Royal Australasian College of Surgeons

ANNUAL REPORT 2009

TASM
Tasmanian Audit of Surgical Mortality

Tasmania
DEPARTMENT *of*
HEALTH *and*
HUMAN SERVICES

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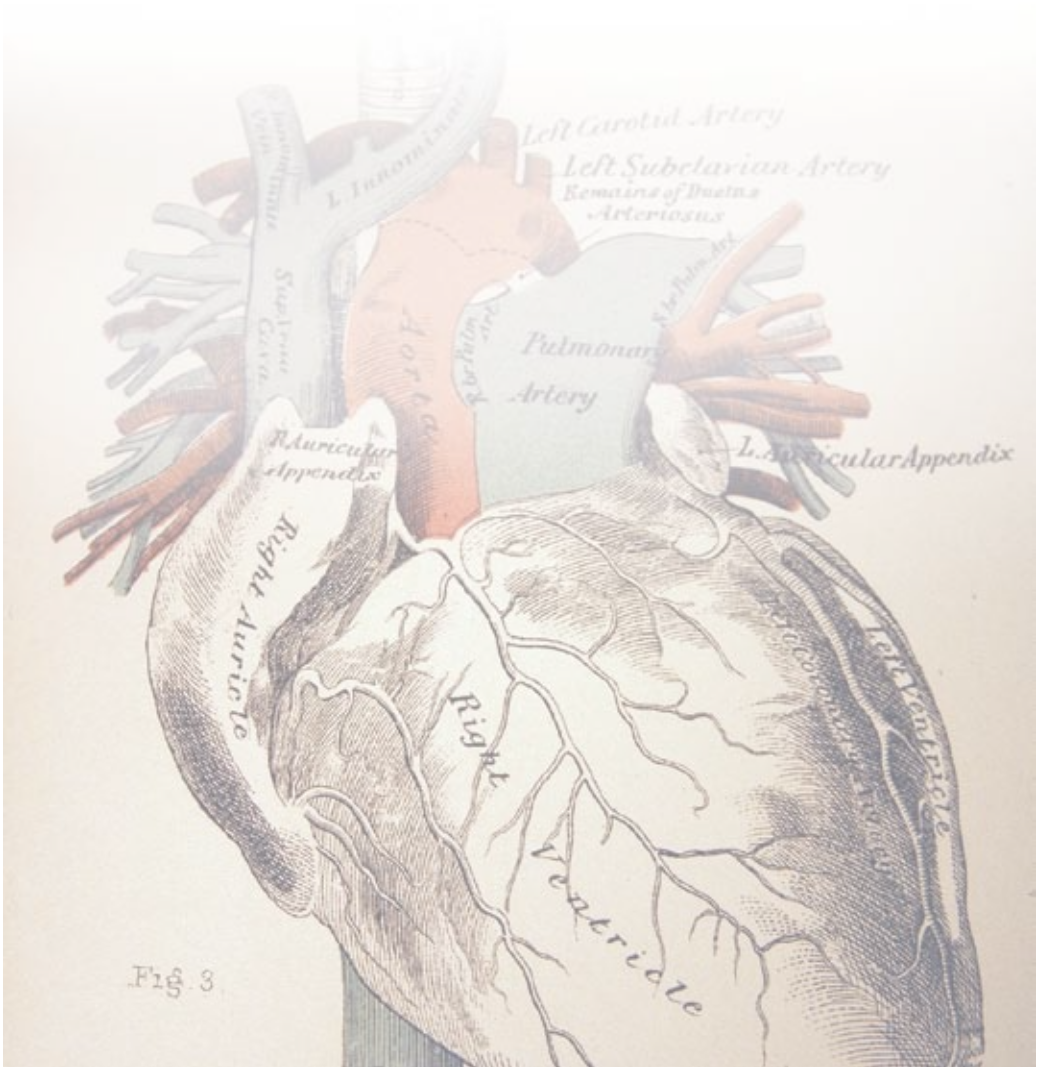
The information contained in this annual report has been prepared under the auspices of the Royal Australasian College of Surgeons Tasmanian Audit of Surgical Mortality Management Committee, which is a declared quality assurance committee under the *Health Act 1997* (Tas).

The information contained in this annual report has been prepared by the Royal Australasian College of Surgeons, Tasmanian Audit of Surgical Mortality Management Committee. 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 6 November 2006).



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Chairman's Report

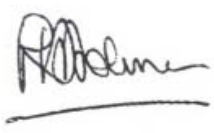
This is the fourth annual Tasmanian Audit of Surgical Mortality (TASM) report, covering deaths which occurred during the year from July 2008 to June 2009. It is pleasing to note that all states and territories are now participating in what is jointly called the Australian and New Zealand Audit of Surgical Mortality (ANZASM), the most recent to come on board being the Australian Capital Territory (ACT) and Northern Territory, in 2010. Tasmania stands out in having 100% participation by surgeons and hospitals, in both the public and private sectors. TASM is unique in including surgeons from colleges other than the Royal Australasian College of Surgeons (e.g. gynaecologists), surgeons who are not fellows of the College of Surgeons, and in having a parallel anaesthetic audit.

The now all-inclusive character of the audit is to be reflected in the release of the first National Report later this year. This will provide a valuable opportunity to view our own data in the context of national outcomes and trends. The relatively small number of cases each year in Tasmania does limit the conclusions that can be drawn from short-term trends. Whilst it is our aim to use multi-year trends in the future, the ability to supplement this with the more substantial national figures will I am sure be very useful, most especially in fulfilling our major objective: to provide feedback to all participants and stakeholders as a driver for improvement in patient outcomes. If we do not close the audit 'circle' in this way, by using the data to question and improve what we do as surgeons, then the collection of this information is very nearly pointless. Although, as in previous years, the majority of the deaths audited involved elderly patients with significant comorbidities, often presenting with inevitably lethal problems, the number of cases where areas of concern or adverse events were identified remains stable at 15%. Certain areas continue to feature, for example deep vein thrombosis (DVT) prophylaxis is still not rated as appropriate in all patients and the use and availability of ICU facilities remains a concern in a proportion of cases.

The central role that the College plays in the process now has led to the development of an online interface for case forms and assessments, and this is due to be rolled out via the College website later in 2010. This will expedite and assist in data entry for many of us, I am sure. We also expect that online entry will help to ensure the completeness of data entry, by making sure that 'required' fields are filled in before progressing, and avoiding transcription errors which occasionally arise from problems of legibility in free text fields. This is probably an appropriate place to emphasise the importance of filling in all fields, as missing data inevitably limit the conclusions to be drawn from the audit. This effect is evident in the current report, where the number of cases included in each section tends to be different for this reason.

I express my sincere gratitude to the participants who also act as first and/or second-line assessors. This role is vital to the success of the audit, and furthermore average response times for assessments are very satisfactory in Tasmania. I encourage those who have not yet undertaken assessments to consider taking on this role. The more of us who participate as assessors, the lighter the load will be for all involved. I also emphasise the fact that performing assessments is something that is educational in itself, and this is recognised in the Continuing Professional Development (CPD) program of the College. An increase in the CPD points approved for TASM activities has been planned by the Professional Standards Committee for future years - completion of case forms will be credited at one point per hour, first-line assessments at two points per hour, and second-line assessments at three points per hour.

Finally can I thank all of those who have contributed to the audit, both the surgical community and the College, which supports the process, most especially in the person of the Project Manager.



Rob Bohmer

Chairman

Abbreviations

ANZASM	Australian and New Zealand Audit of Surgical Mortality
ASA	American Society of Anaesthesiologists
CPD	continuing professional development
CVA	cerebrovascular accident
DHHS	Department of Health and Human Services
DVT	deep vein thrombosis
ENT	ear, nose, and throat
GORD	gastro-oesophageal reflux disease
HDU	high dependency unit
ICU	intensive care unit
IMGs	international medical graduates
Obs & Gynae	obstetrics and gynaecology
PUD	peptic ulcer disease
RAAS	Research, Audit and Academic Surgery Division
RACS	Royal Australasian College of Surgeons
SASM	Scottish Audit of Surgical Mortality
SCF	surgical case form
SPSS	Statistical Package for Social Sciences
SQL	Structured Query Language
SSL	Secure Sockets Layer
TAS	Tasmania
TASM	Tasmanian Audit of Surgical Mortality
NOD	notification of death

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 WAASM project. Subsequently the College established the Australian and New Zealand Audit of Surgical Mortality (ANZASM). Similar mortality audits have been established in Western Australia, South Australia, Queensland, Victoria, Australian Capital Territory (ACT) and Northern Territory.

Findings:

Surgeons

- 100% of consultant surgeons in Tasmania are participating in TASM.
- 149 surgical case forms were returned to TASM (14 remain outstanding). The return rate is 91%.

Hospitals (data from 149 returned proformas)

- 13 Tasmanian private and public hospitals participate in TASM.
- 78% of admissions were emergencies.
- 58% of emergency admission patients had an operation within 30 days of death.
- 92% of elective admission patients had an operation within 30 days of death.
- 32% of all patients had no operation.
- 17% of patients underwent two or more operations.
- 13% of patients had unplanned return to theatre.
- 20% of patients were transferred from one hospital to another.

Patients

- 163 deaths were reported to TASM in 2009.
- 52% were male.
- 92% of cases presented with at least one significant comorbidity.
- 134 cases were assessed (these cases provide the data for this report).
- 15 cases were terminal care and therefore not assessed.
- 15% of cases were referred for second-line assessment (case note review).
- 65% of cases had an ASA grade of 4 or above.

Cases with clinical incidents

- 15% of cases were associated with areas of concern or adverse events.
- 5% of cases were associated with an adverse event which caused the death of the patient.
- 1% of cases were associated with an adverse event which caused the death and was considered *definitely preventable.*

Main messages:

- 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 high risk of death at surgery.[1, 2, 3, 4] Many patients in this audit had more than one high-risk factor at the time of surgery. For example:
  - > 92% of patients had at least one **serious comorbidity** present.
  - > 73% of patients were **71 years old or older.**
  - > 40% of patients had **postoperative complications following the first operation.**
  - > 17% of patients had **two or more operations.**
  - > 16% of patients had **unplanned admissions to the intensive care unit (ICU) following surgery.**
  - > 13% of patients had **unplanned return to theatre following the first operation.**
- The lack of use of ICU was identified by assessors as a key issue. This was also identified in the TASM 2008 Annual Report.
- The lack of appropriate DVT prophylaxis was identified as another easily preventable issue.
- Management could have been improved in preoperative care and postoperative care, according to assessors but rarely was a problem in intraoperative care.
- Timing issues in surgical management (delays in surgery, premature discharge) was another issue that could be improved.

1. Introduction

Key points:

- The Tasmanian Audit of Surgical Mortality (TASM) audits surgically-related deaths in Tasmania.
- This report covers the period 1 July 2008 to 30 June 2009.
- The TASM process involves self-reporting by surgeons and peer review by assessors.
- TASM exists to inform, educate, facilitate change, and improve practice. It achieves this by providing feedback to surgeons, hospitals and the community

1.1 Background

The Tasmanian Audit of Surgical Mortality (TASM) is an external and independent peer review audit of the process of care associated with deaths occurring during surgical admissions in Tasmania. The audit is funded by The Department of Health and Human Services (DHHS) Tasmania and its methodology is based on the Scottish Audit of Surgical Mortality (SASM).

The Royal Australasian College of Surgeons oversees, manages and provides infrastructure support to the audit. In 2005 the College formed the Australian and New Zealand Audit of Surgical Mortality (ANZASM) with the purpose of extending mortality audits to all Australian states and territories.

The TASM 2009 Annual Report includes data collected from 1 July 2008 to 30 June 2009. As this audit is a work in progress, some assessments from 2008 were returned to TASM during 2009. Therefore, this report also includes finalised data from the TASM 2008 Report.

1.2 Project governance and confidentiality

The governance structure of the Royal Australasian College of Surgeons, ANZASM is illustrated in Figure 1.

The regional TASM governance structure is illustrated in Figure 2.

The Royal Australasian College of Surgeons Tasmanian Audit of Surgical Mortality Management Committee has been gazetted as a Quality Assurance Committee under the Tasmanian *Health Act 1997* and also has protection under the Commonwealth Qualified Privilege Scheme under Part VC of the *Health Insurance Act 1973* (gazetted 6 November 2006).

Figure 1: Governance structure of the Royal Australasian College of Surgeons, ANZASM

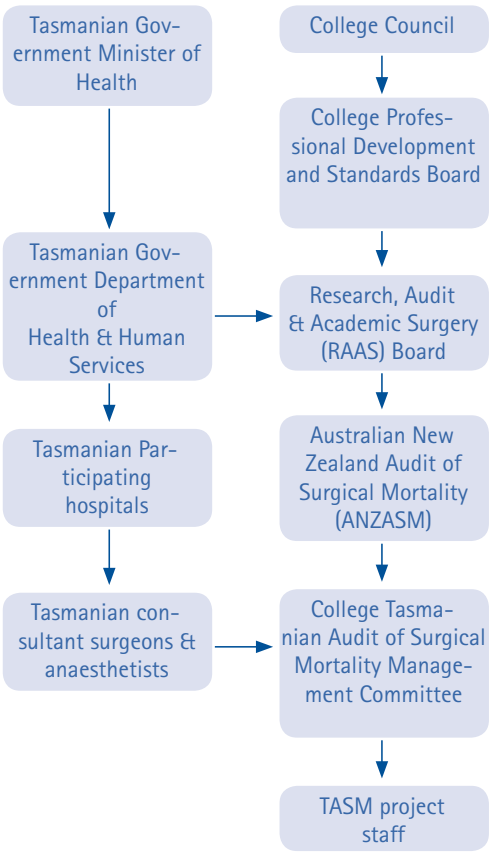
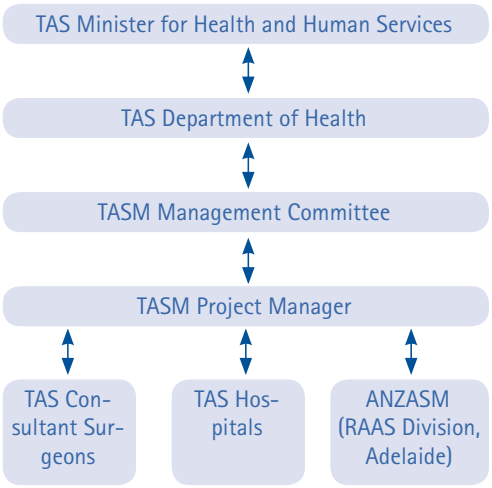


Figure 2: Regional Audit Governance Structure



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 (where the patient was admitted under a surgeon or transferred to the surgeon's care during that admission), 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 those deaths weekly or monthly (via secure email).

1.3.2 Methods

TASM receives notification of a surgically-related death (via password-protected email) from participating hospitals, enters that data in a secure database, and then sends a surgical case form (SCF) to the consultant surgeon for completion. 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 been 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, and is sufficiently serious to:
  - > lead to prolonged hospitalisation, or
  - > lead to temporary or permanent impairment or disability of the patient at the time of discharge, or
  - > contribute to or cause death.

The consultant surgeon is responsible for the completion of the SCF and returns it to TASM.

The SCF is then de-identified and sent to a different surgeon for peer review or first-line assessment. The first-line assessor is a consultant surgeon of the same specialty but may be from a different hospital to the original surgeon.

The first-line assessor determines whether the case should undergo further assessment (second-line assessment) which involves reviewing the medical records of 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 if:

- 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 surgical case form for the assessor to reach a conclusion.
- a report could usefully draw attention to **'lessons to be learned'**, either for clinicians involved in the case, or as part of the collated case note review booklet, for wider distribution within the surgical community.

The second-line assessor is a senior consultant surgeon of the same specialty but from a different hospital to the original surgeon. On rare occasions, there is a lack of assessors in a particular specialty so a process of interstate assessments is practised for those cases, under the umbrella of ANZASM.

1.3.3 Providing feedback

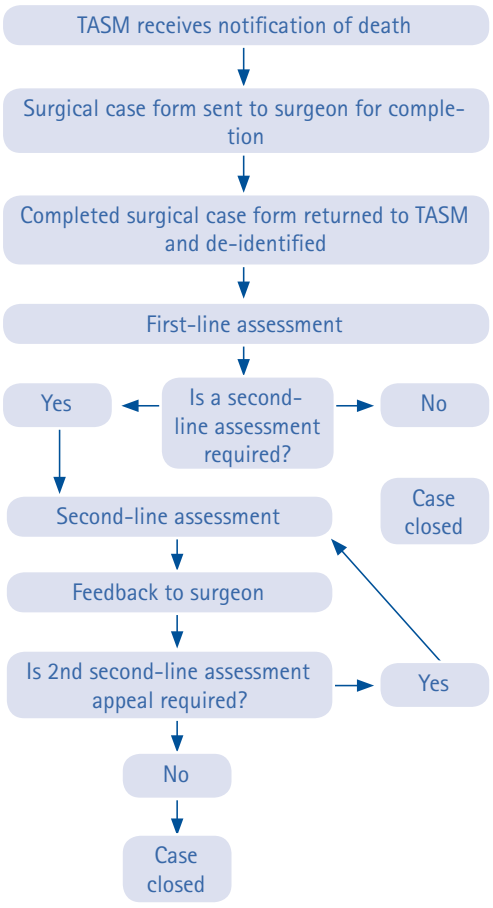
Surgeons receive written feedback from first-line assessors about each of their cases through TASM. They also receive extensive reports after each second-line assessment.

In addition, aggregated feedback in the form of annual reports and case note review booklets are disseminated to all surgeons, hospitals and the public via the College website. This aggregated feedback and related clinical events are not linked to individual patients, surgeons or hospitals. The process is managed by the TASM Project Manager following ANZASM guidelines and is coordinated through a secure database.

TASM's role is to inform, educate, facilitate change and improve practice by providing feedback.

- TASM provides feedback in the following ways:
- Surgeons receive written feedback from first- and second-line assessors on their TASM cases.
- Surgeons receive de-identified summaries of second-line assessments in the case note review booklets and annual reports.
- Hospitals participating in TASM may request reports on aggregated, de-identified data relating specifically to their hospitals and comparing them to the averages of the other hospitals.
- Annual reports are available to the surgical community on the TASM website at www.surgeons.org/tasm (see the Reports and Publications page).

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



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, or
- the patient was under the care of a physician (medical admission), and subsequently underwent a **surgical procedure**.

(Note: Terminal care cases are excluded from the full audit process.)

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

1.4 Reporting conventions

1.4.1 Terminology

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

(For this report, both the categories of 'definitely' and 'probably' are referred to as being preventable.)

- indicate who the incident was associated with, categorising this information as:
  - > audited surgical team
  - > another clinical team
  - > hospital
  - > other
- report on the impact of the incident on outcome, on whether the event:
  - > made no difference to 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 assessors (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 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, which is important for 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.

1.4.5 Data analysis

This report covers deaths notified to TASM from 1 July 2008 to 30 June 2009.

Due to the audit process and the timing of return of forms, some cases reported to TASM during 2009 will, at the time of analysis, still be undergoing review. These cases will be included in the next annual report. Similarly, cases which were not complete for the previous report have been finalised and included for analysis in this report.

TASM analysed areas of concern or adverse events ascribed to each case by assessors.

Data is encrypted in the database with Secure Sockets Layer (SSL) certificates. This data is sent to and stored in a central Structured Query Language (SQL) 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 to be created for each case.

An integrated workflow rules engine supports the creation of letters, reminders and management reports. This system is designed and supported by Alcidion Corporation (Adelaide).

The Project Manager enters all data from each TASM form.

The most frequent data-entry difficulty is found at question 9 on the surgical case form (SCF). Question 9 is a free-form question and contains at least a paragraph of

handwritten information. This handwritten information can be sometimes difficult to read and interpret.

Data are downloaded from the secure database into Microsoft Excel 2003 spreadsheets and then analysed using Statistical Package for Social Sciences (SPSS) Version 15.0.

Data is 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. There is a key variable 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 surgical case forms and assessment forms. Medical records departments, surgeons, the Coroner's Office reports, and the Chairman are all resources used by 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 2009

2.1 Overview of TASM 2009

Key points:

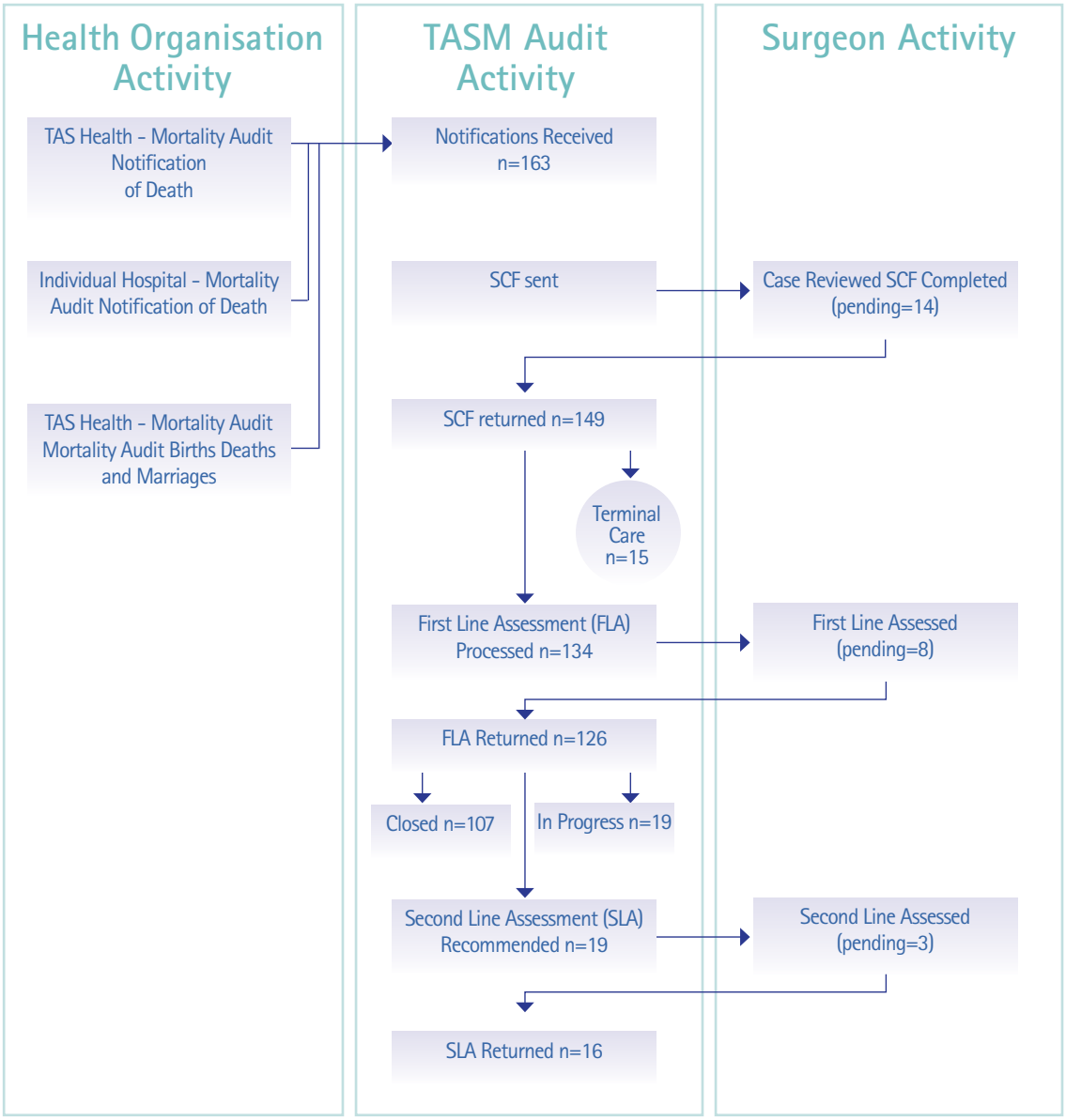
- 163 surgically-related deaths were reported to TASM from 1 July 2008 to 30 June 2009.
- 100% (141) of all Tasmanian consultant surgeons are involved
- TASM's process is consistent with all ANZASM audits and allows for independent peer review of all cases.
- As all Tasmanian surgeons are participating, where possible cases were assessed by a surgeon who did not work in the hospital in which the patient died.

At the end of the reporting period:

- 14 surgical case forms are pending.
- 8 first-line assessments are pending.
- 3 second-line assessments are pending.

There will always be TASM forms pending. This reflects the continuous nature of the audit with surgeons interacting with TASM on a regular basis.

Figure 4: Populated flow chart for 2009



TAS = Tasmania; SC = surgical case; SCF = surgical case form; SLC = second line assessment; FLC = first line assessment

3. Results

3.1 Surgeons

TASM's role is to inform, educate, facilitate change and improve practice by providing feedback to surgeons.

Surgeon participation

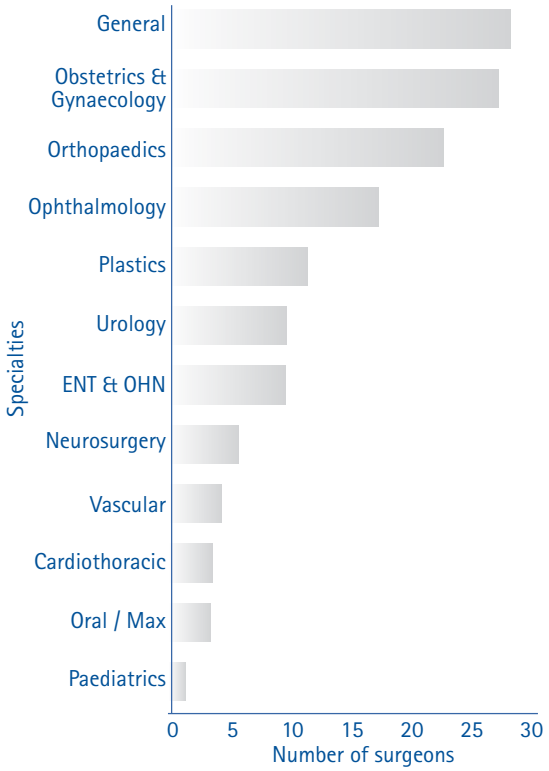
Key points:

- 100% (141/141) of Tasmanian consultant surgeons are participating in TASM.
- 58% (82/141) of these are Fellows of the Royal Australasian College of Surgeons
- 19% (27/141) are gynaecologists.
- The other surgeons are made up of :
  - > 23% (32/141) International Medical Graduates (IMGs) 'Area of Need' specialists on short- and long-term contracts.

3.1.1 Surgeon participation by specialty

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

Figure 5: Specialty of participating surgeon



There are different proportions of the 141 surgeons participating in TASM in each of the surgical specialties. Surgeons are considered to be participating when they submit a surgical case form or submit an *agreement of consultant participation* form.

Many of these surgeons have never been involved with a surgical death which meets the TASM criteria. Due to visiting surgeons on short-term contracts or locum appointments, numbers will fluctuate. Numbers in Figure 5 only relate to the reporting period.

3.1.2 Surgeon completion of surgical case forms (SCF)

The surgeons' return rate of surgical case forms is high. From July 2008 to June 2009, 91% (149/163) of surgical case forms were returned by the end of December 2009.

3.1.3 Grade of surgeon completing the surgical case form (SCF)

Table 1 outlines the grade of surgeon completing the surgical case form. It is pleasing to note that advanced surgical trainees are exposed to the TASM process; however, it is equality important to ensure that there is 'signoff' by the consultant surgeon involved.

Table 1: Grade of surgeon completing the SCF

Grade of surgeon completing form	2009
Consultant	97%
Advanced surgical trainee	3%

3.1.4 Grade of surgeon operating

(Source: surgical case forms)

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

Table 2: Grade of surgeon operating

	Deciding	Operating	Assisting	Extra in theatre
Consultant	93%	78%	8%	9%
AST*	1%	13%	25%	1%
Service registrar	1%	1%	4%	0%
BST**	0%	0%	7%	1%

*AST = Advanced surgical trainee **BST = Basic surgical trainee

In 2% of cases there were general practitioner (GP) surgeons assisting in theatre.

3.1.5 'In retrospect'

(Source: surgical case forms)

When surgeons were asked, 'In retrospect, would you have done anything differently?', 18/141 (13%) surgeons answered that they would have done something differently.

Surgeons' answers were analysed using standard qualitative analysis procedures. The most common responses were:

- change the technique or the operation
- different wound closure
- earlier decision to operate
- more extensive preoperative work-up
- more adequate cardiac work-up preoperatively
- earlier operation or earlier reopen/operation
- institute nasogastric feeding earlier.

3.2 Hospitals

Staff from Patient Information Management Services and Medical Records Departments notify TASM of all surgically-related deaths. Each participating hospital is aware of TASM's inclusion criteria (see 1.3.4) and reports those deaths weekly or monthly (via password–protected email).

3.2.1 Hospital participation

(Source: surgical case forms)

- 4 Tasmanian public and 9 private hospitals participate in TASM.
- 18% (24/134) of all cases were transferred from one hospital to another.
  (There were no data about transfers for 44 cases, which includes the pending cases).

Participating hospitals

13 Tasmanian public and private hospitals are currently participating:

- 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 Helens Private Hospital
- The Eye Hospital.

3.2.2 Transfers

The transfer of patients who need surgery in a regionalised state like Tasmania is an important contributor to patient care.

During 2009:

- 18% (24/134) of all cases were transferred from one hospital to another TASM hospital. (There were no data about transfers for 44 cases.) *(Source: surgical case forms)*
- 83% (136/163) of all deaths occurred in **four** hospitals, reflecting high volumes of surgery that occur in these hospitals. (Source: hospital notifications)
- The largest hospitals have tertiary facilities – The Royal Hobart Hospital and the Launceston General Hospital.
- All transfers were between TASM hospitals.
- 13% (3/24) of transferred cases were elective.*(Source: surgical case forms)*
- The median distance transferred was 200 km.

3.2.3 Hospital admissions

(Source: surgical case forms total n=134)

- 78% (95/122) were emergency admissions.
  (There were no admission data on 12 cases).
- 68% (65/95) of emergency admissions had operations.
- 22% (27/122) of cases were elective admissions.
  (There were no admission data on 10% (12 cases).

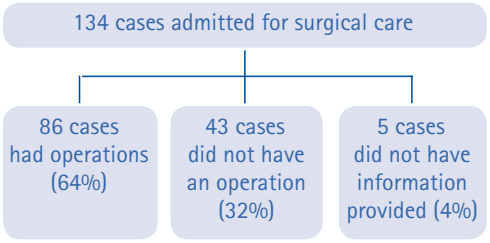
3.2.4 Delays in main surgical diagnosis

- In two cases there was a delay in obtaining the main surgical diagnosis and therefore the decision to operate.
- In one case with delays, there were unfavourable factors relating to the general medical unit.
- In two cases with delays, the delay was associated with the inexperience of staff within the surgical unit.
- In one case there were unfavourable factors relating to the surgical unit.
- In two cases there were unfavourable factors relating to the emergency department.
- In one case there was delay by the emergency department in performing further investigations.
- In one case there was delay associated with inexperience of staff in the emergency department.
- In one case there was delay associated with referral from 'hospital in the home'.
- In one case there was delay associated with the medical imaging department.

3.2.5 Cases with operations

Figure 6 shows the proportion of cases that had an operation. In total, 109 operations were audited by TASM. 86 patients had operations: 15 (17%) of these patients had more than one operation (Information was not provided on 5 cases).

Figure 6: TASM operative and non-operative cases



Emergency admissions:
(Source: surgical case forms)

- 68% (65/95) of **emergency** admissions underwent operations. Of those patients:
- 18% (12/65) had scheduled emergency operations.
- 35% (23/65) had an emergency operation.
- 23% (15/65) had an immediate operation.
- 3% (2/65) underwent elective operations. (There was a change in their admission status.)

In 13 cases the information was missing

Elective admissions:
(Source: surgical case forms)

- 81% (22/27) of elective admissions underwent operation.

3.2.6 Cases where surgery was not preformed

(Source: surgical case forms)

- 32% (43/134) of all cases had no operation.
- In 10 cases information was missing.
- There was no operation in 44% (42/95) of emergency admissions cases.
- There was no operation in 11% (3/27) of elective admission cases.

The reasons* for not having an operation were:

- An active decision was made by consultant surgeon not to operate (n=15).
- A decision was made to limit treatment (n=8).
- Not a surgical problem (n=5).
- A rapid death was expected (n=4).
- Patient refused the operation (n=4).
- Rapid death (n=4).

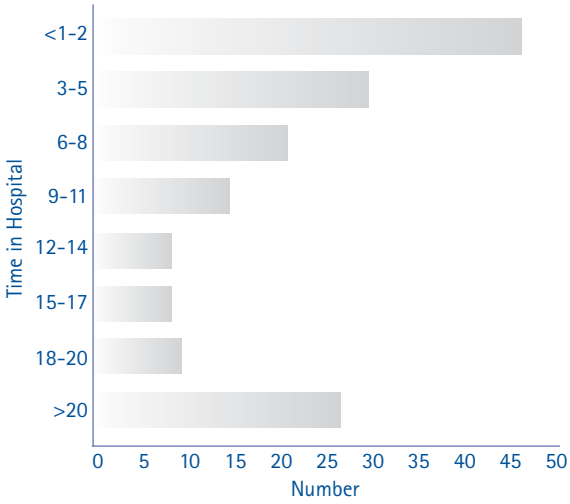
*The reason for no operation was not supplied in 3 cases.

3.2.7 Time in hospital before death

(Source: notifications from hospitals)

- The median length of stay in hospital was 6 days with the range <1 day to 142 days (n=163).
- 9% (14/163) of patients were in hospital for <1 day.
- The most frequent length of time in hospital (mode) was 2 days.
- 28% (46/163) of patients were in hospital for 2 days or less.

Figure 7: Time in hospital before death



3.2.8 Use of intensive care or high dependency units

(Source: surgical case forms and assessment forms)

The treating surgeons and assessors were asked, 'was ICU/HDU used?', and 'if not, should it have been used?' Table 3 outlines the **key** responses.

Table 3: Use of ICU or HDU

Was ICU/HDU used? Surgeons stated:	% of cases
ICU was used	71%
HDU was used	14%
If not, should ICU/HDU have been used? Assessors' opinions:	**% of cases**
ICU should have been used	6%
HDU should have been used	3%

3.3 Patients

The patients whose deaths were audited by TASM were predominantly elderly, with multiple and significant comorbidities, and they had been admitted for emergency surgery.

The patient characteristics in 2009 are similar to the patient characteristics stated in the 2008 Annual Report. Further details are presented below.

3.3.1 Demographics

(Source: hospital notifications and assessment forms)

- 163 deaths were reported to TASM in the study period (Source: hospital notifications).
- 126 (84%) surgical case forms have been completed to June 2009 (Source: assessment forms).
- 79 years was the median age at death.
- 52% were males.
- 65% had an American Society of Anesthesiologists (ASA) grade of at least 4.
- 92% had at least one significant comorbidity that surgeons considered could contribute to death.

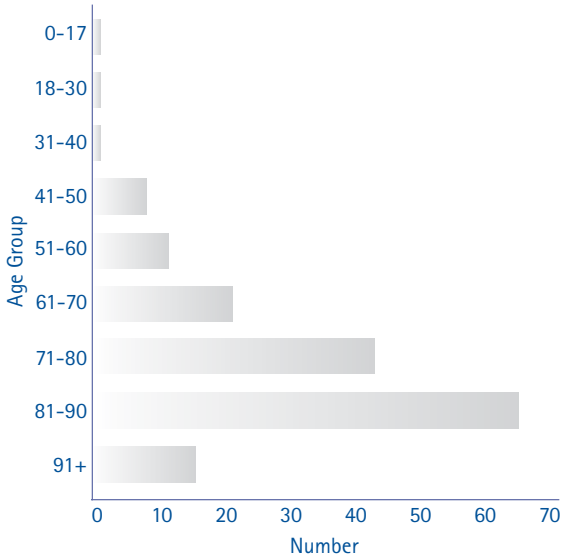
3.3.2 Age distribution

(Source: hospital notifications)

Figure 8 displays the age distribution of patients for cases notified by hospitals (n=163).

- The median age in 2009 was 79 years with a range of 4 years to 99 years.
- The age mode (the most frequent age) was 83 years.
- There were 12 patients aged between 91 and 99 years.

Figure 8: Age distribution



3.3.3 Gender distribution

(Source: hospital notifications, n=163)

- 52% were male.
- 48% were female.

3.3.4 Patients by specialty of surgeon

(Source: hospital notifications)

Table 4 shows the proportion of patients treated by surgeons of different specialties.

Table 4: Patients by specialty of surgeon

Specialty	Frequency	%
General	83	51
Vascular	12	8
Urology	10	6
Neurosurgery	23	14
Orthopaedics	28	17
ENT(OHN)	2	1
Obs & Gynae	1	<1
Cardiothoracic	4	2
Plastic/ Paediatrics	0	0
Total	163	100%

ENT=ear, nose and throat; Obs & Gynae= obstetrics and gynaecology; OHN=oral, head and neck

General surgery, neurosurgery, and orthopaedic surgery reported the most deaths and these specialties have the highest workloads also due to the correlation with the number of surgeons within that specialty.

3.3.5 American Society of Anesthesiologists (ASA) grades

(Source: surgical case forms)

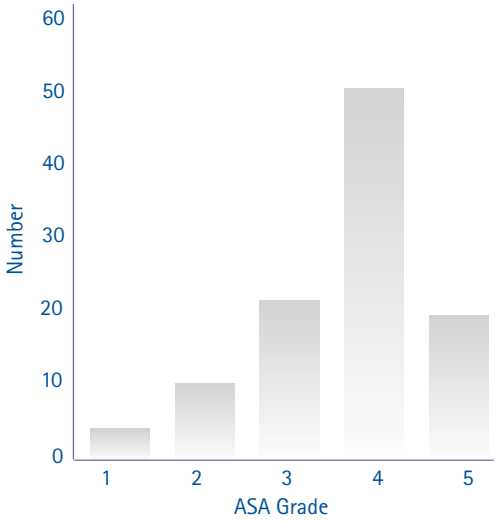
The American Society of Anesthesiologists (ASA) grade (see Table 5) is an internationally recognised classification of perioperative risk. An ASA grade is assigned to a Tasmanian-hospital patient before an operation.

Table 5: ASA grade definitions

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 hrs, with or without an operation
6	A brain dead patient for organ donation

Figure 9 profiles the ASA grade of all TASM cases. Eighty six per cent (92/107) of all patients who died had an ASA grade of 3 or higher. (There were no data for 56 cases.)

Figure 9: American Society of Anesthesiologists grades (n=107)



3.3.6 Malignancy

(Source: surgical case forms)

- Malignancy was present in 31% (37/121) of all the cases. (There were no data available for 42 cases.)
- Malignancy contributed to death in 22% (27/121) of those cases with malignancy. (Malignancy did not contribute to the death in 72% of cases and it was unknown if it contributed in 6% of cases.)
- Malignancy was present in 37% (29/79) of all cases who had operations.
- Malignancy was present in a higher proportion of **elective** cases having operations: 55% (12/22) compared with 31% (17/55) of emergency cases having operations.

3.3.7 Comorbidities

(Source: surgical case forms)

Eighty three per cent (112/134) of all (emergency and elective) cases admitted for surgical care had comorbidities that increased the risk of death before surgery.

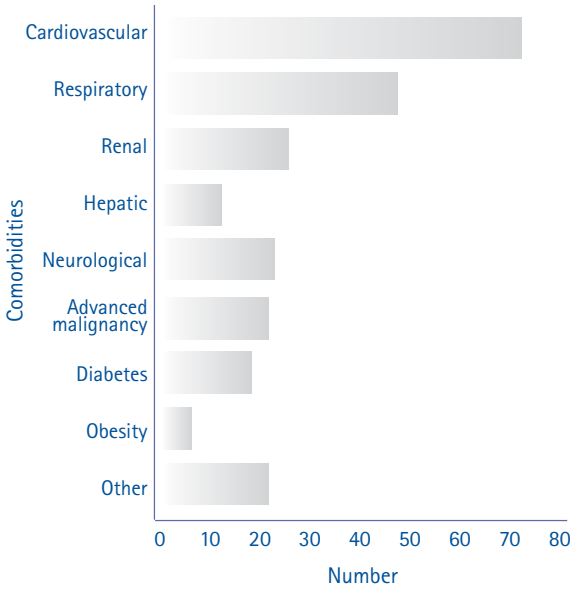
There were 322 comorbidities specified for the 112 cases.

Only 10 cases had no comorbidities.
(There was no data available for 12 cases.)

The most common comorbidity present was cardiovascular disease, found in 23% of all cases. See appendix 1 for other comorbidities.

- 16% cases had 2 comorbidities
- 20% cases had 3 comorbidities
- 21% cases had 4 comorbidities or more

Figure 10: Types of comorbidities present by frequency



The 7% (10/134) who did **not** have comorbidities present but who died were predominantly:

- general surgical patients
- males
- emergency admissions
- at considerable or expected risk of death
- younger than the average TASM patient when they died (61 years versus 83 years)
- in hospital for an average of 2 days.

3.3.8 Risk of death before surgery

(Source: surgical case forms)

Surgeons were asked to rate the overall risk of death (before any surgery) for each patient.

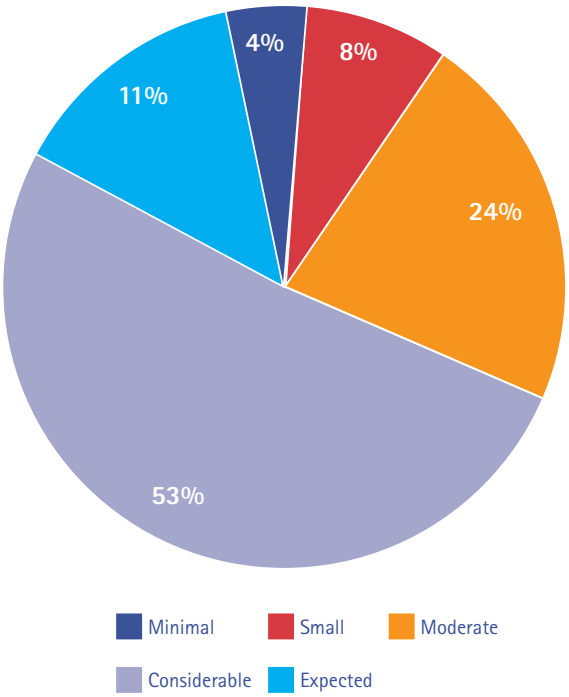
- 65% were at considerable or more risk, according to the admitting surgeons.

There were 3 patients who were recorded as being at minimal risk. The 3 patients are listed in Table 6 (see below)

Table 6: Minimal-risk patients (cause of death)

Cause of death
1. Unexpected episode of rapid atrial fibrillation leading to clinically silent bowel ischaemia- profound hypo-tension
2. Septicaemia and respiratory failure
3. Renal failure and cerebral vascular accident

Figure 11: Risk of death distribution (%)



The overall risk of death before any surgery was given for 79 cases (surgeons' views).

3.3.9 Typical patient

(Source: surgical case form)

The 'typical patient' who died after surgically-related care in hospital:

- was male
- was about 79 years of age
- was in hospital for two days
- did not have malignancy present
- had an incapacitating disease that was a constant threat to life on admission to hospital
- had deep vein thrombosis (DVT) prophylaxis
- had an operation
- did not have a postoperative complication
- did not need improvement in management before, during or after the operation.

3.4 Classification of cases

3.4.1 Postoperative complications

(Source: surgical case forms)

Unplanned actions postoperatively:

- Unplanned postoperative complications are strong predictors of death.
- 11% (18/163) of cases had **unplanned admission to ICU** (There were no data available for 51 cases.)
- 9% (15/163) of cases had an **unplanned return to theatre** (There were no data available for cases 49 cases.)
- 5% (8/163) of cases had **fluid balance issues** (There were no data available for cases 49 cases.)
- 2% (3/163) of cases had **unplanned readmission to hospital** (There were no data for 51cases.)

Complications:

No postoperative complications occurred in 60% of cases.

- 40% (32/80) of all cases had postoperative complications. (There were no data available for 83 cases.)
- In 88% of cases, there was **no delay** in recognising the complication.
- Several cases had more than one postoperative complication.

In the 32 (40%) cases **with postoperative complications**, 35 postoperative complications were recorded:

- procedural related sepsis 5
- significant postoperative bleeding 4
- small bowel anastomotic leak 3
- colorectal anastomotic leak 2
- pancreatic/biliary anastomotic leak 1
- tissue ischaemia 1

(There were 19 complications classified as 'other', including aspiration pneumonia, myocardial infarction, pulmonary embolus, respiratory complications, dehiscence, generalised sepsis, multi-organ failure, trocar perforation and intermittent ileus).

3.4.2 Prophylaxis of thromboembolism

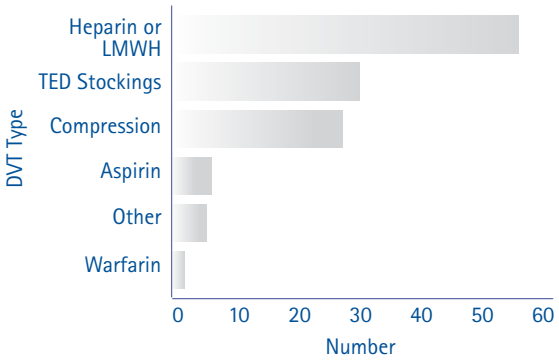
(Source: surgical case forms)

- 72% (86/120) of **all cases** had deep vein thrombosis (DVT) prophylaxis. (There were no data on 43 cases.)
- 26% (31/120) of all cases did not have DVT prophylaxis. (There were no data on 43 cases.)
- 86% (67/78) of **operated cases** had DVT prophylaxis.
- 14% (11/78) of operated cases either did not have DVT prophylaxis or the surgeon did not know whether the patient had DVT prophylaxis.

Of those patients who did not have DVT prophylaxis (n=120 who answered the question):

- 7 surgeons noted on the case form that it was not appropriate.
- 3 cases involved an active decision to withhold the prophylaxis.
- No case stated that it was an omission or an error.
- In 1 case information was missing.

Figure 12: DVT prophylaxis



3.4.3 Postmortem

(Source: surgical case forms)

- 4% (3/77) of cases had a postmortem performed by the coroner.
- 68% (52/77) of cases did NOT have a postmortem performed.
- 3% (2/77) of cases had a postmortem performed by the hospital.
- 9% (7/77) of deaths had postmortems refused.
- For 17% (13/77) of cases the postmortem status was unknown.

3.4.4 Management of cases

(Source: surgical case forms & assessment forms)

In cases that had clinical incidents, **surgeons and assessors** felt that care sometimes **could have been improved** in particular areas (see Table 7).

Most commonly, improvement could have occurred in non-operative areas (decision to operate, preoperative care and postoperative care), and within those areas preoperative care improvements were the most commonly cited.

Table 7: Need for improvement in management of cases

Area	Surgeons (n=77)	FLA Assessors (n=119)	SLA Assessors (n=15)
Preoperative management	4%	7%	47%
Decision to operate	10%	10%	20%
Choice of operation	3%	2%	7%
Timing of operation	3%	5%	13%
Intra-operative care	9%	6%	13%
Experience of surgeon deciding	0%	2%	7%
Experience of surgeon operating	0%	2%	7%
Postoperative care	9%	9%	27%

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 no numbers could be obtained for source populations. Therefore comparisons are difficult. The data is therefore simply observational.

TASM hopes that in the future this will be rectified, so that more meaningful and therefore more useful information can be obtained.

3.5.1 Clinical incidents

(Source: assessment forms)

There were 29 areas of concern and adverse events (not cases) reported by assessors:

- 55% were areas of concern
- 45% were adverse events.

These were:

- decision to operate (n=3)
- delay to surgery (n=3)
- unsatisfactory postoperative care (n=3)
- inappropriate discharge (n=3)
- secondary haemorrhage (n=2)
- incorrect use of DVT prophylaxis (n=2)
- anastomotic leak (n=2)
- delay in referral to surgeon (n=2)
- perforation of bowel (n=2)
- failure to perform surgery (n=1)
- availability of ICU bed (n=1)
- delay in resuscitation (n=1)
- unsatisfactory preoperative assessment (n=1)
- inadequate pain management overnight (n=1)
- poor communication with hospital transfer (n=1)
- postoperative aspiration (n=1).

3.5.2 Associations for areas of concern and adverse events

- 72% (21/29) of areas of concern or adverse events were associated with another clinical team.
- 14% (4/29) of areas of concern or adverse events were associated with the surgical team.

'Other' associations with areas of concern or adverse events were:

- GP
- hospital

Note that some areas of concern and adverse events had multiple associations.

3.5.3 Preventability of areas of concern and adverse events

(Source: assessment forms)

- 72% (21/29) of all areas of concern and adverse events (not cases) were preventable (probably and definitely) (see Figure 13).

Figure 13: Preventability of areas of concern and adverse events (n=29)

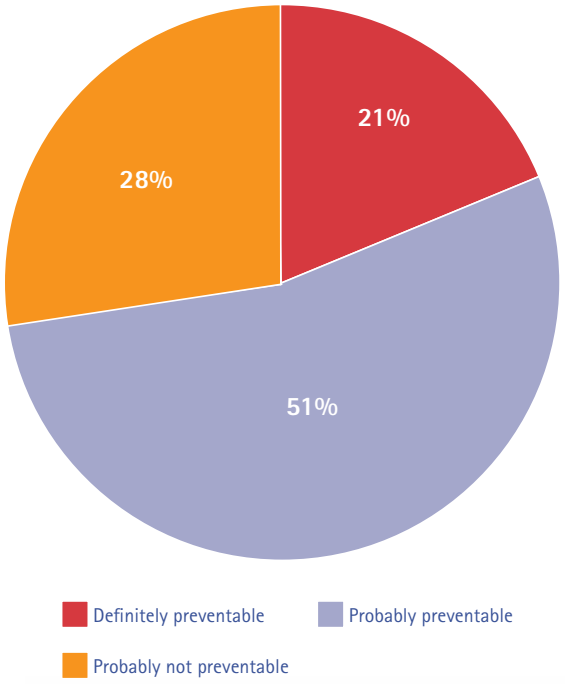


Table 8: Preventability of areas of concern and adverse events (2008 and 2009)

Preventable issue	Number 2008 (n=38)	% 2008	Number 2009 (n=29)	% 2009	% Change
Delay to surgery (earlier operation desirable)	3	7	4	14	▲ 7%
Adverse factors in management	0	0	2	8	▲ 8%
Anastomotic leak from duodenum following open surgery	1	3	0	0	▼ 3%
Injury to small bowel during endoscopic operation	0	0	1	3	▲ 3%
Aspiration pneumonia after anaesthetic	2	5	0	0	▼ 5%
Bile leakage from liver after open surgery	0	0	1	3	▲ 3%
Postoperative bleeding after open surgery	1	3	0	0	▼ 3%
Anastomotic leak after open surgery	2	5	2	8	▲ 3%
Inadequate postoperative cardiac assessment	1	3	0	0	▼ 3%
Delays	3	7	0	0	▼ 7%
Delay in transfer to surgeon by physician	0	0	1	3	▲ 3%
Delay to reoperation	3	7	0	0	▼ 7%
Delay in recognising a respiratory complication	1	3	0	0	▼ 3%
Pulmonary embolus	0	0	1	3	▲ 3%
Secondary haemorrhage	0	0	1	3	▲ 3%
Delay to operation caused by missed diagnosis	1	3	0	0	▼ 3%
Delay investigating the patient	1	3	1	3	~
Anastomotic leak from colon after open surgery	1	3	0	0	▼ 3%
Delay in x-ray department	1	3	0	0	▼ 3%
Delay starting medical treatment	0	0	1	3	▲ 3%
Communication failures	0	0	1	3	▲ 3%
Discharge too premature	0	0	2	8	▲ 8%
Poor documentation	1	3	0	0	▼ 3%
Perforation of small bowel during open surgery	0	0	1	3	▲ 3%
Aspiration complicating general anaesthetic	0	0	1	3	▲ 3%
Cardiac arrest complicating general anaesthetic	0	0	1	3	▲ 3%
Failure to use DVT prophylaxis	1	3	0	0	▼ 3%
Failure to operate	0	0	1	3	▲ 3%
Incorrect / inappropriate therapy	4	10	2	8	▼ 2%
Wrong operation performed	1	3	0	0	▼ 3%
Postoperative care unsatisfactory	2	5	0	0	▼ 5%
Inadequate monitoring	1	3	0	0	▼ 3%
Inadequate assessment	0	0	2	8	▲ 8%
Postoperative inadequate respiratory monitoring	1	3	0	0	▼ 3%
Delay in diagnosis	2	5	0	0	▼ 5%
Decision to operate	4	10	3	10	~
TOTALS	38	100	29	100	

Note: due to the very small numbers of events under each heading, great care needs to be taken in interpreting changes from year to year.

3.6 Cases with clinical incidents

(Source: assessment forms)

This section provides the clinical context of the incidents noted by the assessors.

- 134 cases were sent to assessment by first-line or second-line assessors or both in 2009.
- 12% (15/126) had at least one area of concern or adverse event.
- 8% (10/126) of all cases had at least one adverse event.

Table 9: Cases with clinical incidents

Cases with:	
at least one area of consideration	33 (25 %)
at least one area of concern and adverse event	19 (14 %)
at least one adverse event	10 (7%)
an adverse event that caused death	7 (5%)
an adverse event that: • caused death was definitely pre-ventable • was associated with surgical team	2 (1%)

3.6.1 Adverse events

An adverse event is defined as:

An unintended 'injury' caused by medical management, rather than by the disease process, that is sufficiently serious to lead to prolonged hospitalisation, or lead to temporary or permanent impairment or disability of the patient at the time of discharge, or have contributed to or have caused death.

There were 10 cases with adverse events (2 preoperative, 1 intra-operative and 7 postoperative). Therefore, 90% (9/10) of adverse events occurred outside the operating theatre.

Preoperative (n=2)

- failure to operate
- cardiac arrest

Intra-operative (n=1)

- perforation of bowel during procedure

Postoperative (n=7)

- pulmonary embolus
- multi-organ failure
- management of haemorrhage
- delay in diagnosis of anastomotic leak

3.6.2 Areas of concern

An area of concern is defined as:

An incident where the clinician believes that an area of care SHOULD have been better.

There were 16 cases with 13 types of areas of concern (8 pre-operative, 2 intra-operative, 6 postoperative). Therefore, 88% (14/16) of areas of concern occurred outside the operating theatre.

Preoperative (n=8)

- delay to surgery (3 patients)
- preoperative assessment inadequate
- delay in transfer to surgeon by physician
- delay to investigation of patient
- communication failures (2 patients)

Operative (n=2)

- injury to small bowel during endoscopic operation
- surgical technique not ideal

Postoperative (n=6)

- discharge to convalescence too early
- premature discharge from hospital
- postoperative fluid management
- bile leakage from liver after open surgery
- delay starting DVT prophylaxis

4 Audit comparisons

A baseline for most aspects of surgical care has been constructed and comparisons can be made.

Table 10: Audit comparisons (2008 and 2009)

	2008	2009	CHANGE
NODS	189	163	▼ 14%
Males	53%	52%	▼ 1%
Median age	79 years	79 years	~
ASA grade >= 4	56%	65%	▲ 9%
At lease one significant comorbidity	90%	92%	▲ 2%
Elective admissions	17%	22%	▲ 5%
Delay in main surgical diagnosis	10%	8%	▼ 2%
Death within 30 days of operation	69%	65%	▼ 4%
No operation	31%	32%	▲ 1%
Cases with unplanned return to theatre	16%	13%	▼ 3%
Cases with unplanned admission to ICU	16%	16%	~
Fluid balance an issue	6%	7%	▲ 1%
All cases DVT prophylaxis used	66%	72%	▲ 6%
Operated cases DVT prophylaxis used	79%	86%	▲ 7%
Cases assessed	78%	80%	▲ 2%
Insufficient information on surgical case form	20%	12%	▼ 8%
Second-line assessment requested	21%	15%	▼ 6%
Assessed cases with areas of concern or adverse events	17%	14%)	▼ 3%
Assessed cases with adverse events that caused death	3%	5%	▲ 2%
Assessed cases with adverse event that caused death and definitely preventable	0%	1%	▲ 1%

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

5 Audit limitations

(Source: audit statistician)

As an audit, the data are collected for that purpose, rather than for academic research. However, in audit terms, the data are of a high quality because every case had external peer review.

The data are self reported and a certain level of bias may be present, but an independent assessor makes their own assessment on the facts presented. The accuracy of the notifications of deaths to TASM cannot be guaranteed.

6 Conclusions

(Source: TASM Chairman)

The audit has had wide acceptance and cooperation from the surgeons.

The use of all TASM registered assessors, rather than a small panel of assessors, has spread the workload and involved as much of the workforce as possible.

Surgeons who disagree with their second-line assessment have the right of appeal and can obtain another assessment from a different surgeon in that specialty. This has only happened on one occasion.

The case note review booklet containing about 12 illustrative cases is produced twice a year for distribution to surgeons and trainees (where requested). The cases are based on assessors' comments and all have a clinical message. This seems to have been well received by the surgical community.

Acknowledgements

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    Chair, Professional Development and Standards Board; Chair ANZASM SC
  - > Dr Wendy Babidge
    Director, RAAS Division
  - > Ms Nicola Robinson
    Deputy Director, RAAS Division
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Appendices

Appendix 1 – 'Other' comorbidities present in 2009

Abnormal coagulation profile

Acidosis and anaemia

Anorexia nervosa

Charcot Marie Tooth Disease

Metastasis

General frailty

Gastro-oesophageal reflux disease, peptic ulcer disease, hormone therapy increased cholesterol

Low platelet count

Motor neurone disease

Peripheral vascular disease

Pneumonia

Portal hypertension

Radiation therapy

Total cystectomy & ileal conduit

Recent cerebrovascular accident

Septicaemia

Senile dementia

Severely malnourished

Upper gastrointestinal bleed

Warfarinised for DVT

Infected urinoma

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