM deaths during that period.

The majority of these patients were from north Queensland (see Table 16).

**Table 16: Distribution of Aboriginal and Torres Strait Islander surgical patients by hospital (2014-2015) (n=110)**

| Hospital                            | Patients (n) | Percentage of all QASM Aboriginal and Torres Strait Islander patients |
|-------------------------------------|--------------|---|
| Townsville Hospital                 | 43           | 39.1%   |
| Cairns Base Hospital                | 24           | 21.8%   |
| Princess Alexandra Hospital         | 11           | 10.0%   |
| Royal Brisbane and Women's Hospital | 7            | 6.4%  |
| Gold Coast University Hospital      | 6            | 5.5%  |
| Mackay Base Hospital                | 4            | 3.6%  |
| Other hospitals                     | 15           | 13.6%   |

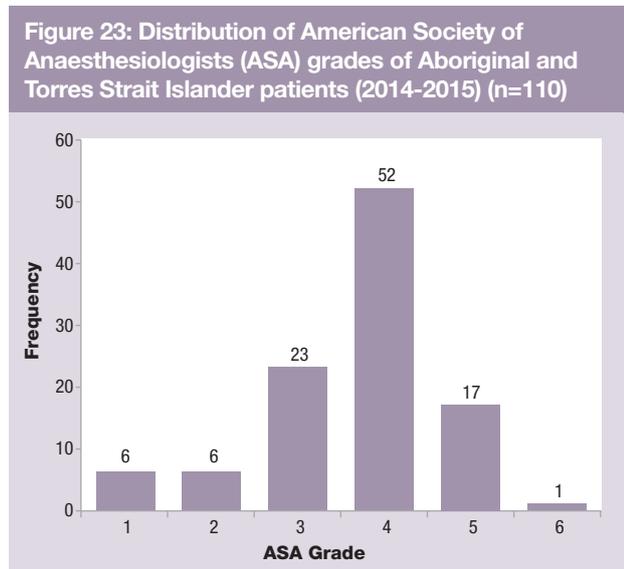
Aboriginal and Torres Strait Island patients were also treated at:

- ▶ The Prince Charles Hospital
- ▶ Mt Isa Hospital
- ▶ Rockhampton Base Hospital
- ▶ Nambour Hospital
- ▶ Caboolture Hospital
- ▶ Logan Hospital
- ▶ Toowoomba Hospital
- ▶ Bundaberg Hospital
- ▶ Hervey Bay Hospital.

The median age of Aboriginal and Torres Strait Islander patients was 56 years (IQR 43 years to 67 years). This is 20 years younger than the median age of non-Indigenous patients. The median age for non-Indigenous patients was 76 years (IQR 64 years to 85 years).

### CLINICAL INFORMATION:

The ASA grade most commonly seen in Aboriginal and Torres Strait Islander patients was ASA grade 4 (see Figure 23).



The distribution of ASA grades for Aboriginal and Torres Strait Islander patients is different from the overall QASM distribution (Figure 19). In particular, there are fewer patients categorised as ASA grade 3.

The six patients who were considered ASA grade 1 were admitted with the following diagnoses:

- ▶ severe traumatic head injury (n=5)
- ▶ myocardial infarction (n=1)

### DELAYS IN DIAGNOSES IN ATSI PATIENTS:

A delay in surgical diagnoses was associated with 10.1% (10/99) of ATSI patients.

This is equivalent to the delay in diagnosis rate for all the QASM patients excluding the indigenous patients RR 1.32 (95% CI 0.76 to 2.29).

For this group, the delays in diagnoses in four cases were associated with the surgical units, and in four cases the delays were to do with the emergency departments of the respective hospitals.

### COMORBIDITIES AND ATSI PATIENTS:

The general prevalence of comorbidities was slightly lower in the ATSI population (86.4%; 95/110) compared with the overall QASM population (89.4%; 5,814/6,501). This is probably associated with the fact that Aboriginal and Torres Strait Islander patients are generally younger.

The most common comorbidity in the ATSI population was cardiovascular disease.

### SURGICAL MANAGEMENT OF ATSI PATIENTS:

Management issues were comparable in the Aboriginal and Torres Strait Islander and non-Indigenous populations, with the exception of the provision of treatment in a critical care unit (see Table 17).

**Table 17: Comparison of management issues seen in Aboriginal and Torres Strait Islander patients compared with non-Indigenous patients (2012-2015) (n=110)**

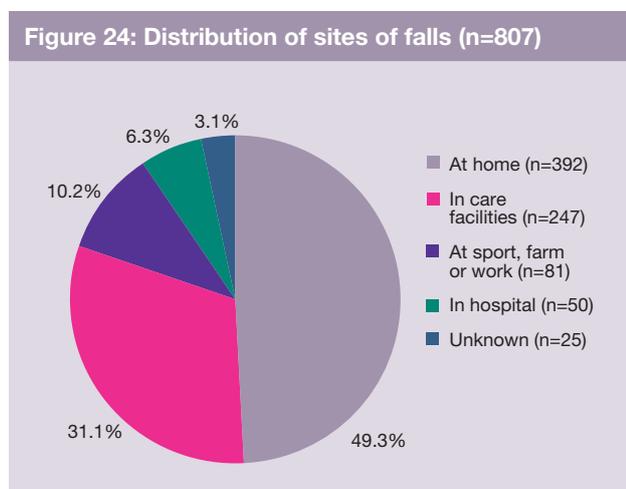
| Management issue                              | Aboriginal and Torres Strait Islander patients* | Non-Indigenous patients* | Risk Ratio (95% CI)# |
|---|---|--------------------------|----------------------|
| Postoperative complication                    | 35.8% (29/81)                                   | 32.6% (744/2282)         | 1.10 (0.81-1.48)     |
| Unplanned return to theatre                   | 14.8% (16/108)                                  | 11.7% (338/2886)         | 1.27 (0.80-2.01)     |
| Unplanned intensive care unit admission       | 16.7% (18/108)                                  | 14.6% (419/2862)         | 1.14 (0.74-1.75)     |
| Unplanned readmission                         | 4.7% (5/107)                                    | 2.7% (77/2855)           | 1.73 (0.72-4.19)     |
| Fluid balance issues                          | 10.3% (11/107)                                  | 10.2% (292/2861)         | 1.00 (0.57-1.78)     |
| Different actions by surgeon                  | 18.5% (20/108)                                  | 14.8% (425/2879)         | 1.12 (0.75-1.68)     |
| Treated in critical care unit after operation | 81.7% (67/82)                                   | 64.6% (1481/2292)        | 1.26 (1.14-1.41)†    |

\*As recorded by the surgeon; this question came into effect in January 2012.  
 # CI is a range of values for a statistic that is believed to contain, with a probability of 95%, the true value of that statistic.  
 † Result was statistically significant at the 0.05 level.

There was a significantly higher rate of treatment in a critical care unit for Aboriginal and Torres Strait Islander patients compared with non-Indigenous patients RR 1.26 (95% CI 1.14 to 1.41).

## REPORT ON FALLS (2012-2015)

Each year about one-third of the QASM cases comprise admissions to hospital following trauma (30.8%; 1,010/3,274), with falls being the most common cause (80.5%; 807/1,002) (see Figure 24).



Patients who had falls were mostly older patients. The median age for patients who had fallen was 84 years (IQR 74 years to 89 years). The median age for those who did not have falls was 74 years (IQR 63 years to 82 years).

The patients who had had the trauma from a fall stayed for a shorter length of time in hospital. The median length of stay for patients who had fallen was 8 days (IQR 4 days to 17 days). For those who did not have a fall, the median length of stay was 9 days (IQR 4 days to 20 days).

Most of the falls patients were admitted as Orthopaedic Surgery patients (70.3%; 567/807) and many were admitted as Neurosurgery patients (19.2%; 155/807).

## REPORT ON DOMESTIC VIOLENCE

Domestic violence is a social rather than surgical problem, but surgeons are called upon to deal with the consequences of this type of violence.

The QASM has collected data on patients admitted following domestic violence since 2011.

In the four years since data collection began there have been 4,951 cases submitted to the QASM. Of these cases, five have had domestic violence indicated on the SCF.

### DEMOGRAPHICS:

The median age of patients was 47 years (IQR 22 years – 53 years).

All five patients were males, however this number is low and needs to be interpreted with caution.

None of the patients were of Aboriginal or Torres Strait Islander descent.

### INCIDENCE:

There were five cases associated with domestic violence, resulting in an incidence rate of 0.1% (5/4,951) in the four years 2011/2012 and 2014/2015.

### SURGICAL ASPECTS:

|                   |   |
|-------------------|---|
| Specialties:      | General Surgery (n=2)<br>Neurosurgery (n=2)<br>Vascular Surgery (n=1) |
| Operative status: | Operation (n=3)<br>No operation (n=2)                                 |

### ADMISSION DIAGNOSIS NARRATIVE:

- ▶ acute subdural haemorrhage
- ▶ gunshot wound to the forehead and left mandible
- ▶ gunshot to abdomen
- ▶ stab wound to leg
- ▶ suicide by hanging

### CLINICAL INCIDENTS:

In no NTASM domestic violence cases did the surgeons consider that, in the patients' surgical care, they would have done anything differently nor did they think there had been an adverse event.

# QASM RECOMMENDATIONS FROM PREVIOUS REPORTS

| Category        | Recommendation  | Status   |
|-----------------|---|--|
| Surgeons        | To encourage participation in the QASM by all surgeons in public and private surgical practice.   | Complete   |
| Surgeons        | The changes to the RACS CPD compliance need to be communicated to all surgeons – i.e. mandatory participation in the QASM, where it is available, is required for ongoing CPD compliance. Also that CPD compliance is necessary for ongoing registration.   | Complete   |
| Surgeons        | To promote a culture of willing participation in the annual scientific meetings in an attempt to improve public and government perceptions of surgeons in this state.   | Complete   |
| <b>RACS</b>     |   |  |
| RACS            | To encourage the RACS Professional Standards Committee to review and increase the allocation of CPD points for the completion of both first- and second-line assessments for the QASM. This will encourage surgeon participation in both.   | Complete   |
| <b>QASM</b>     |   |  |
| QASM            | To provide individual reports to surgeons annually. Such reports should include the total number of cases, case form completion rates and times, and assessment status. This information should be accessible on the Fellows' Interface website at any time. The QASM should encourage more surgeons to use it. | Work in progress   |
| QASM            | The QASM should continue to monitor various aspects of data that it collects. Further understanding is needed of factors that are involved in delays in diagnoses. Understanding is also needed on how those delays impact on treatment, preoperative care, DVT prophylaxis and fluid management.               | Work in progress   |
| QASM            | The QASM should continue monitoring ICU/HDU availability and use to assess whether current bed allocation practices are adequate and appropriate.   | Complete. Results presented in this report.<br>Figure 6, P23.                    |
| QASM            | The QASM should develop yearly trend analysis as data becomes available and provide and develop specific recommendations for Queensland Health.   | Complete.<br>Figure 2, P14<br>Figure 11, P26<br>Figure 15, P27<br>Figure 21, P31 |
| QASM            | The QASM should continue participation in the ANZASM National Surgical Mortality Audit Reporting program.   | Work in progress   |
| <b>Seminars</b> |   |  |
| QASM            | The QASM has identified many needs in its data especially in respect to rural and remote patients. This data should be used as themes for seminars.   | Complete.<br>Appendix 5, P41   |
| QASM            | Plan: One seminar will be run by the QASM each year, based on issues identified in the QASM data as needing attention, as it has done in the past.  | Complete.<br>Appendix 5, P41   |

# QASM RECOMMENDATIONS FOR IMPROVED SURGICAL CARE IN QUEENSLAND

| Background   | Recommendation  |
|--|---|
| <b>Goal 1: Facilitate more effective care with elective patients</b>   |   |
| Knowing that elective patients are an important number of patients, and they have a high level of clinical incidents; Hospitals should ensure that these patients are given the same level of care as the emergency patients.  | Checklists and monitoring of the elective patients should be as assiduously done as for the emergency patients, once admitted to hospital.                      |
| <b>Goal 2: Enhance training for surgeons in the decision-making process</b>  |   |
| Preventable assessment problems are the most common source of clinical incidents in the QASM.  | The RACS and hospital authorities need to encourage surgeons to do more “non-surgical skills” training.   |
| <b>Goal 3: Develop processes for improving relations with ICU specialists</b>  |   |
| Communication between surgeons and ICU specialists should be open and frank about share patients.  | ICU specialists should be obliged to report back to surgeons when they make decisions about progressing patients on to rehabilitation or to the geriatric ward. |
| <b>Goal 4: Establish systems that protect the elderly in surgical care</b>   |   |
| While most patients who die are elderly with several comorbidities, they are very vulnerable. Hospitals must protect this vulnerable population as much as possible. There will be increased numbers of elderly patients as the average age of the population increases. | Multidisciplinary teams should be set up to cater for the needs of the elderly patients. The RACS should teach surgeons how to best function in these teams.    |
| <b>Goal 5: Provide funding for research into reducing incidence of avoidable clinical incidents.</b>   |   |
| Clinical incidents lead to increased mortality, morbidity and costs to patients and hospitals. Two thirds of the clinical incidents noted by the QASM assessors were preventable.  | Queensland Health Department should finance a research position to determine how preventable clinical events can be minimised in frequency.                     |
| <b>Goal 6: Improve the QASM process</b>  |   |
| Electronic data sharing is predicted to be the most efficient and effective way of communication in hospitals in the future.   | The QASM should be able to share data with electronic health records or medical records departments.  |

# QASM AUDIT LIMITATIONS 2007-2015

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As an audit, data is collected for monitoring purposes, rather than for academic research. {Russell, 2003 #42} Monitoring and academic systems have different purposes and different processes.

In audit terms the data is of a high level because every case has had external, independent peer review. An assessor who is from a different hospital to that in which the patient died reviews each case. This is standard process in all ANZASM audits.

Although the first-line assessor is blind to the treating surgeon's name, hospital name and patient's name, this is not possible for the second-line assessor.

The data is self-reported and a certain level of bias may be present, but an independent assessor makes their own assessment on the facts presented. Self-reporting in the SCF, which initiates the audit process, relies on the honesty of the surgeon.

The accuracy of the notifications of deaths to the QASM cannot be guaranteed. The efficiency of notifications could be improved if the notifications could be transferred from a centralised data base at Queensland Health by a direct linkage to the QASM data base. Notifications of death would then flow directly to the audit. This already occurs in several other state-based audits (VASM, SAAPM, TASM and WAASM).

The data in this report is generally expressed in simple frequencies. It has not been adjusted for age, sex, ASA grade, duration of operations or level of difficulty of operations. It is hoped in the future these factors will be incorporated into the calculations in these reports and the interpretation of the adjusted audit data will be more useful.

# QASM APPENDICES 2007-2015

## APPENDIX 1: SURGICAL SPECIALTIES

General Surgery was the specialty which had the largest group of patients in QASM.

|                                      | Frequency (n) | Total patients (%) |
|--------------------------------------|---------------|--------------------|
| General Surgery                      | 3029          | 40.1%              |
| Orthopaedic Surgery                  | 1526          | 20.2%              |
| Neurosurgery                         | 1300          | 17.2%              |
| Vascular surgery                     | 662           | 8.8%               |
| Cardiothoracic surgery               | 616           | 8.2%               |
| Urology                              | 216           | 2.9%               |
| Otolaryngology Head and Neck Surgery | 93            | 1.2%               |
| Plastic Surgery                      | 45            | <1.0%              |
| Paediatric Surgery                   | 30            | <1.0%              |
| Ophthalmology                        | 4             | <1.0%              |
| Obstetrics and Gynaecology           | 21            | <1.0%              |
| Oral Maxillofacial Surgery           | 6             | <1.0%              |
| Other                                | 3             | <1.0%              |
| <b>Total</b>                         | <b>7,551</b>  | <b>100.0%</b>      |

Table 1.2: Age of patients by specialty (n=7,550)

| Specialty                            | Median age (years) | Interquartile range* (years) | Range (years) |
|--------------------------------------|--------------------|------------------------------|---------------|
| General Surgery                      | 77                 | 66-85                        | 1-105         |
| Orthopaedic Surgery                  | 84                 | 76-90                        | 2-102         |
| Neurosurgery                         | 62                 | 48-74                        | 0-97          |
| Vascular Surgery                     | 77                 | 69-83                        | 4-96          |
| Cardiothoracic Surgery               | 69                 | 56-77                        | 0-92          |
| Urology                              | 78                 | 68-85                        | 22-101        |
| Otolaryngology Head and Neck Surgery | 73                 | 60-79                        | 0-96          |
| Plastic Surgery                      | 73                 | 67-85                        | 36-93         |
| Paediatric Surgery                   | 0                  | 0-1.5                        | 0-17          |
| Obstetrics and Gynaecology           | 71                 | 53-81                        | 29-88         |

\*The interquartile range shows the values for the data within the 25% and 75% limits. It overcomes the problems that can arise with the simple range because extreme values are ignored. It represents the middle 50% of values in a rank ordered series. (Argyrous, 2002)

## APPENDIX 2: POSTOPERATIVE COMPLICATIONS BY SPECIALTY

**Table 2.1: Proportion of patients who had complications by specialty, 2007-2015 (n=4,795)**

| Specialty                            | Patients with complications (n) | Total patients | Proportion with complications (%) |
|--------------------------------------|---------------------------------|----------------|-----------------------------------|
| Cardiothoracic Surgery               | 279                             | 468            | 59.6%                             |
| General Surgery                      | 644                             | 1,742          | 37.0%                             |
| Neurosurgery                         | 169                             | 780            | 21.7%                             |
| Obstetrics and Gynaecology           | 9                               | 17             | 52.9%                             |
| Ophthalmology                        | 0                               | 3              | 0.0%                              |
| Oral/ maxillofacial Surgery          | 0                               | 2              | 0.0%                              |
| Orthopaedic Surgery                  | 241                             | 1,070          | 22.5%                             |
| Otolaryngology Head and Neck Surgery | 14                              | 55             | 25.5%                             |
| Paediatric Surgery                   | 3                               | 25             | 12.0%                             |
| Plastic Surgery                      | 12                              | 35             | 34.3%                             |
| Urology                              | 34                              | 144            | 23.6%                             |
| Vascular Surgery                     | 195                             | 454            | 43.0%                             |
| <b>Total</b>                         | <b>1,600</b>                    | <b>4,795</b>   | <b>33.4%</b>                      |

## APPENDIX 3: WHEN SURGEONS ARE ASKED; “IN RETROSPECT, WOULD YOU HAVE DONE ANYTHING DIFFERENTLY?”

Examples of comments from surgeons are provided below:

- ▶ Would not have accepted patient transfer.
- ▶ Would not have offered second attempt at surgery. This was a terminal event in a demented 88 year old male.
- ▶ The decision to operate at all on this patient given his injuries. His age and the timing of presentation to hospital were considered in deciding to proceed.
- ▶ Possibly could have treated urosepsis more aggressively.
- ▶ Re-check postoperative progress on first postoperative night.
- ▶ Reconsidered operation.
- ▶ Patient should have had cardiac medications on day of original planned surgery. This would have given the operation a day earlier, but potentially made no other difference to the final outcome.
- ▶ Perform upper gastrointestinal endoscopy.
- ▶ Refuse patient and family requests for surgery.
- ▶ Medical consultation on admission instead of when patient first became confused.
- ▶ Monitor electrolytes more closely after increment of frusemide by medical team.
- ▶ Improved rehydration on admission.
- ▶ In hindsight I question whether any surgery was too much. It was a long and difficult operation and emphasises the risks involved in complex medical patients

## APPENDIX 4: HOSPITALS PARTICIPATING IN QASM

Thirty **public** hospitals (100%) are participating in the QASM.

### PUBLIC HOSPITALS:

- ▶ Beaudesert Hospital
- ▶ Bundaberg Hospital
- ▶ Caboolture Hospital
- ▶ Cairns Base Hospital
- ▶ Caloundra Hospital
- ▶ Gladstone Hospital
- ▶ Gold Coast University Hospital
- ▶ Gympie Hospital
- ▶ Hervey Bay Hospital
- ▶ Ipswich Hospital
- ▶ Lady Cilento Children's Hospital
- ▶ Longreach Hospital
- ▶ Logan Hospital
- ▶ Mackay Base Hospital
- ▶ Maryborough Hospital
- ▶ Mater Public Adult Hospital
- ▶ Mater Public Children's Hospital
- ▶ Mater Mothers' Hospital
- ▶ Mount Isa Hospital
- ▶ Nambour General Hospital
- ▶ Princess Alexandra Hospital
- ▶ Queen Elizabeth 11 Jubilee Hospital
- ▶ Redcliffe Hospital
- ▶ Redland Hospital
- ▶ Robina Hospital
- ▶ Rockhampton Base Hospital
- ▶ Royal Brisbane and Women's Hospital
- ▶ The Prince Charles Hospital
- ▶ The Townsville Hospital
- ▶ Toowoomba Hospital

### PRIVATE HOSPITALS:

Thirty-six **private** hospitals (100%) are participating in the QASM.

- ▶ Allamanda Private Hospital
- ▶ Brisbane Private Hospital
- ▶ Caboolture Private Hospital
- ▶ Cairns Private Hospital
- ▶ Friendly Society Private Hospital
- ▶ Greenslopes Private Hospital
- ▶ Gympie Private Hospital
- ▶ Hervey Bay Surgical Hospital
- ▶ Hillcrest Rockhampton Private Hospital
- ▶ Holy Spirit Northside Private Hospital

- ▶ John Flynn Gold Coast Private Hospital
- ▶ Kawana Private Hospital
- ▶ Mater Hospital Pimlico
- ▶ Mater Private Hospital Brisbane
- ▶ Mater Misericordiae Hospital Bundaberg
- ▶ Mater Misericordiae Hospital Gladstone
- ▶ Mater Misericordiae Hospital Mackay
- ▶ Mater Misericordiae Hospital Rockhampton
- ▶ Mater Private Hospital Redland
- ▶ Mater Women's and Children's Hospital Hyde Park
- ▶ Nambour Selangor Private Hospital
- ▶ Noosa Hospital
- ▶ North West Brisbane Private Hospital
- ▶ Peninsular Private Hospital
- ▶ Pindara Private Hospital
- ▶ South Burnett Private Hospital
- ▶ St Andrew's Ipswich Private Hospital
- ▶ St Andrew's Toowoomba Hospital
- ▶ St Andrew's War Memorial Hospital
- ▶ St Stephen's Private Hospital (Hervey Bay)
- ▶ St Vincent's Private Hospital Toowoomba
- ▶ Sunnybank Private Hospital
- ▶ Sunshine Coast University Private Hospital
- ▶ The Sunshine Coast Private Hospital
- ▶ The Wesley Hospital

### DAY HOSPITALS:

Fifteen **day hospitals** (41.0%) are participating in the QASM. Three day hospitals have declined participation.

- ▶ Brisbane Endoscopy Services
- ▶ Cairns Day Surgery
- ▶ Chermside Day Hospital
- ▶ Chermside Dialysis Clinic
- ▶ Ipswich Day Hospital
- ▶ Mackay Specialist Day Hospital
- ▶ Nambour Day Surgery
- ▶ Noosa Surgery and Endoscopy Centre
- ▶ Pacific Day Surgery Centre
- ▶ Pacific Private Day Hospital
- ▶ Short Street Day Surgery
- ▶ Southport Day Hospital
- ▶ T&G Day Surgery
- ▶ Toowoomba SurgiCentre
- ▶ Townsville Day Surgery

## APPENDIX 5: QASM SEMINARS

| Year | Seminars  | Attendees |
|------|---|-----------|
| 2011 | <i>Queensland Surgical Dilemmas: Distance, Delays and Deteriorating Patients</i>      | 79        |
| 2012 | <i>Complex Decision Making</i>  | 91        |
| 2012 | <i>Seminar for nurses and paramedics: Distance, Delays and Deteriorating Patients</i> | 80        |
| 2013 | <i>Adverse Events – Systems or Surgeons</i>   | 70        |
| 2014 | <i>Situational Awareness and the Surgeon</i>  | 45        |
| 2015 | <i>Operating on the Obese Patient</i>   | 124       |

## APPENDIX 6: LESSONS FROM THE AUDIT – TITLES AND THEMES (2007 - 2015)

|                  |  |
|------------------|--|
| <b>Volume 1</b>  | Cardiac  |
| <b>Volume 2</b>  | Perforated T-cell gastric lymphoma undergoing chemotherapy             |
| <b>Volume 3</b>  | Bronchial stump leak   |
| <b>Volume 4</b>  | Abdominal sepsis following elective laparoscopic ventral hernia repair |
| <b>Volume 5</b>  | Serious multi-trauma patients demand serious measures                  |
| <b>Volume 6</b>  | Multiple systems – multiple obstructions to best patient care?         |
| <b>Volume 7</b>  | Decision before incision!  |
| <b>Volume 8</b>  | Death after endoscopy – ‘surgical audit’ or not?                       |
| <b>Volume 9</b>  | Not in that institution... please!                                     |
| <b>Volume 10</b> | History and examination is still important for surgeons                |
| <b>Volume 11</b> | Communication issues   |
| <b>Volume 12</b> | Preoperative management issues   |
| <b>Volume 13</b> | The obese surgical patient   |
| <b>Volume 14</b> | When not to operate  |
| <b>Volume 15</b> | Postoperative complications  |
| <b>Volume 16</b> | Fluid balance issues   |

## APPENDIX 7: QASM PRESENTATIONS 2012-2015

| Date        | Title   | Presenter or Attendee                        | Location                            |
|-------------|---|--|-------------------------------------|
| Sept 2015   | Population Health Congress  | Therese Rey-Conde                            | Hobart                              |
| August 2015 | RACS Western Australian Audit of Surgical mortality seminar ASM                               | John North                                   | Perth                               |
| August 2015 | RACS Northern Territory / South Australian / and Western Australian Annual Scientific Meeting | John North                                   | Darwin                              |
| July 2015   | RACS Queensland ASM   | John North                                   | Magnetic Island                     |
| July 2015   | Surgical Training in Acute Illness and Injury Recognition (STAIRS)                            | John North / Therese Rey-Conde               | Gold Coast                          |
| June 2015   | Royal Brisbane and Women's Hospital (RBWH) Clinical Governance meeting                        | John North / Therese Rey-Conde / Kyrsty Webb | Royal Brisbane and Women's Hospital |
| May 2015    | Annual Scientific Congress (ASC)  | John North                                   | Perth                               |
| May 2015    | Black Card Reconciliation   | Sonya Faint                                  | Brisbane                            |
| Feb 2015    | Data Presentation   | Sonya Faint                                  | Melbourne                           |
| Nov 2014    | Australasian Mortality Data Interest Group (AMDIG) meeting                                    | Therese Rey-Conde                            | Sydney                              |
| Aug 2014    | Patient Safety Forum, Queensland Health   | Therese Rey-Conde                            | Brisbane                            |
| Aug 2014    | RACS Northern Territory Trauma Seminar  | Therese Rey-Conde                            | Darwin                              |
| Aug 2014    | RACS Queensland Annual Scientific Meeting   | John North                                   | Noosa                               |
| Feb 2014    | RACS Trauma seminar   | John North                                   | Brisbane                            |
| Dec 2014    | Directors of Medical Services Advisory committee  | John North                                   | Brisbane                            |
| Nov 2013    | RACS Queensland Audit of Surgical Mortality seminar   | John North                                   | Brisbane                            |
| Oct 2013    | Advanced epidemiology course  | Therese Rey-Conde                            | Brisbane                            |
| Oct 2013    | Surgical Training in Acute Illness and Injury Recognition (STAIRS)                            | John North                                   | Gold Coast                          |
| Sept 2013   | Diagnostic accuracy in medicine Meeting NSQIP   | Therese Rey-Conde (self-funded)              | Chicago (USA)                       |
| Aug 2013    | RACS Northern Territory / South Australian / and Western Australian Annual Scientific Meeting | John North                                   | Darwin                              |
| Aug 2013    | Ramsay Chief Executive Officer meeting  | John North / All staff                       | Brisbane                            |
| Aug 2013    | RACS Queensland Annual Scientific Meeting   | John North / Jenny Allen                     | Cairns                              |
| Sept 2013   | Australasian Association Quality in Health Care Meeting (AAQHC)                               | Jenny Allen                                  | Cairns                              |
| June 2013   | Qld Epidemiology Group  | Therese Rey-Conde / Jenny Allen              | Brisbane                            |
| May 2013    | Annual Scientific Meeting, New Zealand  | John North                                   | New Zealand                         |
| Feb 2013    | Michael Cleary  | John North                                   | RACS                                |
| Nov 2012    | Australasian Mortality Data Interest Group (AMDIG) meeting AMDIG                              | Therese Rey-Conde                            | Sydney                              |
| Nov 2012    | RACS Queensland Audit of Surgical Mortality seminar   | John North / all staff                       | Brisbane                            |
| Sept 2012   | Surgical Training in Acute Illness and Injury Recognition (STAIRS)                            | John North                                   | Gold Coast                          |
| Aug 2012    | RACS Queensland Annual Scientific Meeting   | John North / Therese Rey-Conde / Jenny Allen | Stradbroke Island                   |

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- ▶ participating surgeons
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- ▶ second-line assessors
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- ▶ hospital departments of surgery
- ▶ Queensland Health (project funding)
- ▶ RACS (project infrastructure)
- ▶ the Research, Audit and Academic Surgery Division and the RACS ANZASM Steering Committee

## QASM STEERING COMMITTEE 2014/2015

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# NOTES



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Queensland Audit of Surgical Mortality

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