Tasmanian Audit of Surgical Mortality

ANNUAL REPORT 2013

Royal Australasian College of Surgeons

Tasmanian Government

UTAS FACULTY OF HEALTH SCIENCE School of Medicine

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The information contained in this annual report has been prepared under the auspices of the Royal Australasian College of Surgeons, Tasmanian Audit of Surgical Mortality Management Committee, which is a declared quality assurance committee under the Tasmanian *Health Act 1997*.

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Chairman's report

This year represents the Tasmanian Audit of Surgical Mortality's (TASM) tenth anniversary, and the twentieth for its progenitor, the Scottish Audit of Surgical Mortality. It is thus an appropriate time to reflect upon the achievements of the audit process. Since the Australian Surgical Audits were established (led by the Western Australia Audit of Surgical Mortality in 2001), deaths under surgical care have been declining. An analysis of Australian Institute of Health and Welfare data shows that perioperative mortality numbers in Australia have decreased over the four year period 2009-13 by 2.8%/year. This has occurred in the face of an increase in the number of operations carried out of 2.5%/year, so that the mortality rate has dropped by 5.4%/year during this quadrennium. Overall mortality has now come down to 2.9/1,000 operations (amounting to 7,105 deaths in 2012/13), and to only 0.76/1,000 operations for elective procedures.

This significant reduction is not necessarily due to the audit process (an association we know is not causation), but it is not unreasonable to suggest that the audit may be contributing at least in part. The improvement in deep vein thrombosis prophylaxis rates was probably an early effect, for example. More recently, problems of fluid balance and transfer delay have been addressed in educational activities and collaboration with the health department, respectively. In Tasmania, all surgeons participate in the audit- the surgical case form return rate for this year is 100%. Many have carried out first-line reviews, and a significant numbers have undertaken the more arduous second-line reviews. For me at least, reviewing inevitably leads to the thought- "How will my own actions appear if they come to be reviewed? Is what I am doing in accord with the practice of my peers? Is it in accord with the evidence?" And where the consensus is not the same as the evidence, this may even help to push normal practice toward best (evidence-based) practice. These questions, and this push, driven by universal audit, are hopefully a further contribution to the reduction in surgical mortality that we are seeing.

There is an old saying that a surgeon makes their living from the patients whom they operate on, and their reputation from those that they do not operate on. The audited deaths are dominated by the elderly, especially those with multiple comorbidities, and the question of futile surgery is not infrequently raised by surgeons on case forms, and by reviewers. We are all aware of the invidious situation in which we are often placed when the question of withholding care arises, and we cannot be driven by surveillance to 'shirk' high risk procedures. Nevertheless, each year contributing surgeons and assessors identify cases where operation would better have been withheld. If audit helps us to navigate this knife-edge, then this too will improve outcomes, and also improve resource utilitisation.

As the above considerations show, there is reason to believe that TASM is functioning as a mechanism to alert surgeons to areas in which practice can be improved, and this validates the College's requirement for fellows to participate in order to satisfy Continuing Professional Development (CPD) requirements. It is pleasing though that full participation here in Tasmania had already been achieved on a voluntary basis. Can I once again thank all of my colleagues for their

participation, and especially those who have acted as reviewers or members of the TASM Committee.

Mr Rob Bohmer

Chair, TASM

The department remains committed to the TASM process. The evidence suggests that peer-based audit processes do lead to changes in surgeon behaviour and to an increased emphasis on the delivery of safe, high quality care. The department wishes to continue to engage with Tasmanian surgeons to improve care delivery. Current work to better define the roles of healthcare organisations, and to develop an overarching clinical services plan for Tasmania, must be informed by an understanding of designing care for safety. Audit programs such as TASM are central to understanding how this should be achieved. The department also wishes to encourage the surgical community to engage in building safe, effective care systems in each of our clinical environments, recognising that this is what the community wants, and secondly that care is not delivered by individuals in isolation, but rather as part of a complex social model – the care team. The department will continue to work closely with the clinical community to understand what needs to be done to support better care.

Grant Phelps

Medical Director Service Quality and Improvement

Abbreviations

ANZCA	Australian and New Zealand College of Anaesthetists
ANZASM	Australian and New Zealand Audit of Surgical Mortality
ASA	American Society of Anaesthesiologists
DHHS	Department of Health and Human Services
DVT	deep vein thrombosis
FRACS	Fellow of the Royal Australasian College of Surgeons
HDU	high dependency unit
ICU	intensive care unit
RAAS	Research, Audit and Academic Surgery Division
RACS	Royal Australasian College Of Surgeons
SCF	surgical case form
SPSS	Statistical Package for Social Sciences
TAS	Tasmania
TASM	Tasmanian Audit of Surgical Mortality

Executive summary

Background

The Tasmanian Audit of Surgical Mortality (TASM) is an external, independent, peer-review audit of the process of care associated with surgically-related deaths in Tasmania.

TASM is funded by the Tasmanian Department of Health and Human Services (DHHS) and has statutory immunity under both state and federal legislation.

In 2005 the Royal Australasian College of Surgeons took responsibility for oversight of the Western Australian Audit of Surgical Mortality project. Subsequently the College established the Australian and New Zealand Audit of Surgical Mortality (ANZASM). Similar mortality audits have been established in Tasmania, South Australia, Queensland, Victoria, Australian Capital Territory and Northern Territory. New South Wales provides comparable data to ANZASM but is independently managed by the Clinical Excellence Commission.

Audit summary

- There were 135 deaths in the 2013 Annual Report, compared with 122 in the 2012 reporting period.
- The surgical case form (SCF) return rate was 100%. There were no outstanding forms as at the census date.
- Fourteen cases were terminal care and therefore excluded from the audit process.
- A total of 121 cases underwent the assessment process, and these cases provide the data for this report.

Surgeons

- All consultant surgeons in Tasmania currently participate in TASM. The surgeons are to be commended for their participation in, and commitment to, the audit process.

Hospitals

- All 13 private and public hospitals in Tasmania currently participate in TASM.
- 88% of audit patients were admitted as emergencies.
- Death within 30 days of an operation occurred in 65% of emergency patients and 100% of elective admission patients.
- 24% of patients did not undergo an operation.
- 11% of patients were reported as having an unplanned return to theatre.
- Patients were transferred between hospitals in 17% of cases.

Patients

- Males accounted for 52% of audit cases, with a median age of 76 years. Females accounted for 48% of audited cases.
- 91% of patients presented with at least one significant comorbidity.
- A total of 13% of cases were referred for second-line assessment (case note review) compared with the national rate of 12% (ANZASM National Report 2013[1]).
- 60% of cases had an American Society of Anesthesiologists (ASA) grade of 4 or above.

Cases with clinical incidents

- There were 24 cases that were associated with areas of concern or adverse events.
- The death of one patient was caused by an adverse event that was viewed by assessors as being probably preventable.

Key points

- The majority of patients reported in this audit were elderly, and in general:
  - > had several pre-existing comorbidities;
  - > were at considerable risk with surgery;
  - > had undergone emergency surgery.
- There are several recognised characteristics associated with a high risk of death at surgery. Many patients in this audit had more than one high-risk factor prior to or following surgery. For example:
  - > 91% of cases had at least one serious comorbidity;
  - > 73% of cases were over 70 years of age;
  - > 12% of cases had unplanned admissions to the intensive care unit (ICU) following surgery.
- Postoperative complications were experienced by 44% of patients, compared with 34% of patients nationally in 2013 [(1)].
- Assessors identified areas of management in the preoperative and postoperative case periods that could be improved; however, problems relating to intraoperative care were rare.
- Timing in surgical management (delays in surgery, delay to diagnosis) is an area for improvement.
- The audit should continue to review falling surgical mortality rates to ascertain whether the audit process has contributed to the reduction of surgical mortality in Tasmania. This could identify trends in which further perioperative improvements can be made in collaboration with the department.

1. Introduction

Key points:

- TASM audits surgically-related deaths in Tasmania.
- This report contains data from 1 July 2012 to 30 June 2013, as well as select comparisons with data from earlier years.
- The TASM process involves self-reporting by surgeons and peer-review by first- and second-line assessors.
- TASM exists to inform, educate, facilitate change and improve practice. It achieves this by providing expert analysis and feedback to surgeons, hospitals and the community.
- Participation in the audit is now mandatory for continuing professional development recertification by the Royal Australasian College of Surgeons.
- Surgeon participation in the audit is mandatory in hospitals in Tasmania, and is part of the surgeon credentialing process.

1.1 Background

TASM is an external and independent peer-review audit of the process of care associated with deaths occurring during medical and surgical admissions in Tasmania. The audit is funded by the DHHS Tasmania and its methodology is based on the Scottish Audit of Surgical Mortality.

The Royal Australasian College of Surgeons oversees, manages and provides infrastructure support to the audit. In 2005 the College formed ANZASM with the purpose of extending mortality audits to all Australian states and territories. This was achieved in 2010.

1.2 Project governance and confidentiality

The governance structure of ANZASM is illustrated in Figure 1. The TASM governance structure is illustrated in Figure 2.

The information contained in this annual report has been prepared under the auspices of the Royal Australasian College of Surgeons, Tasmanian Audit of Surgical Mortality Management Committee, which is a declared quality assurance committee under the Tasmanian *Health Act 1997*.

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

Figure 1: Governance structure of the Australian and New Zealand Audit of Surgical Mortality (ANZASM) and the Tasmanian Audit of Surgical Mortality (TASM)

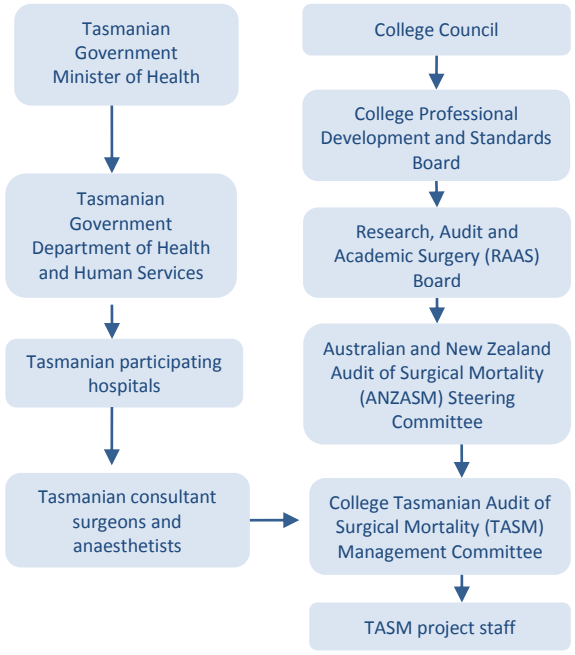
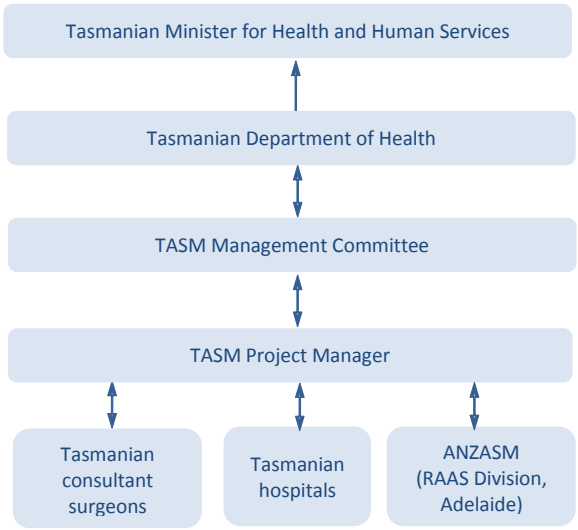


Figure 2: Tasmanian Audit of Surgical Mortality (TASM) governance structure



ANZASM: Australian and New Zealand Audit of Surgical Mortality. RAAS: Research, Audit and Academic Surgery Division.

1.3 The audit process

1.3.1 Notification of deaths

TASM audits public and private hospital deaths that occurred when a surgeon was involved in the management of a patient, whether or not the patient underwent a surgical procedure.

The medical records departments of the participating hospitals, both public and private, notify TASM of all surgically-related deaths. Each participating hospital is aware of TASM's inclusion criteria (see 1.3.4) and reports surgically-related deaths weekly or monthly.

1.3.2 Methods

Once TASM has been notified of a death, the information is entered into a secure database and the consultant surgeon is asked to complete an SCF (online or paper). Events associated with the death are reported by the surgeon on the SCF against the following criteria.

- *Area for consideration* — where the clinician believes an area of care could have been improved or different, but recognises that there may be debate about this.
- *Area of concern* — where the clinician believes that an area of care should have been better.
- *Adverse event* — an unintended 'injury' caused by medical management, rather than by the disease process, which is sufficiently serious to:

- lead to prolonged hospitalisation;
- lead to temporary or permanent impairment or disability of the patient at the time of discharge;
- contribute to or cause death.

The consultant surgeon is responsible for the completion of the SCF. Once the complete SCF is returned to TASM it is deidentified and sent to a different surgeon for first-line assessment (peer review). The first-line assessor is a consultant surgeon of the same specialty who is from a different hospital to the original surgeon. The audit allows for cases to be sent interstate for review when deemed necessary.

The first-line assessor determines whether the case should undergo further assessment (second-line assessment), which involves reviewing the medical records for the case. The first-line assessor may also close the case at this stage. The first-line assessor may find no clinical incidents, or may find clinical incidents which do not need further assessment.

Cases undergo a second-line assessment when:

- an area of concern has been identified, or an adverse event is thought to have occurred during the clinical care of the patient, that warrants further investigation;
- there is insufficient information on the SCF for the assessor to reach a conclusion;
- a report could usefully draw attention to 'lessons to be learned' for either the clinicians involved, or the wider surgical community through inclusion of the case in a case note review booklet.

The second-line assessor is a senior consultant surgeon of the same specialty but from a different hospital to the treating surgeon. On the rare occasion that there is no appropriate Tasmanian assessor, the assessment is undertaken by an interstate surgeon under the ANZASM framework.

1.3.3 Providing feedback

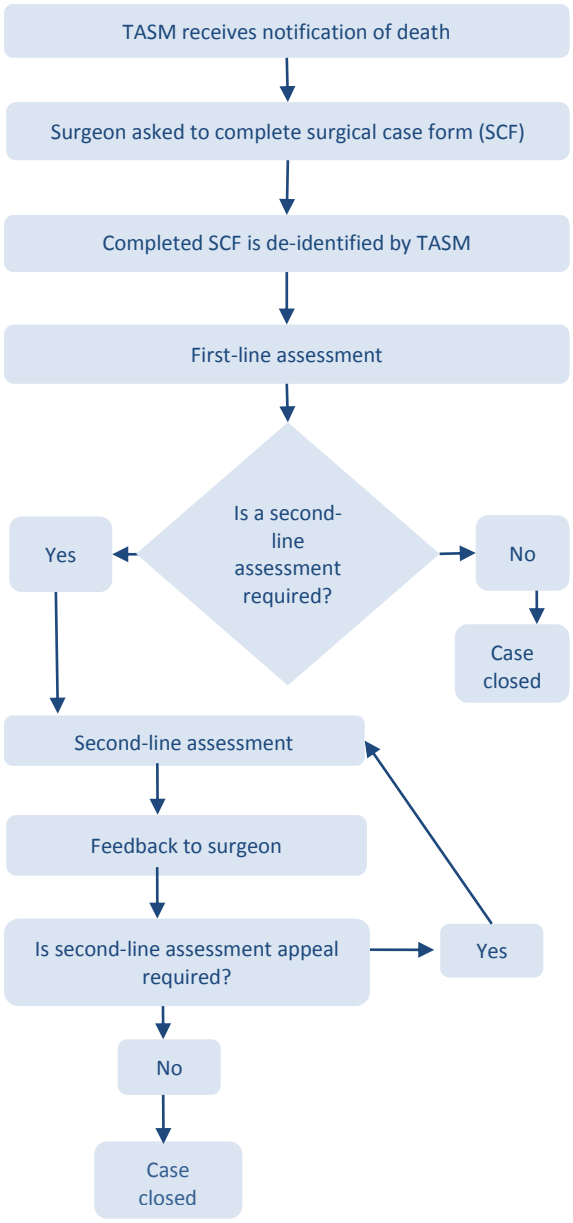
Surgeons receive feedback from first-line assessors about each of their cases through TASM. They also receive extensive reports after each second-line assessment. TASM provides guidelines for assessors regarding the provision of feedback, and the assessor feedback provided to the surgeons is de-identified.

In addition, aggregated feedback in the form of annual reports and case note review booklets are disseminated to all surgeons and hospitals via the RACS website. The annual report is also made publicly available.

Aggregated feedback and related clinical events are not linked to individual patients, surgeons or hospitals. The deidentification process is managed by the TASM project manager following ANZASM guidelines and is coordinated through a secure database.

Hospitals participating in TASM may request reports on aggregated, de-identified data relating specifically to their hospitals and comparing them to the averages of other hospitals.

Figure 3: The Tasmanian Audit of Surgical Mortality (TASM) methodology



The SCF and first-line assessments can be completed online via the Fellows Interface, or via the use of paper forms.

1.3.4 Audit inclusion and exclusion criteria

TASM 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;
- 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 criteria it is excluded from the audit by the notifying hospital. If TASM is notified of a death and the case does not fall within the inclusion criteria, the death is excluded.

TASM also excludes terminal care cases from the full audit process.

In addition to patients under the care of a specialist from the Royal Australasian College of Surgeons, TASM includes cases where the specialist was from one of the following Colleges:

- The Royal Australian and New Zealand College of Obstetricians & Gynaecologists;
- The Australian and New Zealand College of Anaesthetists.

1.4 Reporting conventions

1.4.1 Reporting clinical incidents

Surgeons and assessors are asked to:

- Give their opinion as to whether the incident was preventable, under the categories:
  - > definitely
  - > probably
  - > probably not
  - > definitely not

  In this report, the categories 'definitely' and 'probably' are referred to as preventable.
- Indicate who the incident was associated with, categorising this information as:
  - > audited surgical team
  - > another clinical team
  - > hospital
  - > other.
- Report on whether the event:
  - > 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.

1.4.2 Assessor opinion

The areas for consideration, areas of concern and adverse events contained in this report were events ascribed to the case by either the first-line assessor or the second-line assessor (referred to as 'assessors').

The categorisation of the severity of the event, the effect on outcome, and the team or location the event was associated with, are the opinions of the assessors.

1.4.3 Focus of reporting

TASM reports focus primarily on areas of concern and adverse events (see 1.3.2).

Areas for consideration are excluded from this analysis because they usually make no difference to the outcome and are simply an indication that there were different options. However, areas for consideration are included in the data collection process to facilitate reporting of less serious events, an important factor in improving overall patient care.

Some cases were associated with more than one clinical incident. In this situation, where analysis of clinical incidents was reported by case, the most serious incident was ascribed to the case.

1.4.4 Missing data

Numbers in parentheses in the text (n) represent the number of cases analysed. Not all data were complete; therefore, the total number of cases used in different sections of the analysis varies. The total numbers of cases included in each analysis are provided for tables and figures in the report, where applicable.

1.4.5 Data analysis

TASM analysed areas of concern and adverse events ascribed to each case by assessors. Data is encrypted in the database with Secure Sockets Layer certificates. This data is sent to and stored in a central Structured Query Language server database which includes a reporting engine. All transactions are time stamped. All changes to audit data are written to an archive table, enabling a complete audit trail for each case.

An integrated workflow rules engine supports the creation of letters, reminders and management reports. The project manager enters all data from each TASM form in instances where it has not been submitted online by the surgeon or assessor using the Fellows Interface.

Data are downloaded from the secure database into Microsoft Excel 2010 spreadsheets and then analysed using IBM Statistical Package for Social Sciences (SPSS) Version 19. Data are cleaned 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. Twelve tables are downloaded and copied into SPSS. A key variable is used that is common to all tables.

Generally, simple frequencies and cross tabulations are used after selecting for the correct criteria for the particular analysis. When indicated, data are checked against the original SCF and assessment forms. Medical records departments, surgeons, the Coroner's Office reports and the Chairman collaborate with TASM to maintain data integrity.

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

2. Audit 2013

2.1 Overview of TASM 2013

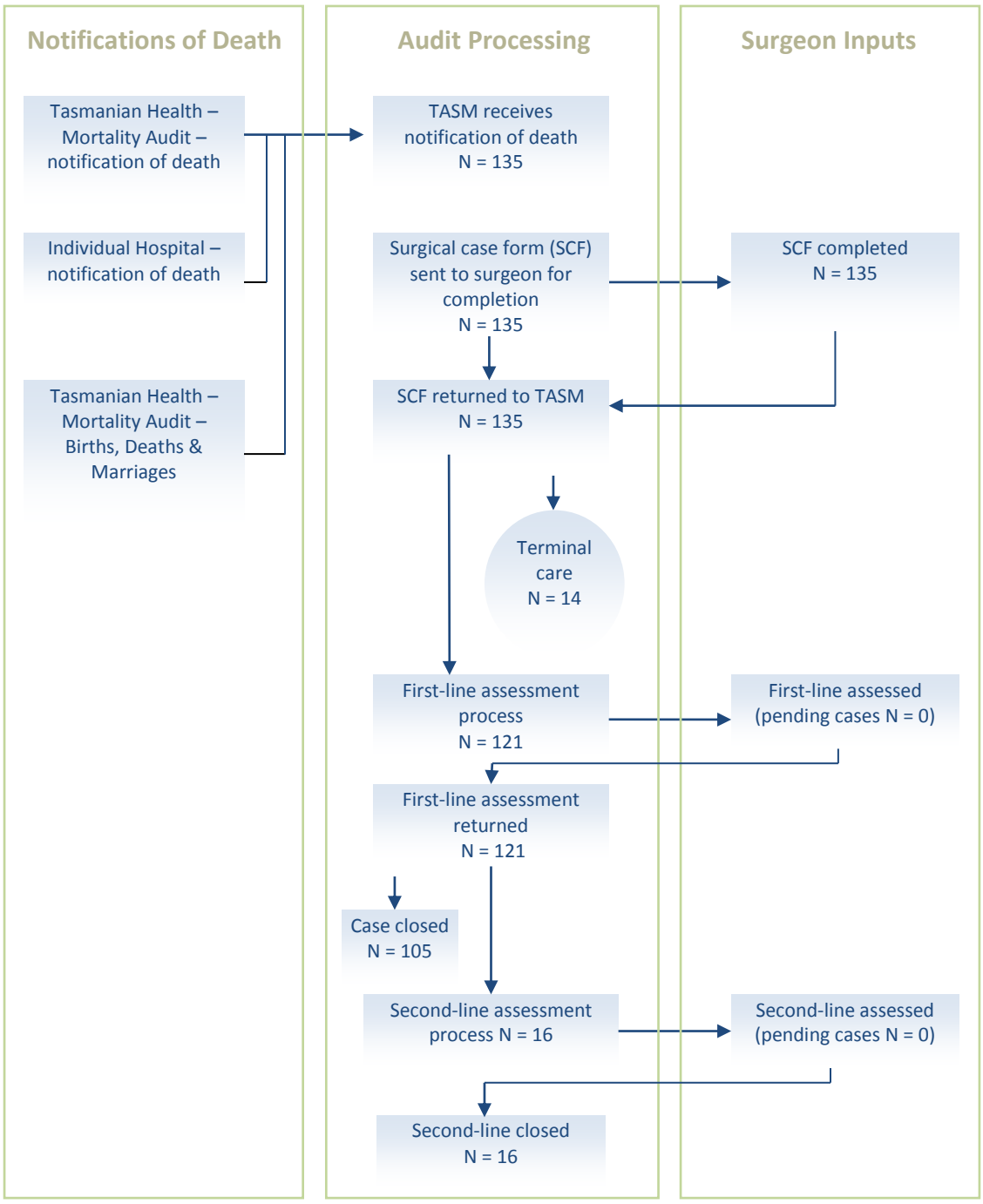
Key points:

- A total of 135 surgically-related deaths were reported to TASM from 1 July 2012 to 30 June 2013.
- The SCF return rate at census date for participating surgeons was 100%.
- The number of deaths under the care of a surgeon showed a small increase from the previous report of 122 deaths. (Section 4)
- All 163 Tasmanian consultant surgeons (100%) are involved in the audit process. (Section 3)
- As all Tasmanian surgeons are participating, and where possible cases were assessed by a surgeon who did not work in the hospital in which the patient died. (Section 1)
- TASM's process is consistent with all ANZASM audits and allows for independent peer review of all cases. (Section1)

The TASM 2013 Annual Report includes data collected from 1 July 2012 to 30 June 2013. As this audit is a work in progress, some assessments from the 2012 audit report were returned to TASM during the 2013 audit period. Therefore, this report also includes finalised data from the TASM 2012 audit period, which was originally reported in the 2012 TASM Annual Report.

The 2013 TASM annual report has a 100% return rate of all of its surgical case forms that were sent out during the reporting year.

Figure 4: Populated flow chart for 2013



SCF: surgical care form

3. Results

Key points:

- All 163 Tasmanian consultant surgeons participated in TASM.
- Surgeons returned 100% of SCFs by the census date (135/135).
- 69% of participating surgeons are Fellows of the Royal Australasian College of Surgeons (FRACS) (112/163).
- The other 31% of surgeons includes obstetricians and gynaecologists, ophthalmologists and International Medical Graduates (51/163).
- Four public and nine private Tasmanian hospitals participate in TASM.
- In total, 17% (20/121) of all cases were transferred between hospitals. This is an increase and change from 10% in the last TASM annual report.

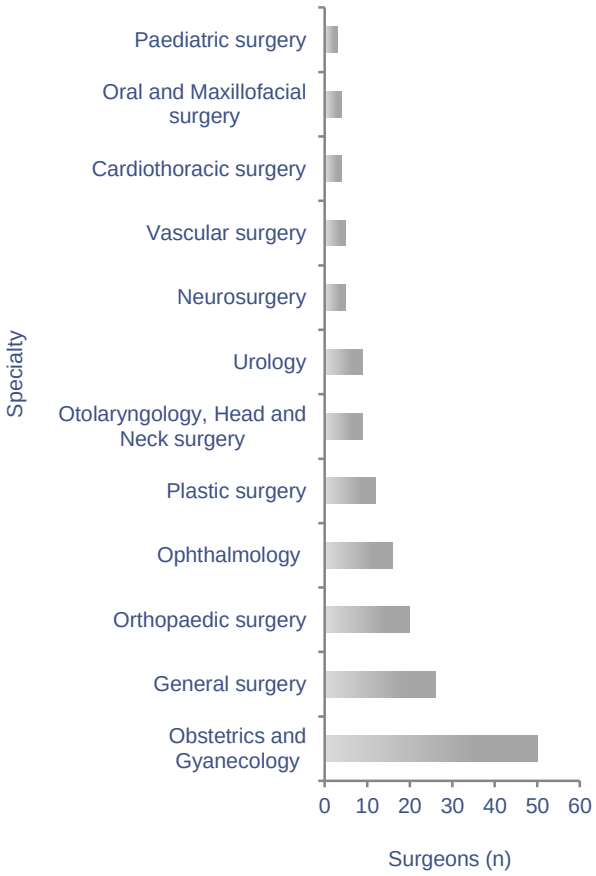
3.1 Surgeons

The primary role of TASM is to inform, educate, facilitate change and improve practice by providing feedback to surgeons.

3.1.1 Surgeon participation by specialty

The specialty distribution of participating surgeons is seen in Figure 5.

Figure 5: Specialty of participating surgeon (N=163)

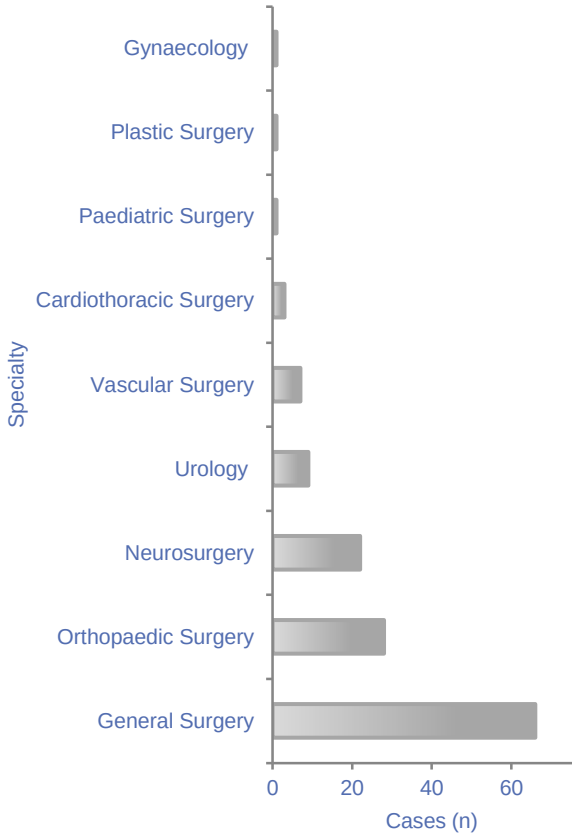


Comment

Surgeons are considered to be participating when they submit either an SCF or a form agreeing to participate. Many surgeons who participate in the audit have not been involved with a surgically-related death that meets the TASM inclusion criteria. Surgeon numbers fluctuate due to the inclusion in the audit of visiting surgeons on short-term contracts or locum appointments.

An overview of the number of death notifications received during the audit period by specialty is shown in Figure 6 below.

Figure 6: Number of death notifications by specialty (N=135)



3.1.2 Surgeon completion of surgical case forms

Surgeons returned 100% (135/135) of SCFs by the census date. This is higher than the 2013 national average of 94%[(1)].

3.1.3 Grade of surgeon completing the surgical case form

The grade of surgeon completing the SCF is shown in Table 1. It is encouraging to see that Surgical Education and Training trainees are being involved in the audit process, although final responsibility for completion of the SCF remains with the consultant surgeon.

Table 1: Grade of surgeon completing the surgical case form

Grade of surgeon completing form	%
Consultant	83%
Service registrar	4%
International Medical Graduate	4%
Surgical Education and Training trainee	9%

3.1.4 Grade of surgeon operating

Table 2 highlights the proportion of consultants operating on TASM cases.

Table 2: Grade of surgeon operating

	Deciding	Operating
Consultant	97%	98%
Service registrar	2%	1%
International Medical Graduate	0%	0%
Surgical Education and Training trainee	1%	1%

3.1.5 In retrospect

Surgeons were asked whether they would have done anything differently in retrospect. Twelve percent (15/121) of surgeons answered that they would have done something differently. These answers related to:

- eight General surgical cases;
- six Orthopaedic surgery cases;
- one Cardiothoracic surgery case.

Included below is a selection of surgeons' responses to the question:

- Referred patient to a physician on day one when patient was noted to be confused.
- Could have acted more quickly on a patient with renal sepsis and obstruction which led the patient to be compromised.
- Maybe I could have disconnected the pancreatojejunostomy and sutured end of pancreas earlier.
- A perineal repair could have been done. However risks/benefits were discussed with patient and family preoperatively.
- In retrospect an operation at an earlier stage may have improved the outcome despite the general health status of the patient.
- The decision to operate on elderly patient is always difficult and the high risk of further cholangitis.
- Care prior to returning to theatre and fluid resuscitation and timing of return to theatre could have been improved.
- Could have measured intra-abdominal pressure, in an obese patient with an ileus and pancreatitis (and possibly pancreatic necrosis) this might have been a factor in both respiratory and general decompensation.
- Patient should have been palliated and not operated on.
- There should have been more communication between the anaesthetic unit and the orthopaedic unit.

3.2 Hospitals

TASM receives weekly or monthly notification of all surgically-related deaths by staff from patient information management services and medical records departments. Each participating hospital is aware of the TASM inclusion criteria (see 1.3.4).

3.2.1 Hospital participation

Participating hospitals

Thirteen Tasmanian public and private hospitals are currently participating in the audit.

- Calvary Health Care Tasmania:
  - > Lenah Valley Campus;
  - > St John's Campus;
  - > St Luke's Campus;
  - > St Vincent's Campus.
- Hobart Day Surgery.
- Hobart Private Hospital.
- Launceston General Hospital.
- Mersey Community Hospital.
- North West Private Hospital.
- North West Regional Hospital.
- Royal Hobart Hospital.
- St Helen's Private Hospital.
- The Eye Hospital.

3.2.2 Transfers

Patient transfer to centres with greater surgical capability is fundamental to good patient care in a regionalised state such as Tasmania.

A transfer between hospitals took place in 17% (20/121) of cases. These included:

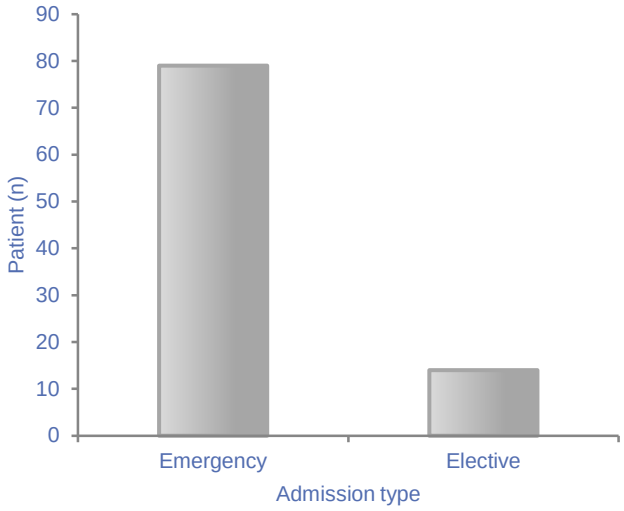
- > Neurosurgery cases: 9 transfers;
- > General Surgery cases: 6 transfers;
- > Orthopaedic Surgery cases: 2 transfers;
- > Vascular Surgery cases: 3 transfers.

- Most transfers took place between two public hospitals: The Royal Hobart Hospital and the North West Regional Hospital.
- The median distance transferred was 200 kilometres.

3.2.3 Hospital admissions

- As shown in Figure 7, 88% (106/121) of cases were emergency admissions while 12% (15/121) of cases were elective admissions.
- The proportion of emergency admissions has increased slightly since the 2012 TASM Annual Report [(2)] in which emergency admissions comprised 85% of cases.

Figure 7: Emergency and elective admissions (N=121)



3.2.4 Delays in main surgical diagnosis

The number of delays in the main surgical diagnosis recorded per year during the audit period between 2006 to 2013 can be seen in Table 3.

Table 3: Delays in main surgical diagnosis

Audit Period Year	Number of cases with delays
2006	10
2007	18
2008	13
2009	12
2010	6
2011	5
2012	10
2013	10

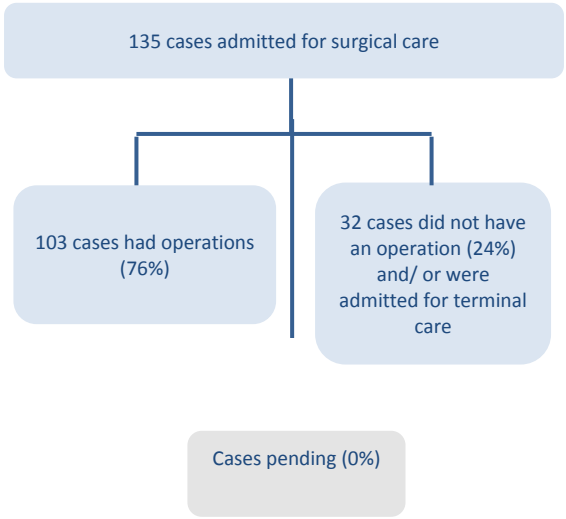
The main reasons for the delays were:

- Medical unit: misinterpretation of clinical picture and failure to do correct test.
- Surgical unit: results not seen, poor communication, incorrect consultation, misinterpretation of results and delay due to anticoagulation medication.
- Emergency department: multi-trauma resulting in delay to computed tomography (CT) scan, inexperience of staff, failure to do correct tests and delay to notify consultant.
- Imaging: delay to get patient to the department.

3.2.5 Cases with operations

Figure 8 shows the proportion of cases during the 2013 audit period that had an operation. It should be noted that some patients had more than one operation.

Figure 8: TASM operative and non-operative cases (N=135)



Comment

Of the 76% (103/135) cases that had an operation, 71% (96/135) of all deaths occurred in two hospitals, reflecting the high volumes of surgery that occur in these hospitals.

Emergency admissions

There were 76% (103/135) of cases where an operation was performed. It should be noted that some patients can have more than one operation.

- 19% (20/103) of emergency admission patients had scheduled emergency operations (> 24 hours after admission).
- 40% (41/103) of patients had an emergency operation (< 24 hours).
- 21% (22/103) of patients had an immediate operation (< 2 hours).
- 19% (20/103) of patients underwent elective operations and had a change in their admission status from elective to emergency.

Elective admissions

All 15 elective admission patients underwent an operation.

3.2.6 Cases where surgery was not performed

Patients did not undergo an operation in 26% (32/121) of cases. The reasons given for a patient not undergoing surgery are given below. More than one reason may have been assigned to a case.

> An active decision was made not to operate (n=24).

> This decision was made by the surgeon (n= 22).

> A decision was made to limit treatment (n=8).

> It was not a surgical problem (n=4).

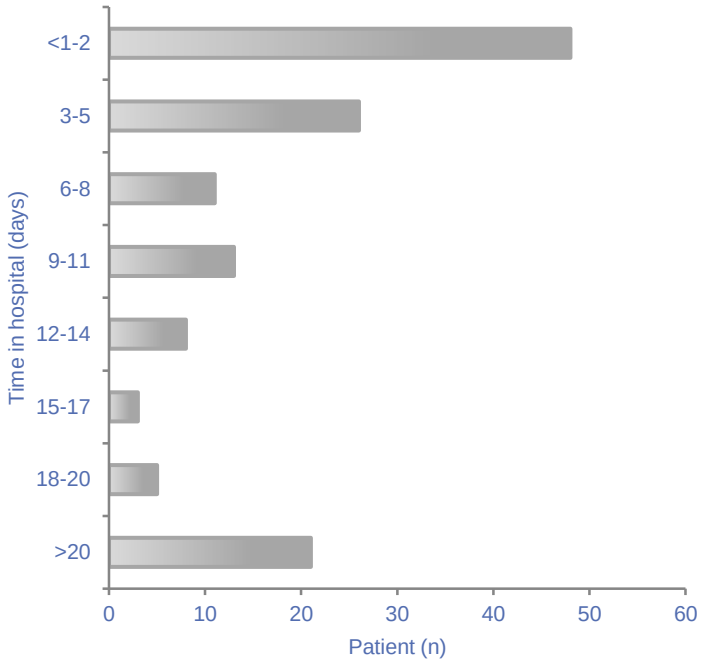
> The patient refused the operation (n=8).

> Rapid death occurred (n=10).

3.2.7 Time in hospital before death

- The median length of stay in hospital was twelve days, ranging from less than 1 day to 104 days (N=135).
- In 36% (48/135) of cases patients were in hospital for less than or up to 2 days (see Figure 9).

Figure 9: Length of time in hospital before death (N=135)



3.2.8 Use of intensive care or high dependency units

The treating surgeons and assessors were both asked whether the ICU or high dependency unit (HDU) were used during the management of the patient. If the ICU or HDU was not used, the treating surgeon and assessors were asked whether it should have been used. Table 4 outlines the key responses.

Table 4: Use of ICU or HDU (N=121)

Was ICU/HDU used? Surgeon responses	Percentage of cases
ICU/HDU was used	60%
If not, should ICU/HDU have been used? Assessor responses	Percentage of cases
ICU should have been used	0%
HDU should have been used	0%

ICU: intensive care unit; HDU: high dependency unit.

Surgeons were also asked whether the surgical team was satisfied with the critical care unit (ICU or HDU) management of the patient. In 4% of cases the surgeon was not satisfied (3/72), and a selection of comments is included below.

- The patient developed a pneumothorax. Chest drain insertion mostly caused lung injury.
- Questions raised about fluid resuscitation and timing of blood transfusion prior to second surgery.
- Airway trauma and bleeding due to nasogastric tube insertion into trachea - re intubation (anticoagulated).

3.3 Patients

Patients whose deaths were audited by TASM were predominantly elderly, had multiple and significant comorbidities, and were admitted for emergency surgery. The patient characteristics in 2013 are similar to the patient data stated in previous TASM Annual Reports.

3.3.1 Demographic summary

A demographic profile of audit patients is provided below (N=135, including terminal care):

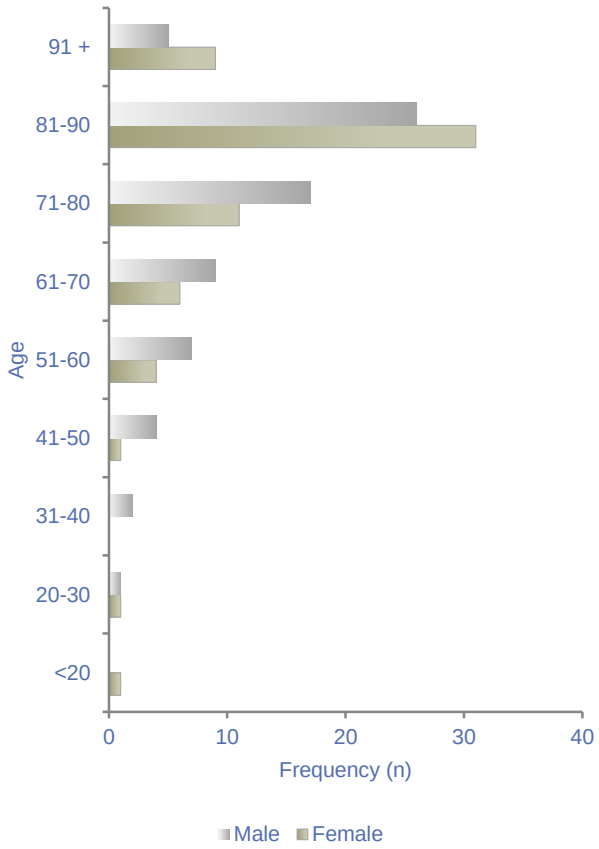
- The median age at death for males was 76 years.
- 53% of patients were males.
- 60% of patients had an American Society of Anesthesiologists (ASA) grade of at least 4.
- 91% of patients had at least one significant comorbidity that surgeons considered could contribute to death.

3.3.2 Age distribution

Figure 10 shows the age distribution of patients for cases notified (N=121) to TASM:

- The median age of patients was 76 years, with a range of 0 years to 100 years.
- The age mode (the most frequent age) was 75 years, a decrease from 2011 audit period in which the age mode was 81 years.
- There were 14 patients aged between 91 and 102 years.

Figure 10: Age distribution by gender (N=135)



Comment

Figure 10 shows the age and sex distribution of patients. Patients between the age of 71 and 90 years accounted for approximately 75% of all cases. The 81 to 90 year age range is similar to previous TASM Annual Reports. At the time of death more females than males were aged in the 81 to 90 year age range, and 91 or more year age range.

3.3.3 Gender distribution

The gender distribution of patients is shown in Figure 10. Overall, 53% of patients were male and 47% of patients were female.

3.3.4 Patients by specialty of surgeon

Table 5 shows the proportion of patients treated by surgeons of different specialties.

Table 5: Patients by specialty of surgeon

Specialty	Frequency	%
Cardiothoracic surgery	3	2
Otolaryngology, Head and Neck Surgery	3	2
General surgery	60	44
Neurosurgery	22	16
Obstetrics & Gynaecology	1	1
Ophthalmology	0	0
Orthopaedic surgery	28	21
Paediatric surgery	1	1
Plastic surgery	1	1
Urology	9	7
Vascular surgery	7	5
Total	**135**	**100**

Comment

General Surgery, Neurosurgery and Orthopaedic Surgery reported the most deaths. These specialties also have the highest workloads due to the correlation with the number of surgeons within that specialty.

3.3.5 American Society of Anesthesiologists (ASA) grades

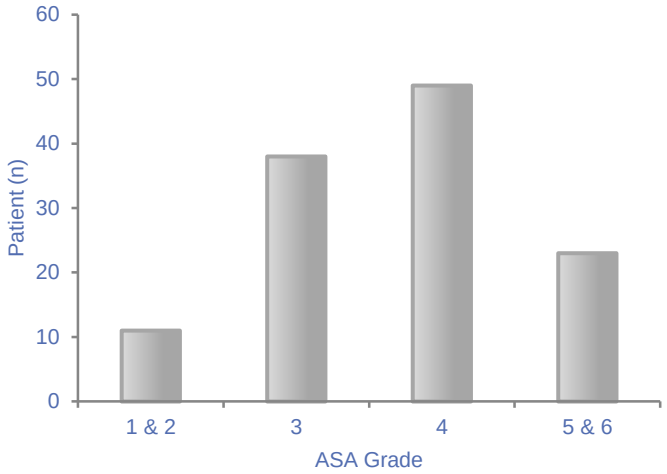
The American Society of Anesthesiologists (ASA) grade is an internationally recognised classification[3] of perioperative risk (see Table 6). An ASA grade is assigned to a Tasmanian hospital patient before an operation.

Table 6: American Society of Anesthesiologists (ASA) Physical Status Classification System

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

An overview of the ASA grade of all TASM cases is provided in Figure 11. An ASA grade of 3 or higher (data not shown) had been assigned to 91% of audit patients (110/121).

Figure 11: American Society of Anesthesiologists (ASA) grades (N=135)



Comment

A large proportion of patients (60%) had an ASA grade greater than or equal to 4, indicating that a moderate to severe degree of systemic disease was present at the time of treatment (data not shown).

3.3.6 Anaesthetic-associated deaths

Tasmanian anaesthetists complete a similar audit process to that described to the TASM audit process. These results are reported to the National Mortality Committee of the Australian and New Zealand College of Anaesthetists (ANZCA). A report on anaesthetic-related mortality data, titled Safety of Anaesthesia - A review of anaesthesia related mortality reporting in Australia and New Zealand, is published by ANZCA on a triennial basis.

3.3.7 Malignancy

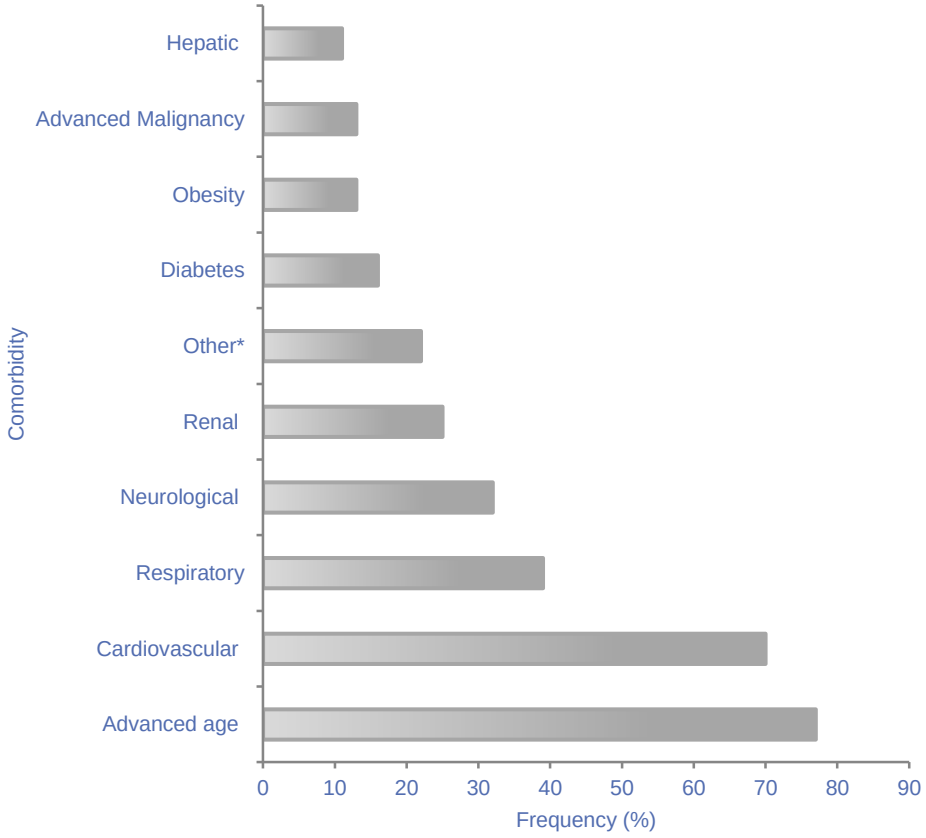
Malignancy was present in:

- 26% (31/121) of all cases. This is consistent with the 2012 report[3] in which malignancy was present in 25% of cases. Malignancy contributed to death in 61% (19/31) of cases. It did not contribute to death in 19% of cases, and its contribution to death was unknown in 19% of cases.
- Of those cases in which an operation was performed and malignancy was present, a greater proportion were emergency 77% (24/31) rather than elective 23% (7/31) admissions.

3.3.8 Comorbidities

Surgeons are asked to record all known comorbidities additional to the primary medical (presenting) problem. The frequency of multiple comorbidities in individual patients per year is shown in Table 7. Of the cases admitted for surgical care, 91% (110/121) had comorbidities that increased the risk of death before surgery. Eleven cases had no comorbidities. In Figure 12 the types of comorbidities are presented by frequency. The most common comorbidity present was advanced age, which was found in nearly 80% of all cases (an increase from 57% in the previous TASM Annual Report [2]).

Figure 12: Types of comorbidities by frequency (N=121)



* includes anticoagulation, malnutrition, severe dehydration, extreme prematurity, recurrent deep vein thrombosis, pulmonary embolism, rheumatoid disease, chronic renal failure, cachexia, scleroderma, cirrhosis, severe parkinsonism, intravenous drug use, metabolic acidosis and hypercholesterolemia.

Comment

Advanced age, cardiovascular issues and respiratory failure were the most common types of comorbidities.

Comorbidities were not present in nine per cent of cases (11/121). These patients were predominantly:

- Orthopaedic and general surgical patients.
- Female.
- Emergency admissions.
- At moderate or considerable risk of death.
- In hospital for an average of 13 days.

Table 7: Types of comorbidities present (2006-2013)

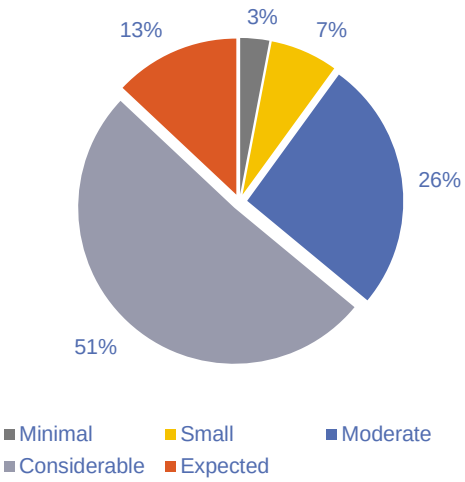
	2006	2007	2008	2009	2010	2011	2012	2013	Total
Cardiovascular	82	78	97	78	91	60	57	70	613
Age	4	4	9	9	16	17	53	77	189
Respiratory	11	13	17	12	13	15	27	39	147
Neurosurgical	6	3	6	8	10	15	21	32	101
Advanced malignancy	3	6	5	10	7	6	17	13	67
Renal	2	5	2	3	6	2	21	25	66
Other*	8	4	2	0	2	4	21	21	62
Hepatic	1	4	0	3	1	4	5	11	29
Diabetes	3	0	1	0	0	0	9	16	29
Obesity	0	1	2	1	1	0	7	13	25

*includes severe malnutrition, dementia, scleroderma, extreme prematurity, severe dehydration, parkinsonism, severe metabolic acidosis, intravenous drug use, cirrhosis, rheumatoid arthritis, cachexia, extremely poor oral hygiene, chronic renal failure, alcoholic liver disease, hypercholesterolaemia, recurrent deep vein thrombosis and pulmonary embolism, coagulopathy.

3.3.9 Risk of death before surgery

Surgeons were asked to rate the overall risk of death (prior to surgery) for each patient:

Figure 13: Risk of death distribution (N=84)



Comment

In all cases, 64% of patients were at deemed to be at considerable or expected risk of death before surgery.

Table 8: Cause of death for patients considered to have minimal or small risk of death prior to surgery

Main causes of death	Number of patients
Pulmonary embolus	2
Respiratory failure	1
Acute myocardial infarction	1
Ischaemic bowel septicaemia	2
Cardiac arrest	1
Multiorgan failure secondary to sepsis	1

- Eight patients were recorded as being at minimal or small risk of death.

3.3.10 Typical patient

The type of patient who died after surgically-related care in hospital:

- was male
- was approximately 76 years of age
- was in hospital for less than two days
- had no malignancy present
- had an incapacitating disease that was a constant threat to life on admission to hospital
- received deep vein thrombosis (DVT) prophylaxis
- underwent an operation
- did not have a postoperative complication
- received satisfactory care in management before, during or after the operation.

3.4 Classification of cases

3.4.1 Postoperative complications

The postoperative complications recorded from 2007 to 2013 audit periods can be seen in Table 9. Postoperative complications range from minor (no effect on outcome) to major (leading to death).

Table 9: Postoperative complications

Percentage of patients with complications between 2007 and 2013	2007	2008	2009	2010	2011	2012	2013
	%	%	%	%	%	%	%
Postoperative complications	38	47	40	41	39	44	44
Delay to recognise complications	7	16	10	13	8	15	8
Return to theatre	11	15	14	12	11	14	11
Unplanned admission to ICU*	13	17	14	15	17	19	12
Hospital readmission	1	3	2	5	3	7	1
Fluid balance issue	5	7	7	6	7	7	5

*Intensive care unit.

The most recent national figure for postoperative complications is 34 %[(1)].

Types of postoperative complications

- Several cases involved more than one postoperative complication in the 2013 audit period. There were 41 postoperative complications, including:
  - > Tissue ischaemia (n=3)
  - > Procedure-related sepsis (n=2)

- Anastomotic leak pancreatic and/or biliary (n=2)
- Anastomotic leak colorectal (n=1)
- Anastomotic leak gastric (n=1)
- Other complications included brain swelling, renal failure, ventriculitis cord compression – paraplegia, septicaemia, aspiration pneumonia, cardiac arrest, myocardial infarction, pulmonary embolism, multiorgan failure, bowel infarction, cerebral vascular accident, gastrointestinal bleed.

3.4.2 Prophylaxis of thromboembolism

The treating surgeon was asked to record whether DVT prophylaxis was given and, in cases where it was given, the type of prophylaxis used (see Figure 14). If DVT prophylaxis was not given, the surgeons are asked to provide the reason it was withheld.

In 72% (87/121) of all cases, patients had DVT prophylaxis. In 27% (33/121) of all cases they did not have DVT prophylaxis. (missing data in 1% (1/121)).

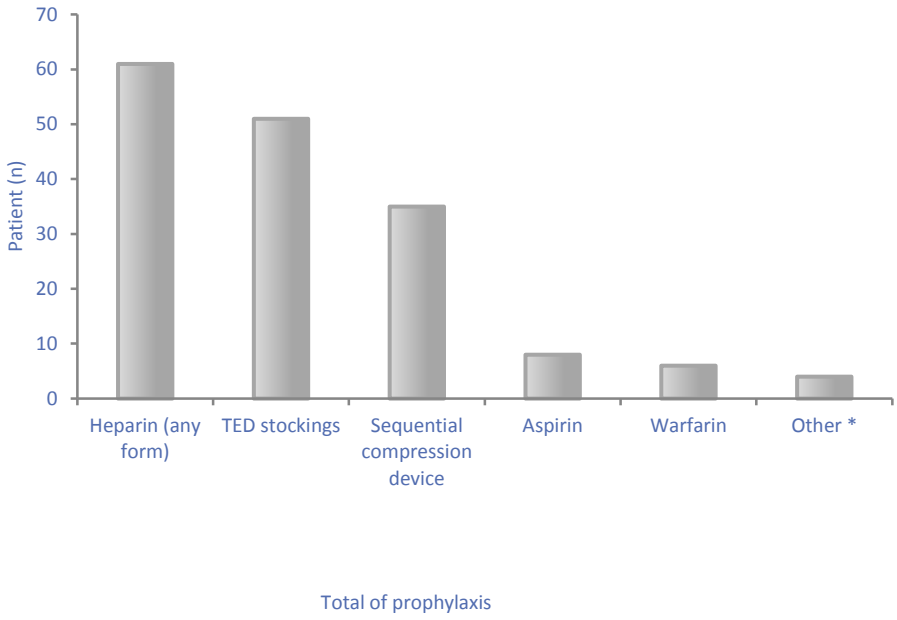
- Of the 103 operated cases, 83% had DVT prophylaxis (72/87). (Missing data in 16 cases)
- Of the remaining patients who did not have DVT prophylaxis, 13% (11/87) of patients either did not have DVT prophylaxis or the surgeon did not know whether the patient had been given DVT prophylaxis.

The main reasons for the deliberate withholding of DVT prophylaxis in the 11 cases were:

- rapid death (n=2)
- active bleeding (n=2)
- patient for palliation (n=3)
- coagulopathy (n=2)
- patient on warfarin (n=1)
- withheld prior to operation (n=1).

An overview of the types of DVT prophylaxis used, and the number of patients who received each type of prophylaxis, is provided in Figure 14.

Figure 14: Use of different methods of DVT prophylaxis (N=87)



DVT: deep vein thrombosis
TED: thromboembolism deterrent
*included Clexane and Clopidogrel.

3.4.3 Postmortem

- A coronial postmortem was performed in 10% (12/121) of cases.
- A postmortem was not performed in 61% (74/121) of cases.
- A postmortem was refused in 1% (1/121) of cases.
- The postmortem status was unknown in 28% (34/121) of cases.
- There were no cases where a postmortem was performed by the hospital.

3.4.4 Management of cases

For cases that had clinical incidents, surgeons and assessors were asked to identify areas of patient management that could have been improved. An overview of the areas of patient management that could be improved, and the number of cases in which the surgeon, first-line assessor and second-line assessor identified problems in those areas, is provided in Table 10.

Table 10: Management areas identified as needing improvement in cases with clinical incidents.

Area	Number of cases in which a management issue was identified		
	Surgeons	First-line assessors	Second-line assessors
Preoperative management	6	11	4
Decision to operate	8	12	1
Choice of operation	5	6	2
Timing of operation	3	4	0
Intraoperative care	3	5	0
Experience of surgeon deciding	1	0	0
Experience of surgeon operating	1	0	0
Postoperative care	8	11	5

Comment

Most commonly, improvements could have been made in a combination of operative settings and either were associated with the surgeon or the surgical team: pre- and postoperative care, the decision to operate, choice of operation, timing of the operation and intraoperative care.

There are inter-assessor variations in areas identified by the second-line assessor, compared with both the surgeon and first-line assessor.

3.5 Clinical incidents

This section describes clinical incidents beyond the context of the individual case. It is important to have an epidemiological overview of clinical incidents and their levels of importance. The limitation in this data is that denominator data is not available i.e. all surgeries that were performed in Tasmania. Therefore, comparisons are difficult and the data becomes simply observational. TASM hopes that in the future this will be rectified, so that more meaningful and useful information can be obtained.

A primary objective of the peer review process is determining whether death was a direct result of the disease process alone, or if aspects of the management of a patient might have contributed to that outcome.

There are two possible outcomes: either the death was a direct outcome of the disease process and the clinical management had no impact on the outcome, or there was a perception that aspects of patient management may have contributed to the death of the patient.

Where there is a perception that the clinical management may have been problematic, ANZASM has specified a range of criticism from which the assessor can choose:

- *Area for consideration* — where the clinician believes an area of care could have been improved or different, but recognises that there may be debate about this.

- *Area of concern* — where the clinician believes that an area of care should have been better.
- *Adverse event* — an unintended 'injury' caused by medical management, rather than by the disease process, which is sufficiently serious to:
  - lead to prolonged hospitalisation;
  - lead to temporary or permanent impairment or disability of the patient at the time of discharge;
  - contribute to or cause death.

3.5.1 Clinical incidents management

There were 24 areas of concern or adverse events reported by assessors. This is compared to 23 events in the 2012 TASM annual report [(2)]. Of the 24 reported clinical incidents, 17 were areas of concern and 7 were adverse events. More than one area of concern or adverse event may be associated with a patient.

Assessors attributed the clinical incidents to:

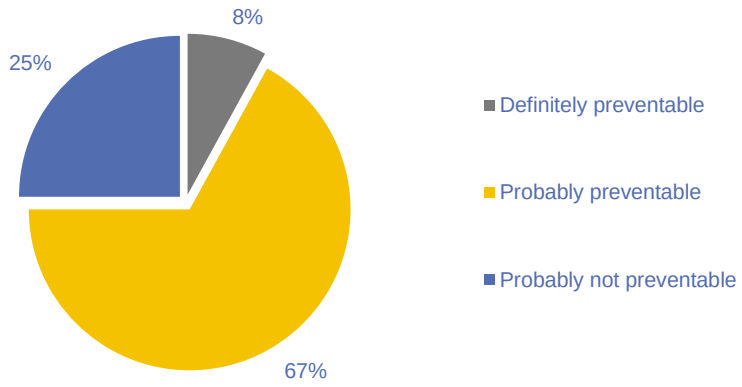
- Decision to operate
- Adverse factors in management
- Wrong choice of suture material
- Colonic complication of open surgery
- Vascular complication laparoscopic operation
- Diagnosis missed on x-ray
- Postoperative pancreatitis
- Perioperative cerebral ischaemia or infarction
- Perforation of colon after open surgery
- Delay to operation caused by missed diagnosis
- Diagnosis missed by radiologist
- Intraoperative bleeding during open surgery
- Anastomotic leak after open surgery
- Delay to recognise anastomotic leak
- Better to have done different operation or procedure
- Failure to investigate or assess patient fully
- Care unsatisfactory
- Delay to diagnosis
- Delay to surgery (earlier operation desirable)
- Aspiration pneumonia after anaesthetic
- Postoperative care unsatisfactory

- Inadequate postoperative assessment
- Drug given to which a documented allergy exists
- Postoperative care unsatisfactory
- Delay to reoperation
- Better to have been treated with endoscopy.

3.5.2 Preventability of areas of concern and adverse events

In total, 75% (18/24) of all areas of concern and adverse events were considered to be probably or definitely preventable (see Figure 15).

Figure 15: Preventability of areas of concern and adverse events



3.6 Cases with clinical incidents

This section provides the clinical context of the incidents noted by the assessors. During the audit period 121 cases underwent assessment by first- or second-line assessors, or both.

- 14% (17/121) of closed cases had at least one area of concern.
- 6% (7/121) of closed cases had at least one adverse event.

The number of cases with clinical incidents is displayed in Table 11.

Table 11: Number of cases with clinical incidents (N=46 incidents in 135 cases)

Clinical incident	No. of cases
At least one area of consideration	22
At least one area of concern	17
At least one adverse event	7

Comment

One of the seven adverse events caused death of the patient and was deemed definitely preventable.

3.6.1 Adverse events

There were seven cases with adverse events (two preoperative, two intraoperative and three postoperative). The seven adverse events were attributed to:

Preoperative (n=1)

- Inadequate preoperative assessment.

Intraoperative (n=2)

- Possibility of vascular injury to the caecum
- The intraoperative technical management of surgery.

Postoperative (n=4)

- Aspiration
- Postoperative neurological event
- Missed free gas on the chest x-ray
- Drug administered to patient where it was previously documented that it was recognized as an allergen.

3.6.2 Areas of concern

A total of 17 areas of concern were identified in five cases (six preoperative, four intraoperative and seven postoperative). There were 76% (13/17) of cases where an area of concern occurred outside the operating theatre (13/17).

The following reasons were given for these incidents:

Preoperative (n=6)

- Delay in operating (x2)
- Missed diagnosis at referring hospital which delayed transfer
- Missed diagnosis on x-ray by radiologist
- Earlier diagnosis and reduced delays
- Delay to theatre as patient wasn't fasted.

Intraoperative (n=4)

- Intraoperative hemorrhage
- Equipment not available
- Possibility of vascular injury to caecum
- Better to have done different operation.

Postoperative (n=7)

- Anastomotic leak
- Postoperative management
- Continuity of care
- Monitoring problems
- Delay in recognising complications
- Delay to reoperation
- More thorough review of observations.

4. Audit comparisons

A baseline for most aspects of surgical care has been constructed and comparisons can be made. See Table 12 for a comparison of audit baseline data from 2008 to 2013.

Table 12: Audit comparisons (2008 - 2013)

Aspect of surgical care	2008	2009	2010	2011	2012	2013
Notifications of death	189	163	189	159	122	135
Males	53%	52%	57%	48%	52%	53%
Median age (years)	79	79	79	71	76	76
ASA grade ≥ 4	56%	65%	63%	47%	48%	60%
At least one significant comorbidity	90%	92%	92%	93%	88%	91%
Elective admissions	17%	22%	10%	12%	15%	12%
Delay in main surgical diagnosis	10%	8%	3%	3%	10%	8%
Did not undergo an operation	31%	32%	43%	13%	25%	24%
Cases with unplanned return to theatre	15%	13%	12%	11%	14%	11%
Cases with unplanned admission to ICU	17%	14%	14%	17%	19%	12%
Fluid balance an issue	7%	7%	6%	7%	7%	5%
All cases DVT prophylaxis used	66%	72%	74%	72%	68%	73%
Operated cases DVT prophylaxis used	79%	86%	85%	80%	89%	86%
Cases assessed	78%	80%	93%	94%	95%	100%
Second-line assessment requested	21%	15%	14%	9%	13%	13%
Assessed cases with an area of concern or adverse event	17%	14%	11%	9%	19%	18%
Assessed cases with an adverse event that caused death	3%	5%	5%	2%	1%	5%
Assessed cases with an adverse event that caused death & was definitely preventable	0%	1%	0.5%	0%	1%	1%

ASA: American Society of Anetheologists
ICU: Intensive care unit
DVT: Deep vein thrombosis

Overall there has been little change in the pattern of findings over the reporting periods.

5. Audit limitations

The data are self-reported and a certain level of bias may be present, but independent assessors make their own assessments on the facts presented. However In audit terms, the data are of a high quality because every case had external peer review. The accuracy of the receipt of notifications of deaths to TASM cannot be guaranteed.

6. Achievements

The Tasmanian Audit of Surgical Mortality is in an excellent position to promote safer healthcare practices. There is significant value to the Australian health consumer in the audit continuing as a quality assurance activity, as it will assist in maintaining the forthright participation of surgeons as well as enhance the existing data on surgical mortality.

- The audit has had wide acceptance and cooperation from the surgeons.
- The recent use of all TASM-registered assessors, rather than a small panel of assessors, has spread the workload and enabled broader participation and professional development.
- The use of interstate-registered assessors in some regions ensures that the second-line cases remain de-identified, and that the integrity of the independent peer-review process is maintained.
- The Case Note Review Booklet, which contains a number of illustrative cases, is produced twice a year for distribution to surgeons and trainees (where requested). The cases are based on assessors' comments and offer important clinical insights, and the booklet continues to be well-received.
- Workshops and seminars were facilitated based on the issues identified in regional reports and subsequent in-depth investigations of those issues. Through the identification of trends in surgical mortality, the audit plays a vital and ongoing role in improving clinical governance and patient care.
- A greater national awareness and acknowledgment of the value of the audit amongst health professionals should see increased surgical participation and data completeness of forms and thus enable further in-depth trend analysis and informative reporting.
- The audit will continue to encourage the use of the 'Fellows Interface' web-based tool as an important initiative which provides users with a dynamic, user-friendly tool to enter online SCFs and complete first-line assessments. This minimises data entry time, the risk of errors in data entry, and hastens turnaround time. The number of fields completed on Fellows Interface was noticeably higher.
- Improvements have been made to the SCF in order to collect more detail around a patient mortality with infection. This information will be included in the 2014 report.
- The audit has attracted the attention of the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG). We look forward to working with the Fellows from both Colleges as they actively participate in the audit process.

The RACS and the Tasmanian Department of Health can be proud of this important initiative to promote best surgical practice across the nation.

Acknowledgements

TASM acknowledges the support and assistance of many individuals and institutions that have contributed to the continuation and development of the audit, including:

1. participating surgeons
2. first-line assessors
3. second-line assessors
4. medical records, and safety and quality and risk management departments in all participating hospitals
5. the Tasmanian Department of Health for funding and ongoing support
6. the project managers of the Victorian Audit of Surgical Mortality
7. the Royal Australasian College of Surgeons, Division of Research, Audit & Academic Surgery (RAAS) staff, particularly:
   - > Professor Guy Maddern — Chair, ANZASM Steering Committee
   - > A/Prof Wendy Babidge — Director, RAAS Division
   - > Mr Gordon Guy — ANZASM Manager.

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References

1 Royal Australasian College of Surgeons. Australian and New Zealand Audit of Surgical Mortality (ANZASM). National Report 2013. Edition. Australia cited 16 December 2014. Available from: http://www.surgeons.org/media/20273981/rpt_2013-12-17_anzasm_annual_report_2013.pdf

2 Royal Australasian College of Surgeons. Tasmanian Audit of Surgical Mortality (TASM). Annual Report 2012. Edition. Available from: http://www.surgeons.org/media/20433158/2014-01-30_rpt_tasm_ar_2012.pdf.

3 Cuvillon P, Nouvellon E, Marret E et al. American Society of Anesthesiologists' physical status system: a multicentre Francophone study to analyse reasons for classification disagreement. European Journal of Anaesthesiology. 2011; 28(10): 742-7. doi: 10.1097/EJA.0b013e328348fc9d.

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