

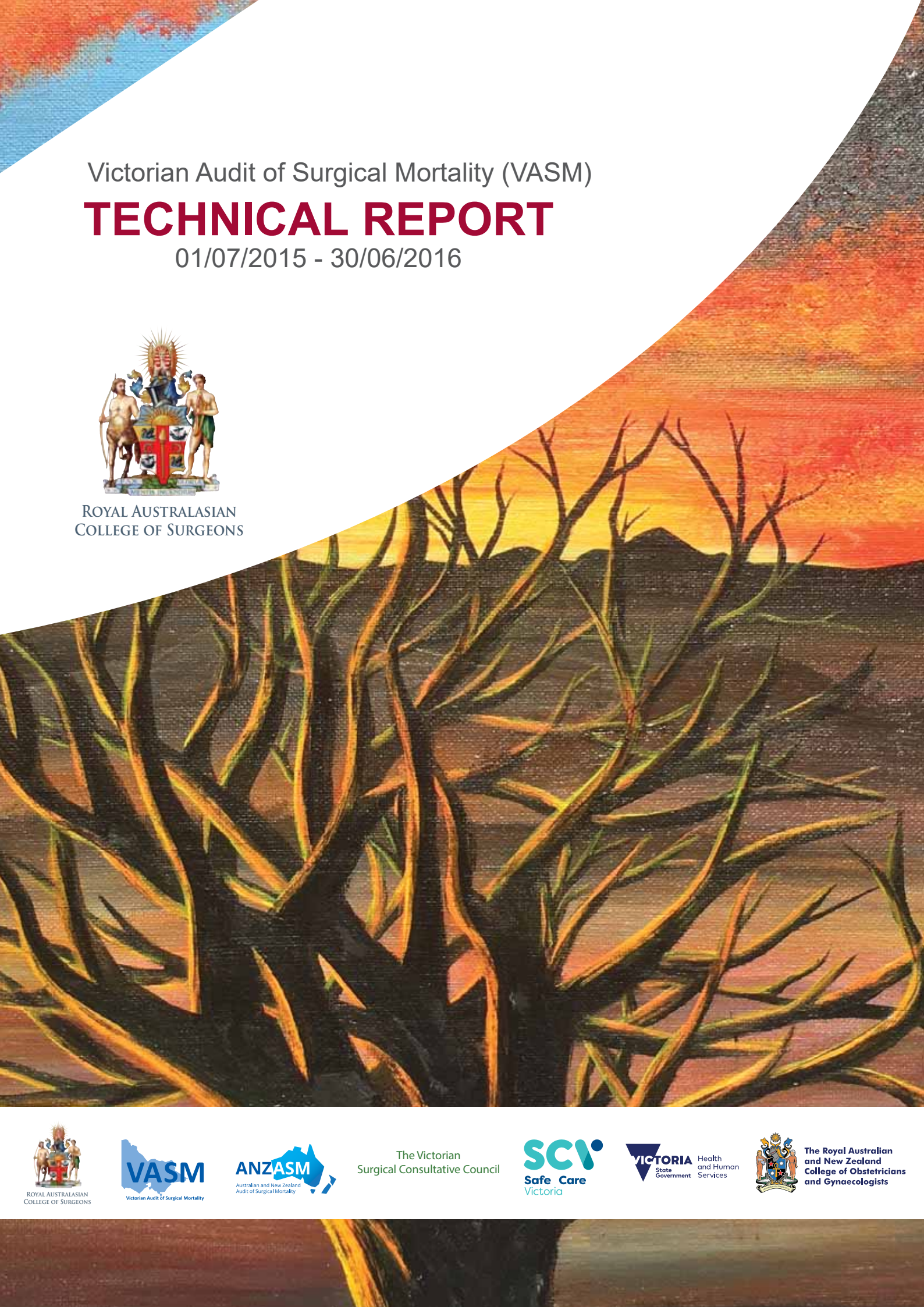
Victorian Audit of Surgical Mortality (VASM)

TECHNICAL REPORT

01/07/2015 - 30/06/2016



ROYAL AUSTRALASIAN
COLLEGE OF SURGEONS



The Victorian
Surgical Consultative Council





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Abbreviations

ANZASM	Australian and New Zealand Audit of Surgical Mortality
DHHS	Department of Health and Human Services
GI	Gastrointestinal
RACS	Royal Australasian College of Surgeons
VASM	Victorian Audit of Surgical Mortality
VSCC	Victorian Surgical Consultative Council

1. About VASM

1.1 VASM structure and governance

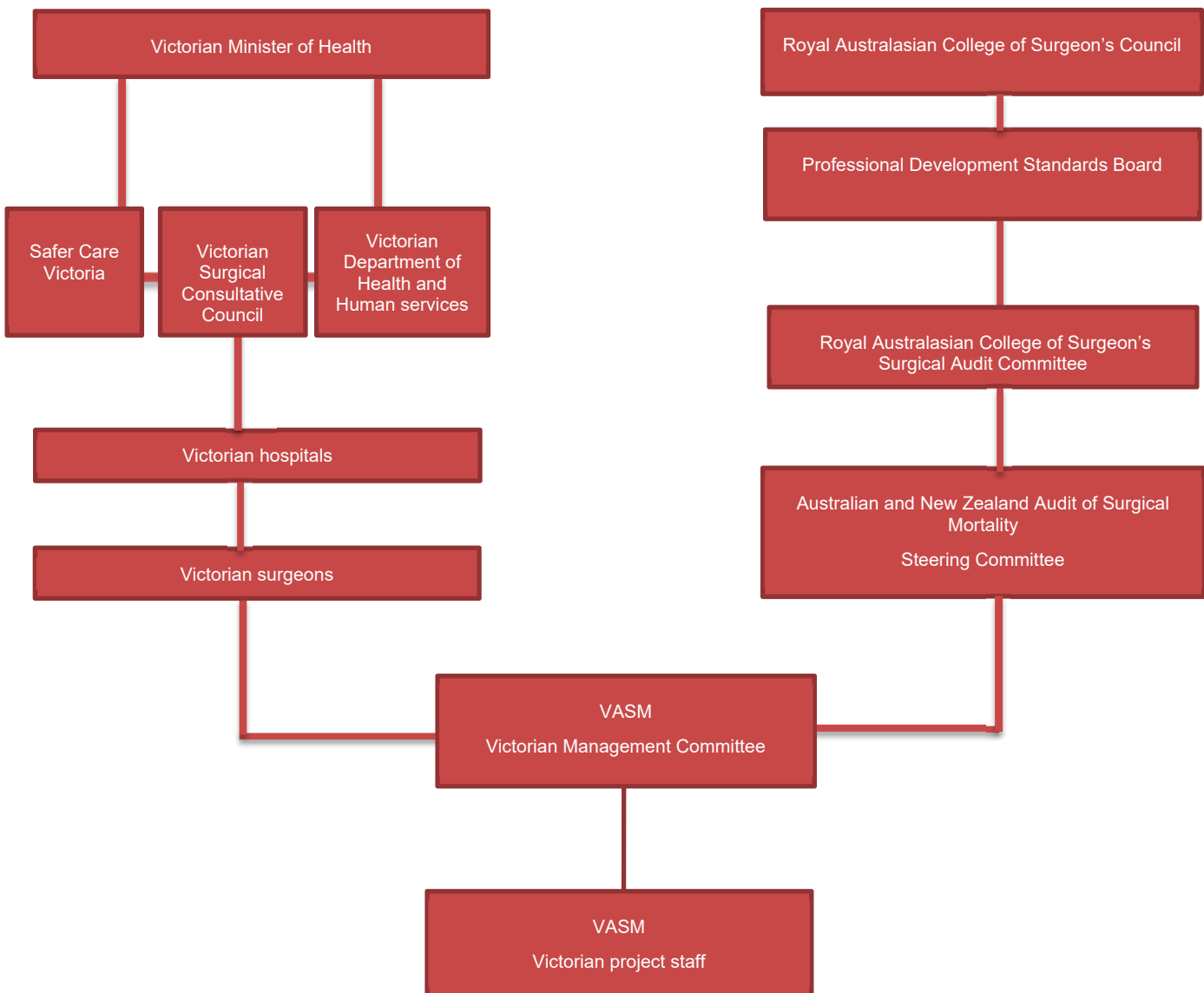
The Australian and New Zealand Audit of Surgical Mortality (ANZASM) is managed by the Research, Audit and Academic Surgery Division of the Royal Australasian College of Surgeons (RACS), and is supported and funded by state and territory governments. ANZASM oversees the implementation and standardisation of each regional (jurisdictional) audit to ensure consistency in audit processes and governance.

Figure 1 represents the governance structure of the Victorian Audit of Surgical Mortality (VASM) and ANZASM. RACS manages VASM on behalf of the Victorian Department of Health and Human Services (DHHS). RACS provides infrastructure support and has oversight of the project. VASM works closely with the Victorian Surgical Consultative Council (VSCC) and provides regular reports to ANZASM, VSCC, health services, surgeons and the Victorian DHHS.

The VSCC, established by the Victorian government in 2001 to review causes of avoidable mortality and morbidity associated with surgery, provides feedback and recommendations to the medical profession and health service system. The VASM project team informs the VSCC of trends in surgical mortality and assists with the development of strategies to enable the surgical community and other healthcare providers to address system issues.

The VSCC receives de-identified aggregate reports from VASM that summarise all cases reviewed. The VSCC informs the surgical community about important issues arising from the collection and analysis of mortality and morbidity data. Along with the VSCC, VASM aims to support further improvements in patient care in Victoria.

Figure 1: Victorian Audit of Surgical Mortality (VASM) project governance structure



Note: Safer Care Victoria (SCV) replaced the Office for Safety and Quality Improvement and is Victoria's leading agency for healthcare safety, quality and innovation. Safer Care Victoria works with patients and health services to take a patient-centred approach to quality and safety improvement.

2. VASM performance review

Table 1: Project schedule and delivery status

Schedule of key deliverables	Status
Key performance reviews 2007–2012	✓ Completed 12 August 2012
VASM contract renewal 2013–2019	✓ Completed 12 August 2012
Enhancement of the Fellows' Interface	✓ Completed 1 November 2013 ✓ Completed 1 February 2016
Establishment of mortality audit at all Victorian public and private hospitals	✓ Completed 1 August 2013
Expansion of the mortality audit to the Royal Australian and New Zealand College of Obstetricians and Gynaecologists	✓ Completed 1 August 2012
Expansion of the mortality audit to the Australian and New Zealand College of Anaesthetists	✓ Completed 1 September 2016
Establishment of internal validation of the VASM audit processes 2013–2019 <ul style="list-style-type: none"> • First-line validation • Second-line validation • Surgical case record form 	✓ Completed 12 August 2013 ✓ Completed 12 August 2015 ✓ In progress
Establishment of treating surgeon feedback process <ul style="list-style-type: none"> • First-line validation • Second-line validation 	✓ Completed 1 January 2015
Establishment of individual hospital clinical governance reports	✓ Completed 1 January 2014
Establishment of individual surgeon reports	✓ Completed 1 March 2016
Establishment of the perceived quality of VASM information project	✓ Completed 1 February 2015 (stage 1) ✓ Completed 1 February 2016 (stage 2) ✓ In progress (stage 3)
Phase 2 delivery of the perceived quality of VASM information project	✓ Completed 1 February 2016
Provision of educational seminars to Fellows, hospital administrators and other healthcare professionals on: <ul style="list-style-type: none"> • Managing the Deteriorating Patient. Presented in collaboration with VSCC and VMIA • Profiling the Accreditation Advantages of the Victorian Audit of Surgical Mortality • Patient Transfers - between Hospitals and within Hospitals • Aviation Error Reduction Strategies Applied to Surgery - How to Conduct Second-Line VASM Peer-Review Assessments • Surgical Emergencies and Shared Care • Understanding the Literature and Preparing for Journal Submission • Perioperative Care: How can we do better? • Would you have changed the management of this patient's course to death? • Improving Outcomes in the Surgical Patient • A VASM Starter Pack for Trainees • VASM workshop: Lessons Learned from the VASM Audit 	✓ Completed 23 February 2012 ✓ Completed 30 October 2012 ✓ Completed 23 February 2013 ✓ Completed 18 October 2013 ✓ Completed 19 February 2014 ✓ Completed 1 May 2014 ✓ Completed 18 February 2015 ✓ Completed 16 October 2015 ✓ Completed 23 February 2016 ✓ Completed 7 March 2016 ✓ Completed 22 October 2016
Provision of educational publications: <ul style="list-style-type: none"> • Case Note Review Booklet • Scientific papers • VASM report released annually 	✓ Completed 15 August 2014 ✓ Completed 15 August 2015 ✓ Completed 15 August 2015 ✓ Completed 15 August 2016 ✓ Completed 15 November 2013 ✓ Completed 15 October 2013 ✓ Completed 15 August 2014 ✓ Completed 15 November 2013 ✓ Completed 15 August 2014 ✓ Completed 15 August 2015 ✓ Completed 27 July 2016
Provision of external evaluation of the VASM audit processes by Aspex Consulting	✓ Completed 27 December 2014 (stage 1)

VASM: Victorian Audit of Surgical Mortality; VMIA: Victorian Managed Insurance Authority; VSCC: Victorian Surgical Consultative Council. FLA and SLA validation: examination of the agreement among two independent assessors performing assessments on the same case.

3. Statistical analysis

3.1 Data management and statistical analysis

All deaths occurring in Victorian hospitals while the patient is under the care of a surgeon, which are notified to VASM, are audited. Cases admitted for terminal care and deaths incorrectly attributed to surgery are excluded from the full audit process. This technical report includes deaths reported to VASM from 1 July 2012 up to 30 June 2016. The multiple rate-limiting steps in the audit process result in a mean time to completion of 3 months. Some deaths that occurred during the reporting period are still under review and will be included in future publications.

Data is encrypted in the web database. This data is sent to, and stored in, a central Structured Query Language server database that includes a reporting engine. All transactions are time-stamped. All changes to audit data are written to an archive table, enabling a complete audit log to be created for each case.

An integrated workflow rules engine supports the creation of letters, reminders and management reports. This system was designed by the Alcidion Corporation and is currently supported by the RACS IT department. All communications are encrypted with Secure Sockets Layer certificates.

Data is downloaded from the secure database and then analysed using the statistical package Stata version 13.1 and Microsoft Office Excel (2010). Demographic data and summary statistics have been presented. Continuous variables have been compared using Student's t-test or the non-parametric rank-sum test as appropriate. Categorical variables have been compared using Pearson's Chi-square test. Some variables have also been tested for yearly trend. Concordance and kappa scores and Gwet scores have been used as measures of agreement.

Numbers in the parentheses in the text (n) represent the number of cases analysed. This number varies as some data fields were not completed by the surgeon.

3.2 Interpretation of Cohen, Gwet score and p values

The Gwet AC score is used to understand the difference between agreement levels beyond chance where:

<0 = no agreement.

0.00–0.19 = poor agreement.

0.20–0.39 = fair agreement.

0.40–0.59 = moderate agreement.

0.60–0.79 = substantial agreement.

0.80–1.00 = almost perfect agreement.

A p value less than 0.05 is considered statistically significant.

3.3 Exclusion of identifiable data

Labels and data that might identify surgical groups, patients or hospitals, as well as extreme values, have been excluded from this report.

3.4 Classification of operative procedures

The operative procedures were categorised in this report to group the operations for simpler classification. A breakdown of operative procedures is provided are listed below;

- Cardiac: includes angiograms, bypass of coronary artery, exploratory median sternotomy, median sternotomy approach, replacement of aortic and mitral valve.
- Colorectal: includes anterior resection of rectum and anastomosis, colostomy, partial colectomy, hemicolectomy, ileostomy and reversal of Hartmann's procedure.
- Gastrointestinal (GI) endoscopy: includes colonoscopy, gastroscopy, endoscopic retrograde cholangiopancreatography and sigmoidoscopy.
- Laparotomy, laparostomy and upper GI: includes cholecystectomy, endoscopic division of adhesions of peritoneum, gastrectomy, ileostomy, jejunostomy, oversewing of small bowel and repair of inguinal hernia.
- Neurosurgical trauma: includes burrhole(s) for ventricular external drainage, craniectomy, craniotomy, evacuation of haematoma, insertion of cranial monitor, insertion of drainage system and intracranial pressure monitoring.
- Orthopaedic: includes hip joint operations, hemiarthroplasty, fracture and internal fixation.
- Peripheral vascular: includes embolectomy of femoral artery and vein graft thrombectomy.
- Thoracic and tracheostomy: includes bronchoscopy, insertion of tube drain into pleural cavity, thoracotomy and tracheostomy.
- Urology: includes diagnostic cystoscopy and transurethral resection of male bladder.
- Wound care: includes debridement of bone, muscle and skin, drainage of septal abscess, dressing of wound.

3.5 Concordant validity considerations

Completion of all fields in the surgical case form by the treating surgeon requires some self-reflection. In particular, the question in the surgical case form in which the treating surgeon is asked to identify any areas of consideration, concern or adverse events arising from his or her care of the patient. The responses to this question by the treating surgeon, first-line assessor and second-line assessor were compared, and the degree of concordance estimated. The results of the concordance analysis are shown in Tables 2, 3 and 4.

It was not expected that there would be full concordance between the treating surgeon and the first- and second-line assessors. The information available to the first-line assessor relies heavily on the treating surgeon's account of the clinical events; however, the second-line assessor has a de-identified copy of the patient's medical records and thus a relatively unbiased chronology of care as it happened. It was predicted that the highest level of concordance would be between the treating surgeon and first-line assessor.

Analysis of concordance is a method of studying inter-rater reliability in reporting all clinical management issues. Performing a full case note review on all reported deaths is not feasible for logistical reasons.

The outcomes of the concordance analysis were reassuring, as they mirrored the predicted outcomes.

Gwet's AC1 provided a more stable inter-rater reliability coefficient than Cohen's kappa. Gwet scores appear less affected by prevalence and marginal probability and are represented in this report for better interpretation of inter-rater reliability analysis.⁽¹⁻⁴⁾

Table 2: Concordant validity between the treating surgeon and the first-line assessor

Concord area	n	Concord	Kappa score	95% CI1	p value1	Gwet's AC score	95% CI2	p value2
ICU care benefit if not received	993	96.88%	0.15	0-0.31	0.06	0.97	0.96-0.98	<0.0001
HDU care benefit if not received	940	92.23%	0.12	0.02-0.22	0.014	0.92	0.90-0.94	<0.0001
Fluid balance	2,784	93.71%	0.61	0.56-0.67	<0.0001	0.92	0.91-0.94	<0.0001
Clinical management issues	3,847	78.32%	0.45	0.42-0.48	<0.0001	0.65	0.62-0.67	<0.0001
Preoperative management/preparation	3,372	89.62%	0.39	0.34-0.44	<0.0001	0.88	0.86-0.89	<0.0001
Decision to operate at all	3,380	88.64%	0.33	0.28-0.38	<0.0001	0.86	0.85-0.88	<0.0001
Choice of operation	3,386	93.77%	0.23	0.16-0.30	<0.0001	0.93	0.92-0.94	<0.0001
Timing of operation	3,361	93.60%	0.47	0.42-0.53	<0.0001	0.93	0.92-0.94	<0.0001
Intraoperative/technical management	3,334	93.97%	0.37	0.30-0.44	<0.0001	0.93	0.92-0.94	<0.0001
Grade/experience of surgeon deciding	3,330	98.56%	0.14	0.01-0.26	0.031	0.99	0.98-0.99	<0.0001
Grade/experience of surgeon operating	3,330	98.18%	0.15	0.04-0.27	0.007	0.98	0.98-0.99	<0.0001
Postoperative care	3,299	92.66%	0.44	0.39-0.50	<0.0001	0.92	0.91-0.93	<0.0001

Note: a total of 3,948 surgical case forms and first-line assessments were available for analysis. There were 3,567 surgical procedures with 5,036 operative episodes.

Cohen's kappa score interpretation outlined in section 3.

Gwet's AC1 kappa score interpretation outlined in the Appendix section 3.

CI: confidence interval; HDU: high dependency unit; ICU: intensive care unit.

Comments:

- High concordance levels were achieved between the treating surgeon and first-line assessor.
- The area with the lowest concordance between the surgeon and first-line assessor was clinical management issues. This was not an unexpected finding and supports the value of independent peer-review.

Table 3: Concordant validity between the treating surgeon and the second-line assessor

Concord area	n	Concord	Kappa score	95% CI1	p value1	Gwet's AC score	95% CI2	p value2
ICU care benefit if not received	95	84.21%	0.10	0-0.28	0.286	0.81	0.71-0.91	<0.0001
HDU care benefit if not received	90	77.78%	0.13	0-0.30	0.125	0.71	0.57-0.85	<0.0001
Fluid balance	523	84.70%	0.32	0.21-0.43	<0.0001	0.80	0.76-0.85	<0.0001
Clinical management issues	623	57.14%	0.21	0.15-0.26	<0.0001	0.17	0.09-0.25	<0.0001
Preoperative management/preparation	570	75.44%	0.25	0.17-0.34	<0.0001	0.64	0.58-0.70	<0.0001
Decision to operate at all	572	80.77%	0.14	0.05-0.24	0.004	0.75	0.70-0.80	<0.0001
Choice of operation	574	82.75%	0.17	0.09-0.26	<0.0001	0.79	0.74-0.83	<0.0001
Timing of operation	564	83.69%	0.31	0.21-0.42	<0.0001	0.79	0.74-0.83	<0.0001
Intraoperative/technical management	565	82.12%	0.22	0.12-0.32	<0.0001	0.77	0.72-0.82	<0.0001
Grade/experience of surgeon deciding	562	96.44%	0.08	0-0.25	0.34	0.96	0.95-0.98	<0.0001
Grade/experience of surgeon operating	563	95.38%	0.12	0-0.28	0.16	0.95	0.93-0.97	<0.0001
Postoperative care	554	77.44%	0.29	0.20-0.38	<0.0001	0.67	0.61-0.73	<0.0001

Note: a total 629 surgical case forms and second-line assessments were available for analysis.

Cohen's kappa score interpretation outlined in section 3.

Gwet's AC1 kappa score interpretation outlined in the Appendix section 3.

CI: confidence interval; HDU: high dependency unit; ICU: intensive care unit.

Comments:

- Disagreement between the treating surgeon and second-line assessor was most marked in the areas of preoperative management/preparation, postoperative care and clinical management issues. It may be that treating surgeons are less objective when it comes to assessing the clinical management received by their own patients. This was not an unexpected finding and supports the value of independent peer review.

Table 4: Concordant validity between the first-line assessor and the second-line assessor

Concord area	n	Concord	Kappa score	95% CI1	p value1	Gwet's AC score	95% CI2	p value2
ICU care benefit if not received	50	76.00%	0.34	0.04-0.65	0.03	0.62	0.40-0.85	<0.0001
HDU care benefit if not received	48	58.33%	0.17	0-0.43	0.21	0.20	0-0.50	0.181
Fluid balance	299	82.94%	0.31	0.17-0.46	<0.0001	0.77	0.71-0.84	<0.0001
Clinical management issues	573	72.43%	0.09	0.01-0.18	0.04	0.61	0.54-0.67	<0.0001
Preoperative management/ preparation	517	63.64%	0.23	0.15-0.31	<0.0001	0.33	0.25-0.42	<0.0001
Decision to operate at all	528	73.30%	0.21	0.12-0.30	<0.0001	0.60	0.53-0.67	<0.0001
Choice of operation	527	75.90%	0.29	0.19-0.38	<0.0001	0.64	0.57-0.70	<0.0001
Timing of operation	507	76.13%	0.30	0.20-0.39	<0.0001	0.64	0.57-0.71	<0.0001
Intraoperative/technical management	516	76.16%	0.34	0.24-0.43	<0.0001	0.63	0.56-0.70	<0.0001
Grade/experience of surgeon deciding	485	96.29%	0.23	0-0.46	0.05	0.96	0.94-0.98	<0.0001
Grade/experience of surgeon operating	508	90.55%	0.16	0.02-0.30	0.03	0.89	0.86-0.93	<0.0001
Postoperative care	499	68.54%	0.28	0.19-0.36	<0.0001	0.45	0.37-0.53	<0.0001
Appropriateness of DVT	373	94.10%	0.05	0-0.21	0.50	0.94	0.91-0.96	<0.0001

Note: a total of 629 first line assessments and second-line assessments were available for analysis.

Cohen's kappa score interpretation outlined in section 3.

Gwet's AC1 kappa score interpretation outlined in the Appendix section 3.

CI: confidence interval; HDU: high dependency unit; ICU: intensive care unit; DVT: deep vein thrombosis.

Comments:

- Disagreement between first- and second-line assessors was most marked in the areas of timing and choice of the operation; decision to operate; technical management and the clinical management section. Second-line assessors perceived more issues than first-line assessors.
- The tendency of second-line assessors to be more critical of clinical management events is foreseeable, as they have the benefit of hindsight. However, the assessor evaluating the quality of the decisions made by the treating surgeon during the course to death allows preventative measures to be implemented during the peer-review process. This also allows for recommendations for improved surgical care to be delivered to the treating clinical teams.

3.6 Conclusion: concordant validity considerations

In general, high levels of concordance percentages were observed, with fair kappa and substantial Gwet scores. The exception was the comparison between first- and second-line assessors, in which poor kappa and fair Gwet scores were obtained.

As expected and potentially due to objectivity (surgeons' assessment) and availability of extra information (such as SLA), the inter-rater scores generally tend to be low.

4. Trending in surgical diagnosis

The surgical diagnosis is identified by the treating surgeon and reviewed by assessors. Table 5 indicates that the diagnosis identified on the surgical case record form during the audit process.

Table 5: Classification of surgical diagnosis

Index	Read Code Text	Total cases
1	Fracture of neck of femur	513
1	Fracture of shaft of femur	14
1	Fracture-dislocation or subluxation hip	10
1	Other fracture of femur	23
1	Subtrochanteric fracture	10
2	Intestinal obstruction NOS	170
3	Intracerebral haemorrhage	33
3	Intracerebral haemorrhage, intraventricular	15
3	Subarachnoid haemorrhage	98
3	Subdural haematoma - nontraumatic	56
4	Head injury	14
4	Traumatic haematoma	30
4	Traumatic subdural haemorrhage	32
5	[M]Adenocarcinoma, metastatic, NOS	23
5	[M]Adenomas and adenocarcinomas	17
5	[M]Carcinoma, metastatic, NOS	55
5	[M]Cholangiocarcinoma	13
5	[M]Glioblastoma NOS	11
5	[M]Neoplasm, metastatic	18
5	[M]Squamous cell carcinoma NOS	23
5	Carcinoma of bladder	17
5	Carcinoma of caecum	10
5	Carcinoma of colon	21
5	Carcinoma of pancreas	13
5	Carcinoma of rectum	17
5	Malignant neoplasm of caecum	11
5	Malignant neoplasm of colon	25
5	Malignant neoplasm of oesophagus	11
5	Malignant neoplasm of pancreas	11
5	Malignant neoplasm of prostate	11
5	Malignant neoplasm of rectum	20
5	Malignant neoplasm of sigmoid colon	14
5	Malignant neoplasm of urinary bladder	13
5	Malignant pleural effusion	22
6	[D]Cardiogenic shock	14
6	Acute myocardial infarction	25
6	Aortic stenosis alone, cause unspecified	15
6	Aortic stenosis, non-rheumatic	11
6	Aortic valve stenosis with insufficiency	10
6	Cardiac arrest	12
6	Coronary artery anomaly	13
6	Coronary atherosclerosis	37
6	Double coronary vessel disease	11
6	Heart failure	19
6	Ischaemic heart disease	18
6	Mitral and aortic incompetence	10
6	Mitral and aortic stenosis	13
6	Single coronary vessel disease	12
7	Abdominal aortic aneurysm which has ruptured	82
7	Abdominal aortic aneurysm without mention of rupture	19
7	Dissecting aortic aneurysm	22
	Total	1,737

NOS: not otherwise specified; [D]: diagnosis; [M]: morphology of neoplasms.

Indexation categories:

- 1= Fracture of femur, n=570 (32.8%)
- 2 = Intestinal obstruction, n=170 (9.8%)
- 3 = Cerebrovascular accident, n=202 (11.6%)
- 4 = Neurotrauma, n=76 (4.4%)
- 5 = Malignancy, n=376 (21.6%)
- 6 = Cardiac disease, n=220 (12.7%)
- 7 = Aortic aneurysm, n=123 (7.1%)

5. Trending in cause of death

The cause of death is identified by the treating surgeon on the surgical case record form and reviewed by assessors. Table 6 indicates the causes of death identified by the treating surgeon on the surgical care record form during the audit process. The cause of death data in VASM are accurate when compared with coronial data, independent of whether the coronial investigation included a complete autopsy.⁽⁵⁾

Table 6: Classification of cause of death

Index	Read Code Text	Number of cases
0 - Contributory excluded	Palliative care	50
0 - Contributory excluded	Hypotension	11
1	[D]Cardiogenic shock	68
1	Acute myocardial infarction	209
1	Atrial fibrillation	11
1	Cardiac arrest	246
1	Myocardial infarction	29
1	Ischaemic heart disease	16
2	[D]Cardiorespiratory failure	57
2	[D]Respiratory arrest	39
2	Acute respiratory failure	28
2	Cardiorespiratory failure as a complication of care	15
2	Chronic obstructive pulmonary disease	10
2	O/E - raised intracranial press	22
2	Primary pulmonary hypertension	13
2	Respiratory failure	323
3	[D]Septic shock	44
3	Perforation of intestine	16
3	Septicaemia	437
4	Bronchopneumonia due to unspecified organism	11
4	Pneumonia	119
4	Other aspiration pneumonia as a complication of care	173
4	Pneumonia and influenza	88
4	Pneumonia due to unspecified organism	15
4	Pneumonia or influenza NOS	32
5	Multiple organ failure	545
6	Renal failure	63
6	Acute renal failure	114
6	Chronic renal failure	12
6	End stage renal failure	10
6	Renal failure unspecified	31
7	Cerebral infarction NOS	33
7	CVA/stroke	38
7	Intracerebral haemorrhage	42
7	Intracranial haemorrhage NOS	17
7	Stroke and cerebrovascular accident unspecified	85
7	Subarachnoid haemorrhage	73
7	Subdural haematoma - nontraumatic	26
8	Acute pulmonary oedema NOS	22
8	Acute pulmonary oedema unspecified	10
8	Congenital cardiac failure	14
8	Congestive heart failure	25
8	Heart failure	211
8	Pulmonary oedema NOS	10
9	Vascular insufficiency of the intestine	97
10	Intestinal obstruction NOS	31
11	Anoxic brain damage	15
11	Cerebral oedema	16
11	Diffuse brain injury	51
11	Focal brain injury	14
11	Head injury	11
11	Severe head injury	22
11	Traumatic subdural haemorrhage	13
12	[M]Carcinoma, metastatic, NOS	29
12	[M]Neoplasm, metastatic	13
12	Disseminated malignancy NOS	14
13	Pulmonary embolus	12
13	Pulmonary embolism	77
14	[D]Death, not instantaneous cause unknown	20
14	[D]Sudden death, cause unknown	65

15	Abdominal aortic aneurysm which has ruptured	21
15	Ruptured aortic aneurysm NOS	17
16	Fracture of neck of femur	15
17	Gastrointestinal haemorrhage	16
18	[D]Hypovolaemic shock	11
18	Haemorrhage NOS	17
19	Peritonitis	18
20	Acute pancreatitis	14
22	Hepatic failure	42
24	Clotting and bleeding disorders	26
	Total	4,160

NOS: not otherwise specified; [D]: diagnosis; [M]: morphology of neoplasms.

Indexation categories:

- 0 = Excluded not a cause of death, n=61 (1.5%)
- 1 = Cardiac event, n=579 (13.9%)
- 2 = Respiratory failure, n=507 (12.2%)
- 3 = Septicaemia, n=497 (11.9%)
- 4 = Pneumonia, n=438 (10.5%)
- 5 = Multiple organ failure, n=545 (13.1%)
- 6 = Renal failure, n=230 (5.5%)
- 7 = Cerebrovascular accident, n=314 (7.5%)
- 8 = Cardiac failure, n=292 (7.0%)
- 9 = Gut ischaemia, n=97 (2.3%)
- 10 = Intestinal obstruction, n=31 (0.7%)
- 11 = Neurotrauma, n=142 (3.4%)
- 12 = Malignancy, n=56 (1.3%)
- 13 = Pulmonary embolism, n=89 (2.1%)
- 14 = Cause unknown, n= 85 (2.0%)
- 15 = Ruptured aortic aneurysm, n=38 (0.9%)
- 16 = Fracture of neck of femur, n=15 (0.4%)
- 17 = GI haemorrhage, n=16 (0.4%)
- 18 = Non-GI haemorrhage, n=28 (0.7%)
- 19 = Peritonitis, n=18 (0.4%)
- 20 = Acute pancreatitis, n=14 (0.3%)
- 21 = Malnutrition, n=0 (0.0%)
- 22 = Hepatic failure, n=42 (1.0%)
- 23 = Cholangitis, n=0 (0.0%)
- 24 = Coagulopathy, n=26 (0.6%)
- 25 = Necrotising fasciitis, n=0 (0.0%)
- 26 = Acidosis, n=0 (0.0%)
- 27 = Dissecting aortic aneurysm, n=0 (0.0%)

6. Trending in clinical management issues

Clinical management issues are identified by assessors during the peer-review process. Table 7 indicates all clinical management issues identified by the assessors. It has been observed that the higher the frequency of an issue, the greater the need and requirement to implement strategies to improve surgical care in that particular clinical arena.

Table 7: Classification of clinical management issues

Index	Read Code Text	Number of cases
1	Open surgery, organ related technical	27
1	Surgeon too junior	20
1	Better to have done different operation or procedure	252
1	Better to have performed more limited surgery	19
1	Better to have had more extensive surgery	15
1	Operation should have been done	10
1	Decision to operate	358
1	Duration of operation too long	12
2	Delays	14
2	Delay in transfer to surgical unit	49
2	Delay to surgery (i.e. earlier operation desirable)	132
2	Delay to operation caused by missed diagnosis	10
2	Delay in recognising complications	61
2	Delay in recognising a cardiac complication	18
2	Delay in diagnosis	90
2	Delay starting medical treatment	13
2	Delay in transfer to tertiary hospital	35
3	Diagnosis missed - unspecified	25
3	Preoperative assessment inadequate	108
3	Cardiac preoperative assessment inadequate	12
3	Failure to investigate or assess patient fully	56
3	Failure to recognise severity of illness	33
4	Failure to use DVT prophylaxis	20
4	Failure to use a drug for treatment or prophylaxis NEC	11
4	Patient-related factors	52
5	Adverse factors in management	20
5	Unsatisfactory medical management	113
5	Postoperative care unsatisfactory	48
5	Fluid balance unsatisfactory	24
5	Postoperative fluid balance unsatisfactory	13
5	Inadequate postoperative assessment	22
6	General complications of treatment	17
6	Aspiration pneumonia	19
6	Pneumonia as a general complication of treatment	11
7	Communication failures	35
7	Poor documentation	84
8	Injury caused by fall in hospital	13
9	Failure to use HDU	11
	Total	1882

NEC: not elsewhere classified; DVT: deep vein thrombosis; HDU: high dependency unit.

Indexation categories:

- 1 = Operative management issues, n=713 (37.9%)
- 2 = Delay issues, n=422 (22.4%)
- 3 = Preoperative care issues, n=234 (12.4%)
- 4 = Protocol issues, n=83 (4.4%)
- 5 = Postoperative care issues, n=240 (12.8%)
- 6 = General complications of surgery, n=47 (2.5%)
- 7 = Communication or poor documentation, n=119 (6.3%)
- 8 = Adverse events, n=13 (0.7%)
- 9 = Critical care issues, n=11 (0.6%)

7. Treating surgeon's appraisal of the VASM peer-review process

The VASM has uniquely implemented an extra step in the audit process, with a feedback form provided to the treating surgeon alongside the assessors' reports. This additional audit step allows the surgeon to record their opinion of the assessments provided. The treating surgeon can provide quantitative and qualitative information via a free-text field to record their perspective, because the treating surgeon is the only person in possession of the clinical nuances of the patient's course to death.

The VASM received 1,718 notifications of death since 1 July 2015. The audit process had been completed for 41.4% (712/1,718) of cases.

In 13.2% (94/712) of cases the peer-review process feedback form was returned by the treating surgeon. Of the 94 responses received in some sections data was omitted, reason for the denominator number fluctuations from 92 to 94.

Of those forms, 83 related to first-line assessments (88.3%) and 10 were associated with second-line assessments (10.6%).

Overall, 81.9% of treating surgeons agreed with the peer-review feedback, 8.5% remained neutral and 9.6% disagreed with the assessors' opinions from the feedback reports. In total, 29 of the 92 surgeons provided additional comments along with their evaluation of the feedback reports (31.5%).

The treating surgeon agreed that the peer-review feedback was a good source of information to improve surgical care at their institution in 72.3% of the 94 evaluations.

Figure 2: Treating surgeon's evaluation of the peer-review feedback

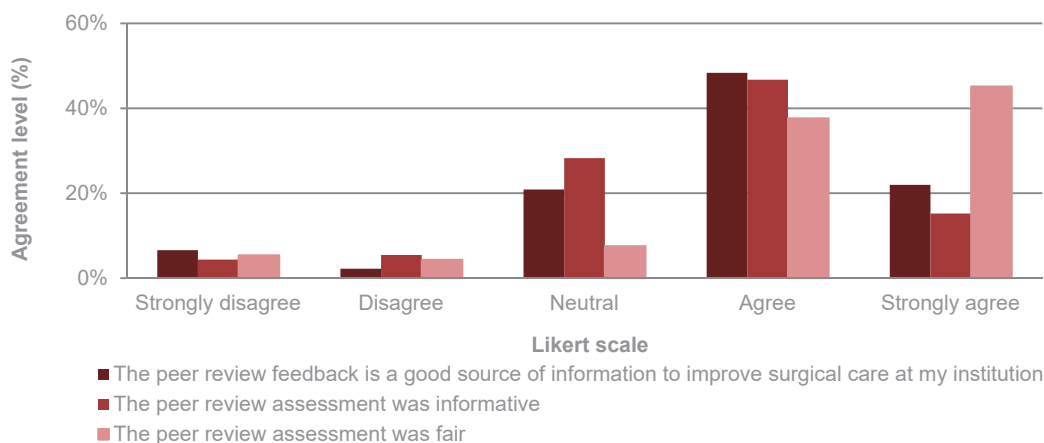


Table 8: Surgeon comments on the VASM peer-review process

Sample of comment extracts
<i>I feel the system is working well if the above case was judged FLA only.</i>
<i>It is always difficult for an assessor to know all the features of a case so I am not critical of the assessors' thoughts but would make the following observations in response to the assessors report. Largely it reflects simply a difference of opinion.</i>
<i>It's great to have this type of feedback.</i>
<i>Agreed, a sad but inevitable death.</i>
<i>Agree with assessor, family requested surgery; an indication for surgical rather than conservative treatment can be an ethical dilemma.</i>
<i>Patient refused dialysis then stroke after.</i>
<i>Report was fair and accurate.</i>
<i>I wish to disagree with the FLA's comments; However this futile surgery ultimately denied the patient the chance to die in a peaceful and dignified way.</i>
<i>Clearly this case was not one where there were multiple options and hence palliative plan was reasonable.</i>
<i>Decision making in a demented nursing home patient is often very difficult. Lots of treatment both medical and surgical is "futile" but the views of the family must be considered.</i>
<i>I realise a lot of people have put work into this process but I resent that it has become mandatory for my CPD.</i>

CPD: Continuing professional development, FLA: first line assessment.

This evaluation survey demonstrates that there is value in the audit process. The VASM audit continues to identify, assess and review factors associated with surgical mortality and the messages are reaching the target audience. The VASM will continue to develop action plans, educational programs and recommendations for further patient care improvements in Victoria.

8. The Perceived Quality of VASM Information

8.1 Introduction

VASM was externally audited in 2015 by Aspex Consulting. One of the recommendations arising from the audit was a key performance indicator relating to “The perceived value of information provided by VASM in order to promote ongoing improvements to surgical safety, quality and confidence across the Victorian health system.” This project, the Perceived Quality of VASM Information, is in response to the recommendations made by Aspex Consulting. It is a mixed methods project with the aim of seeking and examining the feedback from VASM’s health service stakeholders.

VASM has completed two series of this qualitative project in response to the recommendations made by external auditors Aspex Consulting. In 2015, Aspex Consulting recommended that a “the perceived value of information provided by VASM in order to promote ongoing improvements to surgical safety, quality and confidence across the Victorian health system” was to seek and examine feedback from its health service stakeholders.

8.2 Method

A mixed methods approach was used to enable open-ended exploration into stakeholder views, whilst also providing structured tools for annual trending reports. Telephone interviews were used to collect data.

The cohort was selected using stratified sampling⁽⁶⁾ from a pool of participants representing different levels of management and administration staff. The pool of participants included chief executive officers, surgical directors, quality assurance managers, health information managers, and medical records and administration staff.

The interview utilised a specifically designed semi-structured questionnaire. The questionnaire comprised both closed-ended questions that used a Likert scale⁽⁷⁾ and open-ended questions, and can be seen in Appendix 1.

Participants were asked about their perception of the value of the audit process, the quality and usefulness of the VASM information, and their awareness of, and attendance at, the educational workshops and seminars coordinated by the VASM. The data collection was audio-recorded, transcribed and analysed using a qualitative methodology of content analysis and Microsoft Excel 2010.

The qualitative aspect of the project utilised a content analysis approach. The overall goal of content analysis is to scrutinise the text into relatively small units, followed by submitting these units to a descriptive treatment in both coding of the data and interpreting the quantitative counts of codes.⁽⁸⁾ Content analysis aims to describe the phenomenon in a conceptual form where codes can be presented in a variety of ways.⁽⁹⁾ For this research project, an inductive approach was chosen. An inductive approach allows for codes to be generated from the data. The first round of telephone interviews conducted in 2015 was the basis of the qualitative methodology, which, at the time, contained no preconceived data points to build a coding matrix from.

8.3 Results

The results below focus on the second year of the project, which involved rigorous data collection between September and November 2016. Data collection involved telephone interviews of staff from Victorian health services and the Victorian DHHS, and contact was attempted with 94 hospital stakeholders. Of this pool, 52 (55.3%) contacts were made and of those reached, 27 (51.9%) consented to the interview.

The 27 participants were employed in private and public health services that provide surgical services in Victoria. Table 8 outlines the roles and number of those interviewed in 2016 in comparison to 2015.

Table 9: Role of participants interviewed

Role	2015 (n=26)		2016 (n=27)	
	n	%	n	%
DHHS	1	3.8%	2	7.4%
Private hospital				
Administration	1	3.8%	2	7.4%
Medical records	1	3.8%	2	7.4%
Management	6	23.1%	4	14.8%
Total private	8	30.8%	8	29.6%
Public hospital				
Administration	4	15.4%	3	11.1%
Medical records	3	11.5%	6	22.2%
Management	10	38.5%	8	29.6%
Total public	17	65.4%	17	63.0%

Participants were asked the same six questions relating to their perception of VASM, and were asked to grade their response in the form of a one to five rating (Likert scale). The questions, and results of the questions, are outlined in the following table.

Table 10: Results relating to perceptions of VASM

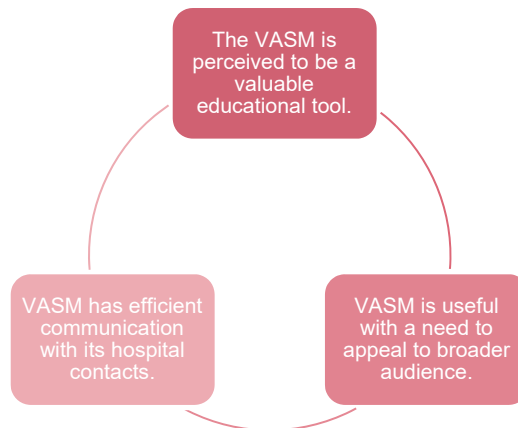
Question	2015			2016		
	Ave	n	%	Ave	n	%
How well do you understand the VASM audit process?	3.7	26	100.0%	3.1	27	100.0%
How comprehensively have you read information published by VASM over the past 12 months?	3.0	25	96.2%	3.0	27	100.0%
How would you rate the quality of the information reported by VASM?	4.3	24	92.3%	3.8	25	92.6%
How would you rate the quality of these educational workshops and seminars conducted by VASM?	4.5	8	30.8%	3.8	4	14.8%
How useful has the information from VASM been to you in your role?	3.3	24	92.3%	2.8	27	100.0%
How would you rate the effectiveness of communications with VASM?	3.9	24	92.3%	4.3	27	100.0%

Note: Workshops and seminars: Only a small pool (14.8%; 4/27) attended a VASM event in 2016 and in 2015 (30.8%; 8/26).

The qualitative aspect of the project involved 27 semi-structured interviews. Twenty-six (96.3%) participants agreed to the interview being recorded and these interviews were transcribed verbatim; however, one interview (3.7%) was not recorded due to technical issues. A number of themes and categories emerged from the interviews, and this is outlined in Figure 3 where overall, data reached saturation.

Figure 3: Major categories regarding the perceived use of the VASM

The following three sections outline these major categories in more detail.



8.3.1 The VASM is perceived to be a valuable educational tool

The VASM was still perceived by many participants to provide valuable data for benchmarking and governance. For example:

“A highly effective external audit mechanism where the surgeons are auditing themselves... at arm’s length, and without recourse unless they find...significant deficiencies. I think it’s a good model for...other healthcare professionals.” – Medical records.

“I do recall is that...it was useful and there was a number of surgeons there [at the VASM seminar] at the time...senior surgeons from some of the bigger health services...a useful exercise in getting their views about how they use that information back into their health service.” – Management.

“Useful and supportive...the last report that you sent out because it has cases where documentation was the issue and that one thing that we’ve been trying to drive here [as in] to improve communication so... it reinforces what we are trying to do.” – Management.

Publications by VASM were cited as of high quality and, in general, of use to many participants. This year, the VASM Report and the Case Note Review Booklet seemed to be equally regarded as valuable tools, as opposed to last year in which the Case Note Review Booklet was seen as clinically useful. Examples listed below;

“We presented the overall results that VASM had provided, and the doctors and nursing staff found it useful.” – Management.

“I love the case study booklet... I think it’s really informative and I learn a lot.” – Administration.

“The readability...it’s not in super sophisticated clinical language. It’s in a language that a non-clinical person like me can read and use it, so it’s good.” – Medical records.

Improvements on the quality of the publication did arise in a few respondents. For example;

“They want to report back on the last 12 months and talking about improving format so obviously a lot of data is very good and tracking in the right direction but it’s reported in a huge chunk of time.” – Management.

Respondents expressed some understanding on VASM closing the loop. Examples listed below;

“I know that the VASM meant to be for a quality assessment, peer group review, as well as to help improve practice and outcomes for patients...and it also act as a, like a feedback loop...the report of what’s happening in surgery.” – Management.

“[VASM] closes the loop...I find it’s quite integrational around disease process and I would say that is very valuable.” – Administration.

Some respondents, however, felt the need for feedback from VASM to improve their own understanding of the audit process within their health service or in their role. These responses slightly differed in context to last year’s results on closing the loop. For example;

“I just collected the data, not sure, I know what I’m collecting but I’m not sure why, how, you know the auditing and all that.” – Management.

“It’s often difficult to know what to do with the reporting internally within the health service.” – Management.

“I understand the importance of getting an understanding of the mortality associated with surgical patients. As for how the patient- how the information is then used, beyond.. uh, the information that we provide, I have very little knowledge.” – Medical records.

“Having feedback that these are clinical issues that are seen within the state I guess, really in surgery...it’s been useful...sometimes it’s difficult to know how to use some of the information in a meaningful way that will potentially change practice, or lead to further audits.” – Management.

8.3.2 VASM has efficient communication with its direct hospital contacts

Overall, VASM is perceived to have effective and efficient communication with direct hospital contacts. This includes email correspondence, ability to solve issues over the phone, and general report distributions. For example;

“I think it’s been good communication...I had no issues...it’s timely.” – Management.

“You get different information in different ways throughout the year, some via email, some via post...if I need anything I always phone...very engaging.” – Administration.

“Professional, friendly, um, timely.” – Medical records.

Some areas of communication require improvement. Examples listed below;

“Probably frequency [of communication] to increase more.” – Management.

“We used to get monthly reminder if we forgot by any chance to send the data in but that process doesn’t seem to happen anymore.” – Management.

8.3.3 VASM is useful with a need to appeal to broader audience

In general, VASM is perceived to be useful with clinically relevant information. However, respondents expressed the need for VASM to disseminate information to non-clinicians who work in the health service sector.

“The management might probably use the information that is published so maybe the list that you could try, maybe the General Manager (GM) or with the director of nursing.” – Medical records.

These responses are particularly relevant to the VASM events, and seemed to influence attendance. For example;

“It’s more aimed at clinical...because you know we’re looking at files and we code them and extract them for data, but I think the whole surgical mortality, I think is more a clinical process than a non-clinical.” – Management.

“Mainly seem to be generated for medical staff. Medical, not admin.” – Medical records.

Some respondents thought VASM could collaborate more with other departments or professional organisations, and similar to the 2015 results, indicated that time has been an issue. For example;

“A workshop for all would be a very good idea...a VASM workshop, or do another such workshop, it would be good for the Department to hold a consultative council and other, you know, a more of a systematic workshop to cover all consultative councils and associated processes. Cause we are time poor.” – Management.

8.4 Recommendations

Leading on from the above categories, a few number of recommendations for improvement have been suggested by our hospital contacts. Figure 4 outlines the VASM’s goals in these areas.

Figure 4: Recommendations for VASM's improvement



8.5 Limitations

As is the nature of qualitative research, the results from this small sample cannot be generalised to represent those of a broader population. While the data did reach saturation, it is likely that with such a diverse pool of participants the intricate nuances between the different stakeholder types did not emerge.

8.6 Conclusion

In summary, the audit was still viewed as a valuable educational tool. Communication with VASM stakeholders was considered as effective and efficient. Some respondents highlighted the need for the VASM publications to appeal to a broader audience (i.e. non-clinical). Respondents also suggested collaborating with other health professionals and providing recommendations from the audit, this feedback loop would improve on reporting and/or communication with VASM.

VASM does continue to identify, assess and review factors associated with surgical mortality. In light of this project, VASM will continue to develop action plans, educational programs and recommendations for improving patient care in Victoria.

9. Appendix

9.1 The Perceived Quality of VASM Information questionnaire

Hospital Detail ID/Interview ID: _____ Hospital ID: _____
Interviewer: _____ Interviewee: _____ Date: ____/____/____
Interview type (please circle): Management | Administration | Medical records | DHHS
Consent to phone recording: Yes / No

On a scale of 1 to 5, how well do you understand the VASM audit process where (1) being "not at all" to (5) being "understand very well"? (1) (2) (3) (4) (5)

a. Open Question: Considering this rating, could you explain why this is the case?
i. (Prompt: If high, why is it so high and is this shared with your colleagues / other stakeholders in VASM? If low, why is it so low, and is this little understanding shared with other stakeholders in VASM?)

Comment: _____

2. On the same scale of 1 to 5, (1) being "not at all" and (5) being "very extensively", how comprehensively have you read information published by VASM over the past 12 months? (1) (2) (3) (4) (5)

a. Open Question: Open Question: Would you be able to expand on this, which bits of information did you read and why did you read these documents compared to others?

Comment: _____

(If answer to Q2 is "1", then skip this question)

3. On the same scale of 1 to 5, how would you rate the quality of the information reported by VASM? (1) (2) (3) (4) (5)

a. Open Question: Could you tell me a little more about this? How was the quality of these publications? (Prompt: which publications could be improved and how?)

Comment: _____

4. Before I ask the next question, I just wanted to check, have you attended any education workshops and seminars by VASM? (Y) (N)

4.1(If yes) on the scale of 1 to 5, how would you rate the quality of these educational workshops and seminars conducted by VASM in collaboration with RACS/DH/VSCC/VMIA? (1) (2) (3) (4) (5)

a. Open Question: Similar to the previous question, could you tell me a bit more about this? How was the quality of these presentations (Prompt: which presentations could be improved and how could this be done?)

Comment: _____

4.2 (If no) Could I ask the reason why this is the case? (e.g. unaware, due to time constraints due to financial constraints.)

Comment: _____

-----Stop and start recording again-----

5. On the same scale of 1 to 5, how useful has the information from VASM been to you in your role? **1 2 3 4 5**
a. Open Question: How have you used the information in your role to improve patient care? And could you explain why this is the case?
i. (If used, prompt for examples; if 'have not used', prompt for reasons why)

Comment: _____

6. On a scale of 1 to 5, how would you rate the effectiveness of communications with VASM? **1 2 3 4 5**
a. Open Question: How have your communications with VASM been?
i. (Prompt: Have any issues been addressed by VASM? If yes, what / if no why)

Comment: _____

7. Finally, are there any other comments you would like to make, any other feedback that you would like to provide?

Comment: _____

Goodbye and thank you for your time. All the feedback that you have kindly provided will be addressed and included in our next annual report.

[If the interviewee had questions regarding VASM, they can be addressed at this stage]

- Provide contact details: Phone: 03 9249 1153 or Email: vasm@surgeons.org.
- For more information visit www.surgeons.org/vasm.

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