

Victorian Audit of Surgical Mortality

TECHNICAL REPORT 2015



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
CI	confidence interval
DVT	deep vein thrombosis
FLA	first line assessment
GI	gastrointestinal
HDU	high dependency unit
ICU	intestine care unit
PDSB	Professional Development Standards Board
RAAS	Research, Audit and Academic Surgery Board
RACS	Royal Australasian College of Surgeons
SLA	second line assessment
VASM	Victorian Audit of Surgical Mortality
VSCC	Victorian Surgical Consultative Council

1. About the VASM

1.1 VASM structure and governance

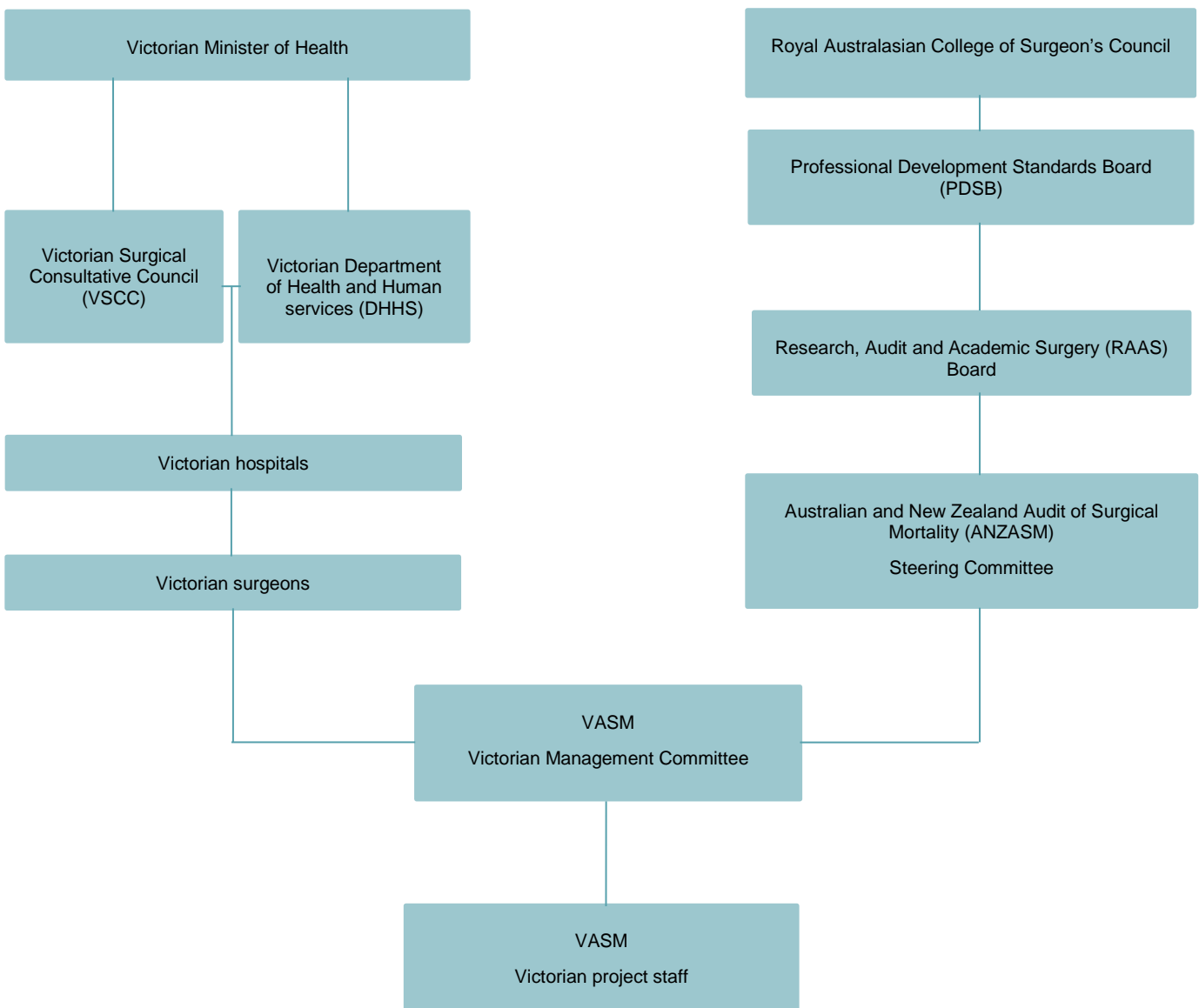
The Australian and New Zealand Audit of Surgical Mortality (ANZASM) is managed by the Research, Audit and Academic Surgery Division of the Royal Australasian College of Surgeons (RACS), being supported and funded by state and territory governments. ANZASM oversees the implementation and standardisation 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 conducts the 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.



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	✓ In progress 1 February 2016
Establishment of internal validation of the VASM audit processes 2013–2019 <ul style="list-style-type: none"> • First-line validation • Second-line validation 	✓ Completed 12 August 2013
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 2016
Phase 2 delivery of the perceived quality of VASM information project	✓ In progress 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 	<ul style="list-style-type: none"> ✓ 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 ✓ In progress 22 October 2016
Provision of educational publications: <ul style="list-style-type: none"> • Case Note Review Booklet • Scientific papers • VASM report released annually • Provision external evaluation by Aspex Consulting group of the VASM audit processes 	<ul style="list-style-type: none"> ✓ Completed 15 August 2014 ✓ Completed 15 August 2015 ✓ 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 December 2014 (stage 1)

Note:

VSCC: Victorian Surgical Consultative Council

VMIA: Victorian Managed Insurance Authority

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, and that 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 2014–2015 Technical report includes deaths reported to VASM since data collection commenced on 1 January 2007 up to 30 June 2015. The multiple rate-limiting steps in the audit process result in a mean time to completion of 3 months. Information on 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 Alcidion Corporation and 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. Variables have also been tested for yearly trend. Concordance and kappa scores and Gewt 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 kappa 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

- 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, as the first-line assessor only has access to the clinical information recorded by the treating surgeon. The lowest concordance was expected to be between the treating surgeon and second-line assessor, as the latter has access to an independent description of the episode of care. For this reason it was predicted that agreement between the first- and second-line assessors would also be weak.

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 score	95% CI2	p value2
ICU care benefit if not received	1,231	96.02%	0.16	0.03-0.29	<0.001	0.96	0.95-0.97	<0.001
HDU care benefit if not received	1,152	91.23%	0.18	0.80-0.27	<0.001	0.90	0.88-0.92	<0.001
Fluid balance	4,222	93.01%	0.60	0.56-0.64	<0.001	0.92	0.91-0.93	<0.001
Clinical management issues	6,113	77.28%	0.45	0.42-0.47	<0.001	0.62	0.60-0.64	<0.001
Preoperative management/preparation	4,826	87.77%	0.38	0.34-0.42	<0.001	0.85	0.84-0.86	<0.001
Decision to operate at all	4,835	88.54%	0.31	0.27-0.35	<0.001	0.86	0.85-0.88	<0.001
Choice of operation	4,829	93.33%	0.23	0.17-0.28	<0.001	0.93	0.92-0.94	<0.001
Timing of operation	4,811	92.41%	0.45	0.41-0.50	<0.001	0.91	0.90-0.94	<0.001
Intraoperative/technical management	4,775	93.24%	0.34	0.28-0.39	<0.001	0.92	0.92-0.93	<0.001
Grade/experience of surgeon deciding	4,773	98.00%	0.20	0.09-0.31	<0.001	0.98	0.9 -0.99	<0.001
Grade/experience of surgeon operating	4,775	97.76%	0.24	0.15-0.34	<0.001	0.98	0.97-0.98	<0.001
Postoperative care	4,705	91.20%	0.39	0.34-0.43	<0.001	0.90	0.89-0.91	<0.001

Note: a total of 6,179 surgical case forms and first-line assessments were available for analysis.

There were 5,184 surgical procedures with 7,270 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 areas with the lowest concordance between the surgeon and first-line assessor were fluid balance and clinical management issues. Fluid balance management is an area that requires further improvement and data will be monitored by VASM in 2016.

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 score	95% CI2	p value2
ICU care benefit if not received	139	83.45%	0.18	0.00-0.35	0.001	0.80	0.71-0.89	<0.001
HDU care benefit if not received	134	75.37%	0.12	-0.01-0.24	0.019	0.67	0.55-0.79	<0.001
Fluid balance	862	81.21%	0.33	0.25-0.41	<0.001	0.74	0.70-0.79	<0.001
Clinical management issues	1,051	58.42%	0.21	0.17-0.26	<0.001	0.20	0.14-0.26	<0.001
Preoperative management/preparation	899	73.30%	0.27	0.20-0.33	<0.001	0.59	0.53-0.64	<0.001
Decision to operate at all	900	82.00%	0.17	0.09-0.25	<0.001	0.77	0.73-0.81	<0.001
Choice of operation	900	81.89%	0.16	0.09-0.24	<0.001	0.77	0.73-0.81	<0.001
Timing of operation	890	79.10%	0.22	0.14-0.30	<0.001	0.72	0.67-0.76	<0.001
Intraoperative/technical management	886	82.17%	0.27	0.20-0.35	<0.001	0.77	0.73-0.81	<0.001
Grade/experience of surgeon deciding	883	95.24%	0.07	-0.04-0.18	0.075	0.95	0.93-0.97	<0.001
Grade/experience of surgeon operating	880	94.89%	0.22	0.07-0.36	<0.001	0.95	0.93-0.93	<0.001
Postoperative care	873	75.60%	0.20	0.13-0.27	<0.001	0.65	0.60-0.70	<0.001

Note: a total 1,074 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 pre and post-operative management, high dependency unit (HDU) care, fluid balance and clinical management issues. Perhaps the treating surgeon is less objective in the assessment of their own cases of the clinical management of patients. This is 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 score	95% CI2	p value2
ICU care benefit if not received	116	75.86%	0.40	0.21-0.58	<0.001	0.60	0.42-0.75	<0.001
HDU care benefit if not received	129	65.12%	0.27	0.11-0.42	0.005	0.36	0.19-0.53	<0.001
Fluid balance	492	80.89%	0.40	0.31-0.50	<0.001	0.72	0.66-0.78	<0.001
Clinical management issues	1,029	71.14%	0.09	0.03-0.15	0.008	0.58	0.52-0.63	<0.001
Preoperative management/preparation	841	65.87%	0.29	0.23-0.35	<0.001	0.36	0.29-0.69	<0.001
Decision to operate at all	865	75.49%	0.27	0.20-0.34	<0.001	0.63	0.58-0.69	<0.001
Choice of operation	853	76.55%	0.29	0.21-0.37	<0.001	0.65	0.60-0.70	<0.001
Timing of operation	829	75.75%	0.33	0.25-0.40	<0.001	0.62	0.57-0.68	<0.001
Intraoperative/technical management	829	78.77%	0.40	0.33-0.47	<0.001	0.67	0.62-0.72	<0.001
Grade/experience of surgeon deciding	822	91.73%	0.15	0.03-0.27	<0.001	0.91	0.89-0.93	<0.001
Grade/experience of surgeon operating	824	90.41%	0.27	0.15-0.38	<0.001	0.89	0.87-0.92	<0.001
Postoperative care	815	67.12%	0.25	0.18-0.31	<0.001	0.42	0.36-0.49	<0.001
Appropriateness of DVT	612	91.18%	0.18	0.05-0.32	<0.001	0.9	0.87-0.93	<0.001

Note: a total of 1,074 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; DVT: deep vein thrombosis.

Comments:

- Disagreement between first and second-line assessors was most marked in the areas of fluid balance; timing and choice of the operation; decision to operate; technical management, intensive care unit and HDU care; preoperative, intraoperative and postoperative care; 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 surgeons during the course to death allows preventative measures to be implemented during the peer-review process and recommendations for improved surgical care to be delivered to the treating clinical teams.

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 to the second line assessors (SLA), kappa scores generally tend to be low.

4. Trending in clinical management issues

Clinical management issues are identified during the peer review process by assessors across the audit period. Table 5 indicates 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 5: Classification of clinical management issues

Read Code	n	(%)	Index
Decision to operate	642	10.6%	1
Better to have done different operation or procedure	501	9.8%	1
Delay in diagnosis	293	5.8%	2
Delay to surgery (i.e. earlier operation desirable)	289	5.7%	2
Delay in transfer to surgical unit	218	4.3%	2
Preoperative assessment inadequate	215	4.2%	3
Unsatisfactory medical management	193	3.8%	5
Postoperative care unsatisfactory	127	2.5%	5
Failure to investigate or assess patient fully	114	2.2%	3
Poor documentation	97	1.9%	7
Delay in recognising complications	88	1.7%	2
Patient-related factors	84	1.6%	4
Delay in transfer to tertiary hospital	74	1.5%	2
Diagnosis missed - unspecified	71	1.4%	3
Surgeon too junior	62	1.2%	5
Communication failures	60	1.2%	7
Aspiration pneumonia	58	1.1%	6
Failure to recognise severity of illness	56	1.1%	3
Fluid balance unsatisfactory	55	1.1%	5
Failure to use DVT prophylaxis	53	1.1%	4
Delay starting medical treatment	48	1.0%	2
Inadequate postoperative assessment	45	0.9%	5
Failure of communication due to poor case notes	41	0.8%	7
Operation should not have been done or was unnecessary	40	0.8%	1
Adverse factors in management	39	0.8%	5
Postoperative bleeding after open surgery	38	0.8%	5
Secondary haemorrhage	38	0.8%	8
Open surgery, organ related technical	37	0.7%	1
Cardiac preoperative assessment inadequate	36	0.7%	3
Injury caused by fall in hospital	36	0.7%	5
Delays	34	0.7%	2
Delay to operation caused by missed diagnosis	34	0.7%	2
Delay in recognising a cardiac complication	34	0.7%	2
General complications of treatment	33	0.7%	6
Diagnosis related complications	31	0.6%	3
Better to have performed more limited surgery	27	0.5%	1
Anastomotic leak after open surgery	27	0.5%	8
Wrong operation performed	26	0.5%	1
Pulmonary embolus	26	0.5%	8
Adverse events related to treatment guidelines/protocols	25	0.5%	4
Failure to use a drug for treatment or prophylaxis	24	0.5%	4
Postoperative fluid balance unsatisfactory	24	0.5%	5
Delay in investigating the patient	23	0.5%	2

Transfer should not have occurred	22	0.4%	4
Drugs related complication	22	0.4%	5
Fluid overload	22	0.4%	5
Treatment did not conform to guidelines/protocols	21	0.4%	4
Heart complication	21	0.4%	6
Failure to use HDU postoperatively	21	0.4%	9
Septicaemia - cause unspecified	21	0.4%	11
Cardiac monitoring inadequate	20	0.4%	3
CT scan should have been done preoperatively	20	0.4%	3
Failure to use HDU	20	0.4%	9
Unsatisfactory management of hypotension	19	0.4%	4
Poor terminal care management	19	0.4%	5
Poor communication between physician and surgeon	19	0.4%	7
Pneumonia as a general complication of treatment	19	0.4%	8
Better to have had more extensive surgery	18	0.4%	1
Preoperative investigations either not seen or confused	18	0.4%	3
Patient refused treatment	18	0.4%	4
Postoperative cardiac monitoring inadequate	18	0.4%	5
HDU not used postoperatively, error in management	18	0.4%	9
Failure to communicate with senior staff	17	0.3%	7
Delay to surgery whilst obtaining a CT scan	16	0.3%	2
Delay in recognising a bleeding complication	16	0.3%	2
Incorrect/inappropriate therapy	16	0.3%	4
Anticoagulation causing postoperative bleeding	15	0.3%	1
Wrong surgical approach used	15	0.3%	1
Inappropriate treatment prior to surgical referral	15	0.3%	3
Inadequate monitoring	15	0.3%	5
Unpreventable adverse events, open surgery	15	0.3%	6
Operation would have been better deferred or delayed	14	0.3%	1
Delay in patient presenting	14	0.3%	2
Delay starting DVT prophylaxis	14	0.3%	4
Problems with appropriate staffing	14	0.3%	5
Inadequate postoperative cardiac assessment	14	0.3%	5
Incorrect use of drains or catheters	13	0.3%	1
Diagnosis missed by surgeons	13	0.3%	3
No protocol for DVT prophylaxis	13	0.3%	4
Failure to use antibiotic prophylaxis	13	0.3%	4
Unsatisfactory management of coagulopathy	13	0.3%	4
Transfer problems	13	0.3%	4
Wrong dose of drug used	13	0.3%	5
Over anticoagulation	13	0.3%	5
Postoperative inadequate respiratory monitoring	13	0.3%	5
Anaesthesia related	12	0.2%	1
Operation better deferred to daytime	12	0.2%	1
Earlier operation desirable - no theatre available	12	0.2%	2
Delay in recognising anastomotic leak	12	0.2%	2
Delay starting antibiotics	12	0.2%	2
Diagnosis missed by medical unit	12	0.2%	3
Assessment problems	12	0.2%	3
Resuscitation inadequate	12	0.2%	5

Poor communication between nursing and surgical staff	12	0.2%	7
Renal failure	12	0.2%	8
Premature discharge from HDU	12	0.2%	9
Wound infection	12	0.2%	11
Operation should have been done	11	0.2%	1
Operation would have been better delayed	11	0.2%	1
Care unsatisfactory (not otherwise specified)	11	0.2%	1
Duration of operation too long	11	0.2%	1
Blood/blood products complication	11	0.2%	4
Premature discharge from hospital	11	0.2%	4
Failure of junior surgeon to seek advice	11	0.2%	7
Premature extubation	10	0.2%	1
Fluid and electrolyte resuscitation inadequate	10	0.2%	1
Failure of communication - unspecified	10	0.2%	7
Postoperative intracranial haematoma	10	0.2%	8
Premature discharge from ICU	10	0.2%	9

DVT: deep vein thrombosis; HDU: high dependency unit; CT: computed tomography; ICU: intensive care unit.

Note: indexation categories:

- 1= Operative management issues
- 2= Delay issues
- 3= Preoperative care issues
- 4= Protocol issues
- 5= Postoperative care issues
- 6= General complications of surgery
- 7= Communication or poor documentation
- 8= Serious clinical management issues
- 9= Critical care issues
- 10= Diagnosis issues
- 11= Septicaemia and wound

5. VASM evaluation survey

5.1 VASM evaluation survey

With the release of each VASM annual report an evaluation survey was sent to surgeons and hospitals. The survey sought feedback on the perceived value of the annual reports as well as the Case Note Review Booklet, the personal feedback sent to treating surgeons as part of the peer-review process, and the value of the new electronic interface allowing online data submissions. In addition, there were free-text sections soliciting suggestions for improvement and topics for future educational seminars. Surgeons were also asked whether the outcomes from any part of the audit process had led to any change in their practice.

VASM surveyed 44 out of 436 hospital contacts (10.1%) from the 126 health services with surgical services and assessed the value and impact of the VASM activities on their clinical settings. The majority of survey respondents agreed with the appropriateness of the VASM program. The past data was compared with the evaluation findings in 2014 from VASM's inception. The data was analysed using quantitative and qualitative methodologies^(5, 6) and the results are shown in Table 6.

Table 6: Hospital evaluation survey results 2007–2014

	2007–2013 (n=109)			2014 (n=44)			Trend
	n	%	Avg	n	%	Avg	
VASM publication and electronic platform							
The VASM annual report is informative.	108	99.1	4.1	43	97.7	4.4	↑
The Case Note Review Booklet is a valid education tool.	109	100	4.2	43	97.7	4.5	↑
The VASM governance hospital report was informative.	-	-	-	41	93.1	4.2	N/A
The VASM webpage is a useful resource about VASM.	91	83.4	3.7	43	97.7	4.1	↑
VASM electronic publications would be valuable.	78	71.5	3.7	39	88.6	4.0	↑
	2007–2013 (n=79)			2014 (n=44)			
Educational value	n	%	Avg	n	%	Avg	Trend
The seminar held was educational.	27	34.1	3.9	16	36.3	3.9	N/A
The workshop held was educational.	7	8.8	3.7	12	27.2	3.3	↓
The VASM process helped improve surgical care at my institution/health service.*	71	89.8	0.7	37	84.1	0.7	N/A

Avg: Average

*The response on the survey item on the value of the VASM process represents a scale where 1=Yes and 0=No.

Note: The averages represent the Likert scale where 1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree.

VASM surveyed 252 of 1,429 Fellows (17.6%). This survey evaluated the value and impact of the VASM activities on their clinical settings. The 2014 data was compared with the survey results obtained since VASM's inception. The data was analysed using quantitative and qualitative methodologies^(5, 6) and the results are shown in Table 7.

Table 7: Surgeon evaluation survey results 2007–2014

	2007–2013 (n=853)			2014 (n=252)			Trend
	n	%	Avg	n	(%)	Avg	
VASM publication and electronic platform							
The VASM annual report is informative.	849	99.5%	3.9	252	100%	4.2	↑
The Case Note Review Booklet is a valid education tool.	845	99.1%	4.0	250	99.2%	4.2	↑
The VASM newsletter is informative.	556	65.2%	3.8	247	98.0%	3.9	↑
The VASM webpage is a useful resource about VASM.	538	63.1%	3.4	240	95.2%	3.6	↑
The electronic Fellows Interface is valuable	644	75.5%	3.4	198	78.6%	3.6	↑
The assessor's comment from the feedback letter is valuable.	669	78.4%	4.1	211	83.7%	4.1	N/A
VASM electronic publications would be valuable.	548	64.2%	3.4	233	92.5%	3.6	↑

	2007–2013 (n=561)			2014 (n=252)			Trend
	n	%	Avg	n	(%)	Avg	
Educational value							
The seminar held was educational.	175	31.2%	3.6	72	28.6%	3.7	↑
The workshop held was educational.	55	9.8%	3.7	61	24.2%	3.5	↓
The VASM process helped improve surgical care at my institution/health service.*	490	87.3%	0.5	208	82.5%	0.6	↑

Avg: Average

*The response on the survey item on the value of the VASM process represents a scale where 1=Yes and 0=No.

Note: The averages represent the Likert scale where 1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree.

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

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, who is the only person in possession of the clinical nuances of the patient's course to death.

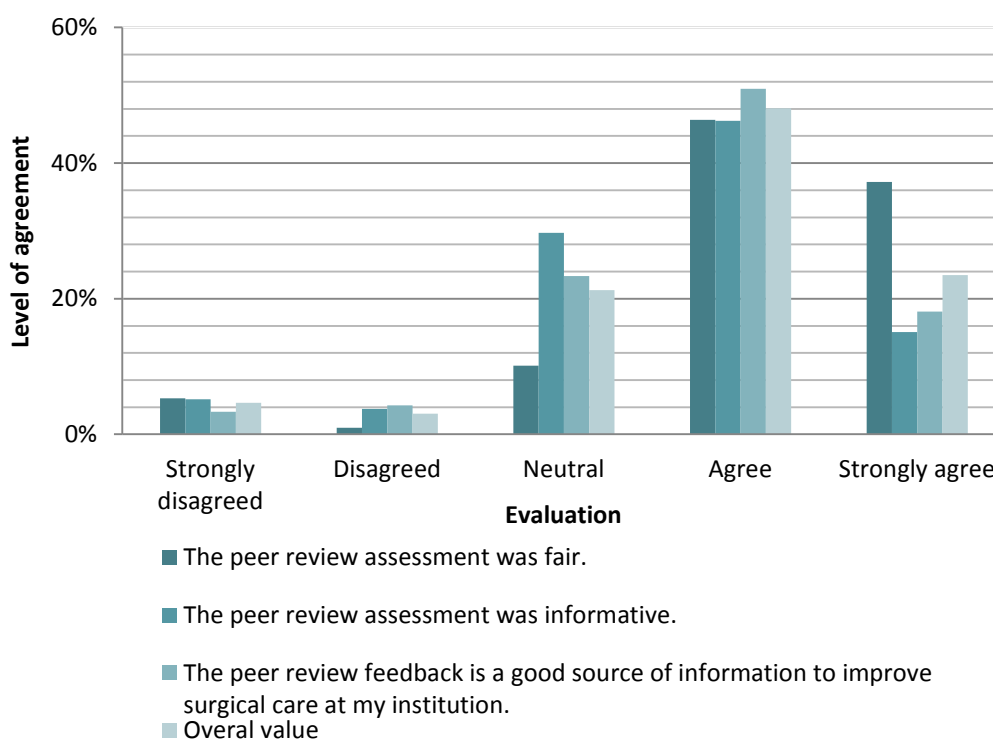
VASM received 1,680 notifications of death since 1 January 2015, and the audit process was completed for 674 cases (40.1%).

In 215 out of the 674 cases the peer review process feedback form was returned by the treating surgeon (31.9%). Of those forms, 164 related to first-line assessments (76.3%) and 51 were associated with second-line assessments (23.7%).

Overall, 71.5% of treating surgeons agreed with value of the peer review feedback, 21.2% remained neutral and 7.6% disagreed with the assessors' opinions from the feedback reports. Seventy surgeons of the 215 Fellows provided additional comments along with their evaluation of the feedback reports (32.6%).

The treating surgeon agreed that the peer-review feedback is a good source of information to improve surgical care at their institution in 145 of the 215 evaluations (67.4%).

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



This evaluation survey pilot 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. VASM will continue to develop action plans, educational programs and recommendations for further patient care improvements in Victoria.

7. The Perceived Quality of VASM Information

7.1 Introduction

VASM has completed the first round of a small qualitative project seeking a range of feedback from stakeholders.

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.”⁽⁷⁾ 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.

7.2 Methodology

The interview process utilised a specifically designed semi-structured questionnaire. The questionnaire consisted of seven question items of closed-ended with Likert scale of 1=not at all to 5=very well and open-ended questions about the quality of information reported by the VASM. (outlined in table 9) It asked the participant’s perception of the value of 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 department. The data collection was audio-recorded, transcribed and analysed using a qualitative methodology of content analysis and Microsoft Excel (2010).

The cohort was randomised to ensure the pool of participants represented different levels of management and administration staff from chief executive officers, surgical directors, quality assurance managers, health information managers, medical records and administration.

Data collected was in the form of quantitative and qualitative feedback. The mixed method approach was designed to provide open ended explorations into stakeholder’s views, while also providing structured tools for annual trending reports. The profile of the stakeholders interviewed is outlined in table 8. The project was designed to have a continuous follow up for 2 years.

The qualitative aspect of the project utilised a content analysis approach. The overall goal of content analysis is to break down 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.⁽⁶⁾ Content analysis described the phenomenon in a conceptual form, and so these codes could be presented in a variety of ways.⁽⁸⁾ For this research project, an inductive approach was chosen. An inductive approach allowed for codes to be generated from the data. This was due to the goal of the project was a novel one, and there was no preconceived data points to build a coding matrix from.

7.3 Results

The project involved rigorous data collection between November and December 2015 of staff from Victorian health services that were telephone interviewed. During this time contact was attempted with 51 hospital stakeholders. Of this pool, VASM was able to make contact with 38 (74.5%) contacts, and of those reached, 26 (68.4%) consented to the interview.

The 26 participants in this project were employed from private and public health services that provide surgical services in Victoria. Table 8 outlines the roles of those interviewed in 2015.

Table 8: Role of participants interviewed

Role	n	%
DHHS*	1	3.8%
Private hospital		
Administration	1	3.8%
Medical records	1	3.8%
Management	6	23.1%
Total private	8	30.8%
Public hospital		
Administration	4	15.4%
Medical records	3	11.5%
Management	10	38.5%
Total public	17	65.4%

Note: DHHS-Department of Health and Human Services representative

Participants were asked six questions relating to their perception of VASM. The stakeholders 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 9: Quantitative results relating to perceptions of VASM

Question	Avg	n	(%)
How well do you understand the VASM audit process?	3.7	26	100%
How comprehensively have you read information published by VASM over the past 12 months?	3.0	25	96.2%
How would you rate the quality of the information reported by VASM?	4.3	24	92.3%
How would you rate the quality of these educational workshops and seminars conducted by VASM?	4.5	8	30.8%
How useful has the information from VASM been to you in your role?	3.3	24	92.3%
How would you rate the effectiveness of communications with VASM?	3.9	24	92.3%

Note: VASM - Victorian Audit of Surgical Mortality

Note: The averages represent the Likert scale where 1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree.

The qualitative aspect of the project involved 26 semi-structured interviews. Twenty-five of the 26 participants agreed to the interview being recorded (96.2%), and these interviews were transcribed verbatim. A number of themes and categories emerged from the interviews.

The following three sections outline the major themed categories in more detail.

7.4 VASM is perceived to be a valuable tool in education and hospital governance.

VASM was perceived by many participants to provide valuable data for benchmarking and governance. Reports published by VASM were cited as of high quality and, in general, of use to many participants. This is especially the case for the Case Note Review Booklet, which seemed to reach a wider audience than the annual report. This is likely due to the direct clinical benefits highlighted in the booklet, as well as the concise level of the clinical information. For example:

“I find the cases in there [the Case Note Review Booklet] to be particularly interesting and relevant. The summary findings [annual report] don't really give me a great deal of information about hospital performance and it is also not something that I expect. But that would be the reason I don't dive too deeply into all of that.” - Management

While the Case Note Review Booklet was found to be widely circulated and read and the annual report did have many readers who valued the information. For example:

“The graphs are well laid out and have relevant information in them and I'm talking about the annual report that's been produced. So if you are looking at causes of death, for example, you could see that cardiac events are clearly the most frequent or highest number.” - Management

Many interviewees stated the need for more information about their direct hospital performance, and the ability to seek feedback for specific cases. This, also known as closing the hospital loop, currently acts against current Qualified Privilege guidelines. However, was touched upon a number of times. For example:

“We submit it to VASM, but we never, and I understand why, but we never get feedback. And I think that is a real let down. So we wouldn't know if there has been a recommendation or a referral for a second review or a third review or anything of that nature... we don't get any feedback about specific cases and sometimes I think that would be helpful, but at the same time I understand why we don't.” - Management

Even in small rural hospitals or specialties where it is perceived that VASM has little practical use, VASM is highly appreciated and sometimes used. For example, one rural participant said:

“In a practical sense, not all that useful. Just in a general sense, because we have been involved in other clinical indicator programs, it is good to see if there are any themes that are coming through that might, we might need to be aware of... when we are looking at our auditing schedule, records and that sort of thing” - Administration

7.5 VASM communication was perceived to be effective with direct hospital contacts

Overall, VASM was perceived as having effective communication with direct hospital contacts. This includes VASM's email correspondence, ability to solve issues over the phone, and general report distributions. One administration officer said:

"I've called up and I've got a response straight away. The communication's wonderful." - Administration

With this in mind, VASM has limited ability to target information to individual's needs, such as sending clinically relevant information and hospital governance information to different contacts. This includes poor communication with upper management, who are often only aware of VASM by name and basic principles. One major difficulty is the ability to highlight the importance of VASM to upper management, particularly given the range and amount of clinically relevant research. For example, one member of upper management stated:

"How do you get it in front of CEOs? Does it get on the CEO's email list? But even then if it does, you've got to remember that you're going to be part of hundreds of emails that we're sassing out." - Management

7.6 Seminars are perceived to be useful but have a strong clinical focus

VASM seminars were perceived as useful for the small number of participants who had attended (n=8). One participant stated:

"Oh they were relevant to the audience. They had useful speakers that met the needs of what we were trying to address. And it wasn't too long. I think half a day as a good effort." - Management

One theme that emerged from the data was that although the seminars were of excellent quality, they were very clinically focused and not as relevant to many of the administration and management teams. For example, one participant stated:

"I am a nurse; I work in quality at the minute. But [the seminars] are often very doctor focused. But there is usually some good take home messages for everybody that attends, obviously that's your business so I would expect" - Management

The major factor leading to participants' lack of attendance at seminars is available time.

The audit continues to identify, assess and review factors associated with surgical mortality and will continue to develop action plans, educational programs and recommendations for further patient care improvements in Victoria

7.7 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.

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