Victorian Audit of Surgical Mortality (VASM)

Technical Report

01/07/2016 - 30/06/2017

ROYAL AUSTRALASIAN
COLLEGE OF SURGEONS

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VASM
Victorian Audit of Surgical Mortality

ANZASM
Australian and New Zealand Audit of Surgical Mortality

The Victorian
Surgical Consultative Council

SCV
Safe Care
Victoria

VICTORIA State Government Health and Human Services

The Royal Australian and New Zealand College of Obstetricians and Gynaecologists
Excellence in Women's Health

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Abbreviations

[D]	diagnosis
[M]	morphology of neoplasms
ANZASM	Australian and New Zealand Audit of Surgical Mortality
CI	confidence interval
CVA	Cerebrovascular accident
DHHS	Department of Health and Human Services
DVT	deep vein thrombosis
ECG	electrocardiogram
ERCP	endoscopic retrograde cholangiopancreatography
GI	gastrointestinal
H/O	history of
HDU	high dependency unit
ICU	intensive care unit
ITU	intensive therapy unit
NEC	not elsewhere classified
NOC	not otherwise classified
NOS	not otherwise specified
O/E	on examination
RACS	Royal Australasian College of Surgeons
TUR	transurethral resection
VASM	Victorian Audit of Surgical Mortality
VSCC	Victorian Surgical Consultative Council

1. About VASM

1.1 VASM structure and governance

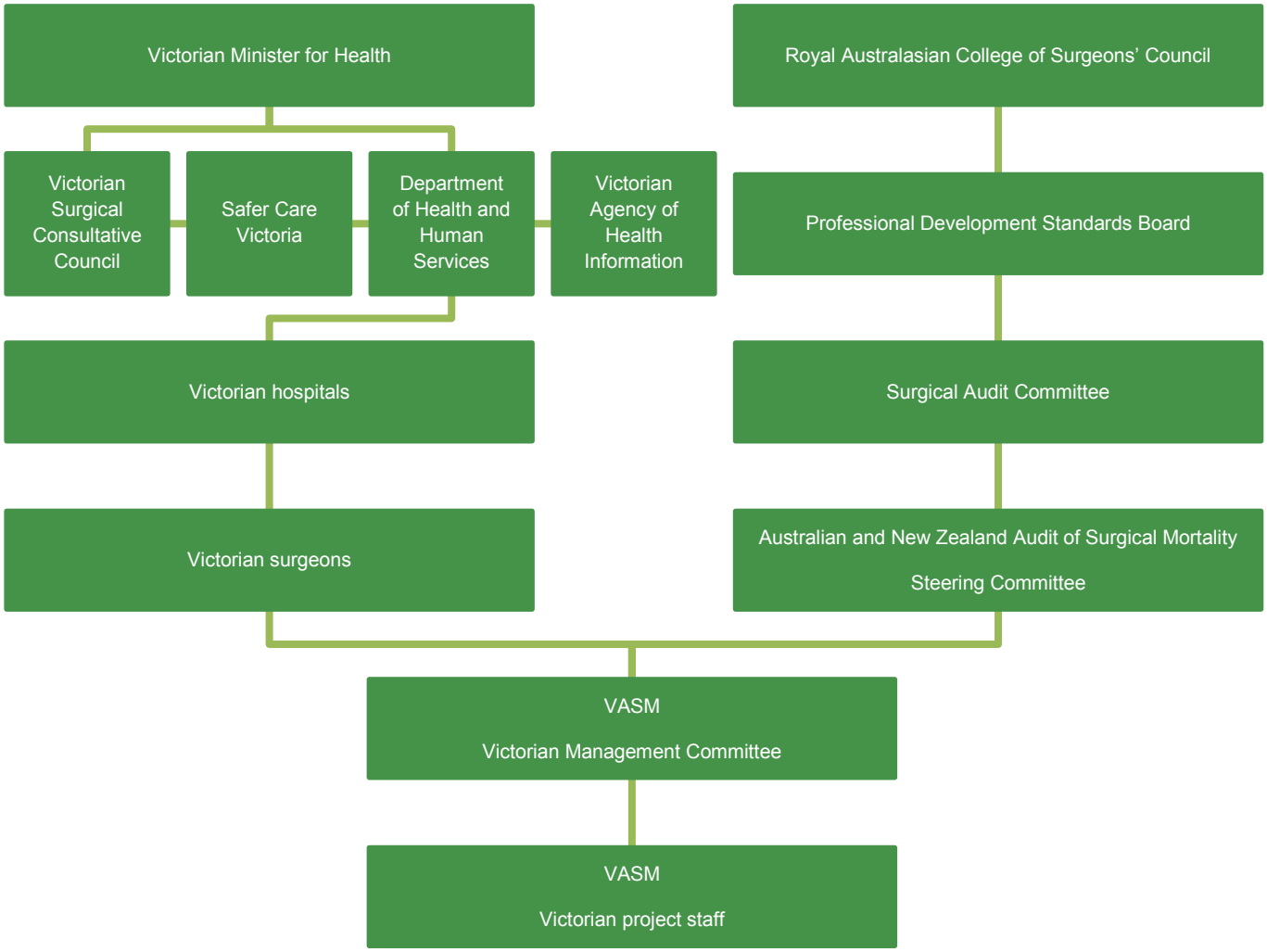
The Australian and New Zealand Audit of Surgical Mortality (ANZASM) is managed by the Research, Audit and Academic Surgery Division of the Royal Australasian College of Surgeons (RACS), and is supported and funded by state and territory governments. ANZASM oversees the implementation and standardisation 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 Safer Care Victoria (SCV), and 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, SCV at DHHS receive 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 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. Statistical analysis

2.1 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 2017. 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 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.

2.2 Interpretation of 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.

2.3 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.

2.4 Concordant validity considerations

Completion of all fields in the surgical case form by the treating surgeon requires some self-reflection, particularly the question that asks the treating surgeon 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.

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 AC provided a stable inter-rater reliability coefficient and is less affected by prevalence and marginal probability and are represented in this report for better interpretation of inter-rater reliability analysis.[1-4]

The results of the concordance analysis are shown in Tables 1, 2 and 3.

Table 1: Concordant validity between the treating surgeon and the first-line assessor

Concord area	n	Concord	Gwet's AC score	95% CI	*p* value
ICU care benefit if not received	1,530	96.9%	0.97	0.95 – 0.99	<0.001
HDU care benefit if not received	1,689	92.6%	0.92	0.89 – 0.95	<0.001
Fluid balance	3,761	93.9%	0.93	0.92 – 0.94	<0.001
Clinical management issues	5,347	78.6%	0.65	0.63 – 0.67	<0.001
Preoperative management/preparation	5,323	89.2%	0.87	0.86 – 0.88	<0.001
Decision to operate at all	5,326	88.6%	0.86	0.85 – 0.88	<0.001
Choice of operation	5,322	93.6%	0.93	0.92 – 0.94	<0.001
Timing of operation	5,326	93.6%	0.93	0.92 – 0.94	<0.001
Intraoperative/technical management	5,316	94.1%	0.94	0.92 – 0.95	<0.001
Grade/experience of surgeon deciding	5,316	98.5%	0.98	0.97 – 1.00	<0.001
Grade/experience of surgeon operating	5,315	98.2%	0.98	0.97 – 0.99	<0.001
Postoperative care	5,315	92.7%	0.92	0.90 – 0.93	<0.001

Note: a total of 5,348 surgical case forms and first-line assessments were available for analysis. There were 4,882 surgical procedures with 7,186 operative episodes.
Gwet's AC kappa score interpretation is outlined in the Appendix section 2.2.
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 surgeon and first-line assessor was clinical management issues. This was anexpected finding and supports the value of independent peer review.

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

Concord area	n	Concord	Gwet's AC score	95% CI	*p* value
ICU care benefit if not received	151	86.2%	0.83	0.73 – 0.94	<0.001
HDU care benefit if not received	168	78.7%	0.72	0.59 – 0.85	<0.001
Fluid balance	760	84.6%	0.80	0.76 – 0.84	<0.001
Clinical management issues	924	56.8%	0.16	0.10 – 0.23	<0.001
Preoperative management/preparation	921	73.0%	0.60	0.54 – 0.65	<0.001
Decision to operate at all	921	79.2%	0.73	0.69 – 0.77	<0.001
Choice of operation	921	83.4%	0.80	0.76 – 0.84	<0.001
Timing of operation	921	83.0%	0.78	0.74 – 0.82	<0.001
Intraoperative/technical management	921	83.6%	0.79	0.75 – 0.83	<0.001
Grade/experience of surgeon deciding	921	96.3%	0.96	0.94 – 0.99	<0.001
Grade/experience of surgeon operating	921	95.7%	0.96	0.93 – 0.98	<0.001
Postoperative care	921	78.4%	0.70	0.65 – 0.74	<0.001

Note: a total 924 surgical case forms and second-line assessments were available for analysis.
Gwet's AC kappa score interpretation is outlined in the Appendix section 2.2.
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 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 an expected finding and supports the value of independent peer review.

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

Concord area	n	Concord	Gwet's AC score	95% CI	*p* value
ICU care benefit if not received	50	76.0%	0.62	0.40 – 0.85	<0.001
HDU care benefit if not received	47	57.5%	0.18	0.00 – 0.48	0.243
Fluid balance	435	93.5%	0.93	0.91 – 0.95	<0.001
Clinical management issues	924	83.2%	0.77	0.71 – 0.82	<0.001
Preoperative management/preparation	917	73.6%	0.61	0.56 – 0.67	<0.001
Decision to operate at all	922	63.1%	0.33	0.25 – 0.39	<0.001
Choice of operation	920	73.4%	0.59	0.53 – 0.65	<0.001
Timing of operation	918	75.3%	0.64	0.59 – 0.70	<0.001
Intraoperative/technical management	920	76.9%	0.66	0.61 – 0.72	<0.001
Grade/experience of surgeon deciding	920	78.5%	0.68	0.63 – 0.74	<0.001
Grade/experience of surgeon operating	921	93.1%	0.92	0.89 – 0.96	<0.001
Postoperative care	918	92.0%	0.91	0.87 – 0.95	<0.001

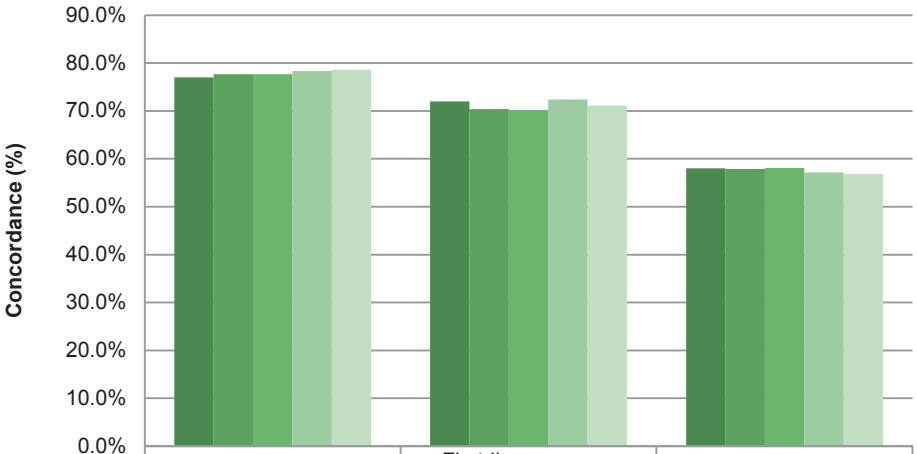
Note: a total of 924 first line assessments and second-line assessments were available for analysis.
Gwet's AC kappa score interpretation is outlined in the Appendix section 2.2.
CI: confidence interval; DVT: deep vein thrombosis; HDU: high dependency unit; ICU: intensive care unit.

Comments:

- Disagreement between first- and second-line assessors was most marked in critical care unit (CCU) (HDU and ICU) care, decision to operate; operation timing, technical management and the clinical management section. Second-line assessors perceived more issues than first-line assessors.
- The tendency of second-line assessors than first-line assessors to be more critical of clinical management events was foreseeable, as they have the benefit of medical case notes. 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 for prospective cases. This also allows for recommendations for improved surgical care to be delivered to the treating clinical teams.

Figure 2 shows the concordance trending between the treating surgeon and assessors.

Figure 2: Concordance trending



	Surgeon and first-line assessor	First-line assessor and second-line assessor	Surgeon and second-line assessor
2011-2012	77.0%	72.0%	58.0%
2012-2013	77.7%	70.4%	57.9%
2013-2014	77.7%	70.1%	58.1%
2014-2015	78.3%	72.4%	57.1%
2015-2016	78.6%	71.1%	56.8%

2.6 Conclusion: concordant validity considerations

In general, high levels of concordance percentages were observed. The first-line assessors are being reliant on the treating surgeon's account of the case, while second-line assessors have access to the full medical record, reason for lower Gwet score and concordance in the second-line assessment comparisons.

3. Trending in surgical diagnosis

The surgical diagnosis is identified by the treating surgeon and reviewed by assessors. Table 4 indicates the diagnosis identified on the surgical case form by the treating surgeon.

Table 4: Classification of surgical diagnosis

Index	Diagnosis	Total cases
1	Fracture of neck of femur	656
1	Fracture of shaft of femur	17
1	Fracture-dislocation or subluxation hip	19
1	Other fracture of femur	35
1	Subtrochanteric fracture	15
1	Fracture of humerus	11
1	Pertrochanteric fracture	16
2	Intestinal obstruction NOS	244
2	Hernia of abdominal cavity	11
2	Obstruction of intestine NOS	10
3	Intracerebral haemorrhage	46
3	Intracerebral haemorrhage, intraventricular	24
3	Subarachnoid haemorrhage	132
3	Subdural haematoma - nontraumatic	59
3	Cerebral oedema	6
4	Head injury	18
4	Traumatic haematoma	38
4	Traumatic subdural haemorrhage	57
5	[M]Adenocarcinoma NOS	16
5	[M]Adenocarcinoma, metastatic, NOS	15
5	[M]Adenomas and adenocarcinomas	25
5	[M]Carcinoma, metastatic, NOS	70
5	[M]Cholangiocarcinoma	19
5	[M]Glioblastoma NOS	14
5	[M]Neoplasm, metastatic	28
5	[M]Squamous cell carcinoma NOS	36
5	Malignant neoplasm of caecum	26
5	Malignant neoplasm of colon	66
5	Malignant neoplasm of oesophagus	23
5	Malignant neoplasm of pancreas	32
5	Malignant neoplasm of prostate	28
5	Malignant neoplasm of rectum	41
5	Malignant neoplasm of sigmoid colon	27
5	Malignant neoplasm of urinary bladder	42
5	Malignant pleural effusion	37
5	Malignant neoplasm of bronchus or lung NOS	16
5	Malignant neoplasm of female breast	15
5	[M]Malignant melanoma NOS	13
5	Malignant neoplasm of gallbladder	11
5	Malignant neoplasm of hepatic flexure of colon	11
5	Malignant neoplasm of stomach	11
5	[M]Adenomatous and adenocarcinomatous polyps of colon	10
5	Malignant neoplasm of splenic flexure of colon	10
5	Cerebral oedema	10
5	Cerebral metastasis	12

6	[D]Cardiogenic shock	18
6	Acute myocardial infarction	40
6	Aortic stenosis alone, cause unspecified	17
6	Aortic stenosis, non-rheumatic	14
6	Aortic valve stenosis with insufficiency	14
6	Cardiac arrest	17
6	Coronary artery anomaly	17
6	Coronary atherosclerosis	52
6	Double coronary vessel disease	13
6	Heart failure	23
6	Ischaemic heart disease	25
6	Mitral and aortic incompetence	16
6	Mitral and aortic stenosis	22
6	Single coronary vessel disease	13
7	Abdominal aortic aneurysm which has ruptured	65
7	Abdominal aortic aneurysm without mention of rupture	25
7	Dissecting aortic aneurysm	37
7	Ruptured aortic aneurysm NOS	37
7	Aortic aneurysm	12
	Total	**2,587**

NOS: not otherwise specified; [D]: diagnosis; [M]: morphology of neoplasms.
Note: a total of 5,348 surgical case forms had been reviewed.

Indexation categories:

1: Fracture of femur, n=769 (27.2%)
2: Intestinal obstruction, n=265 (9.4%)
3: Cerebrovascular accident, n=267 (9.4%)
4: Neurotrauma, n=118 (4.2%)
5: Malignancy, n=655 (23.2%)
6: Cardiac disease, n=337 (11.9%)
7: Aortic aneurysm, n=176 (6.2%)

4. Trending in cause of death

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

Table 5: Classification of top ten cause of death

Index	Cause of death	Number of cases
0 - Contributory excluded	Palliative care	60
0 - Contributory excluded	Hypotension	17
0 - Contributory excluded	[D]Hypoxaemia	13
0 - Contributory excluded	O/E - failure to thrive	13
1	Cardiac arrest	320
1	Acute myocardial infarction	260
1	[D]Cardiogenic shock	92
1	Myocardial infarction	24
1	Ischaemic heart disease	20
1	ECG: myocardial infarction	15
1	Atrial fibrillation	14
1	Other specified cardiac arrhythmias	14
1	Ventricular fibrillation	13
1	Cardiomyopathy	10
2	Respiratory failure	463
2	[D]Cardiorespiratory failure	84
2	[D]Respiratory arrest	51
2	Acute respiratory failure	36
2	Cardiorespiratory failure as a complication of care	20
2	Primary pulmonary hypertension	13
2	Chronic obstructive pulmonary disease	12
3	Septicaemia	604
3	[D]Septic shock	60
4	Other aspiration pneumonia as a complication of care	239
4	Pneumonia	142
4	Pneumonia and influenza	111
4	Pneumonia or influenza NOS	60
4	Pneumonia due to unspecified organism	25
4	Bronchopneumonia due to unspecified organism	12
4	Chest infection NOS	11
5	Multiple organ failure	740
6	Acute renal failure	145
6	Renal failure	86
6	Renal failure unspecified	37
6	End stage renal failure	12
6	Chronic renal failure	12
6	Renal impairment	11
7	Stroke and cerebrovascular accident unspecified	113
7	Subarachnoid haemorrhage	98
7	Intracerebral haemorrhage	54
7	Cerebral infarction NOS	47
7	CVA/stroke	45
7	Subdural haematoma - nontraumatic	30
7	Intracranial haemorrhage NOS	25

7	Intracerebral haemorrhage, intraventricular	14
7	Ruptured intracranial aneurysm(s)	13
7	Brainstem infarction	12
7	Cerebellar haemorrhage	11
8	Heart failure	270
8	Congestive heart failure	37
8	Acute pulmonary oedema NOS	23
8	Congenital cardiac failure	17
8	Acute heart failure	15
8	Pulmonary oedema NOS	15
8	Acute pulmonary oedema unspecified	13
8	Left ventricular failure	11
9	Vascular insufficiency of the intestine	134
10	Intestinal obstruction NOS	43
11	Brain death	90
11	Diffuse brain injury	73
11	Severe head injury	35
11	Anoxic brain damage	27
11	Cerebral oedema	23
11	Traumatic subdural haemorrhage	20
11	Focal brain injury	17
11	Head injury	15
11	Raised intracranial pressure	31
11	Traumatic haematoma	10
12	[M]Carcinoma, metastatic, NOS	42
12	Malignant neoplasm of colon	24
12	[M]Neoplasm, metastatic	20
12	Disseminated malignancy NOS	17
12	Malignant neoplasm of prostate	16
12	Malignant neoplasm of female breast	11
12	Malignant neoplasm of pancreas	10
12	Malignant pleural effusion	10
13	Pulmonary embolism	104
13	Pulmonary embolus	17
14	[D]Sudden death, cause unknown	79
14	[D]Death, not instantaneous cause unknown	25
14	[D]Debility, unspecified	15
14	Delirium, unspecified	14
14	Unknown - Coroner's post mortem exam	13
14	Other sudden death, cause unknown	12
15	Abdominal aortic aneurysm which has ruptured	26
15	Ruptured aortic aneurysm NOS	21
16	Fracture of neck of femur	15
17	Gastrointestinal haemorrhage	28
18	Haemorrhage NOS	30
18	[D]Hypovolaemic shock	17
18	Intraoperative haemorrhage	10
18	Hypovolaemia	10
19	Perforation of intestine	25
19	Perforated diverticulum	10
19	Perforated diverticulum of colon	10
19	Peritonitis	27
20	Acute pancreatitis	18
21	Malnutrition	11

22	Hepatic failure	54
24	Clotting and bleeding disorders	37
24	Coagulation defects	11
25	Necrotising fasciitis	11
28	Hydrocephalus	16
	Total	6,068

[D]: diagnosis; [M]: morphology of neoplasms; CVA: cerebrovascular accident; ECG: electrocardiogram; NOS: not otherwise specified; O/E: on examination.
Note: a total of 5,348 surgical case forms had been reviewed.

Indexation categories:

0: Excluded not a cause of death, n=103 (1.7%)
1: Cardiac event, n=782 (12.9%)
2: Respiratory failure, n=679 (11.2%)
3: Septicaemia, n=664 (10.9%)
4: Pneumonia, n=600 (9.9%)
5: Multiple organ failure, n=740 (12.2%)
6: Renal failure, n=303 (5.0%)
7: Cerebrovascular accident, n=462 (7.6%)
8: Cardiac failure, n=401 (6.6%)
9: Gut ischaemia, n=134 (2.2%)
10: Intestinal obstruction, n=43 (0.7%)
11: Neurotrauma, n=341 (5.6%)
12: Malignancy, n=150 (2.5%)
13: Pulmonary embolism, n=121 (2.0%)
14: Cause unknown, n=158 (2.6%)
15: Ruptured aortic aneurysm, n=47 (0.8%)
16: Facture of neck femur, n=15 (0.2%)
17: Gastrointestinal (GI) haemorrhage, n=28 (0.5%)
18: Non-GI haemorrhage, n=67 (1.1%)
19: Peritonitis, n=72 (1.2%)
20: Acute pancreatitis, n=18 (0.3%)
21: Malnutrition, n=11 (0.2%)
22: Hepatic failure, n=54 (0.9%)
24: Coagulopathy, n=48 (0.8%)
25: Necrotising fasciitis, n=11 (0.2%)
28: Hydrocephalus, n=16 (0.3%)

5. Trending in surgical procedures

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

Table 6 shows the classification of operative procedures.

Table 6: Classification of top ten operative procedures

Index	Procedures	Number of cases
1	Exploratory laparotomy	278
1	Laparoscopic approach	163
1	Laparotomy and removal of foreign body from abdominal cavity	19
1	Laparotomy approach NEC	693
1	Lavage of peritoneum	38
1	Reopening of laparotomy site	96
2	Arthroscopic debridement of knee joint	10
2	Arthroscopic irrigation of knee joint	14
2	Closed (or no) reduction of fracture and internal fixation	11
2	Debridement of bone	52
2	Debridement of open fracture	14
2	Internal fixation of bone NEC	26
2	Open irrigation joint	22
2	Open reduction of fracture of orbit and internal fixation	16
2	Other prosthetic hemiarthroplasty of hip	79
2	Other prosthetic hemiarthroplasty of hip NOS	13
2	Primary cemented hemiarthroplasty of hip	36
2	Primary int fxn (no red) prox fem #+screw/nail device alone	15
2	Primary open reduction fracture bone & intramedullary fixation	24
2	Primary open reduction+external fixation of femoral fracture	50
2	Primary reduction intraarticular fract bone using arthrotomy	10
2	Prmy open red+int fxn prox fem #+screw/nail+intramed device	14
2	Prmy open red+int fxn proxy femoral #+screw/nail+plate device	221
2	Prmy open reduction #+locked reamed intramedullary nail fxtn	12
2	Prmy open reduction of #+internal fixation with screw(s)	17

2	Prmy open reduction of #+intramedullary nail fixation	35
2	Prosthetic cemented hemiarthroplasty of hip	139
2	Prosthetic uncemented hemiarthroplasty of hip	11
2	Total prosthetic replacement of hip joint NOS	14
2	Total prosthetic replacement of hip joint using cement	12
3	Allograft replacement of aortic valve	15
3	Annuloplasty of tricuspid valve	10
3	Aorta operations	10
3	Cardiopulmonary bypass	11
3	Coronary artery operations	21
3	Drainage of pericardium	30
3	Exploratory median sternotomy	26
3	Extracorporeal circulation NEC	12
3	Haemostasis of unspecified organ	10
3	Implantation of ventricular assist device	22
3	Insertion of central venous catheter NEC	31
3	Lobectomy of lung	11
3	Median sternotomy approach	58
3	Other bypass of coronary artery	138
3	Plastic repair of aorta	21
3	Plastic repair of aortic valve	32
3	Plastic repair of mitral valve	30
3	Plastic repair of tricuspid valve	15
3	Prosthetic replacement of aortic valve	18
3	Prosthetic replacement of mitral valve	11
3	Replacement of aortic valve NEC	98
3	Replacement of mitral valve NEC	40
3	Transluminal insertion of pulsation balloon into aorta	19
4	Allograft of skin NEC	11
4	Arthroscopic irrigation (not knee)	10
4	Change of dressing	48
4	Debridement of burnt skin NEC	28
4	Debridement of muscle NEC	102
4	Debridement of skin NEC	263
4	Debulking of tumour of unspecified organ	15
4	Dressing of wound	144
4	Excision malignant skin tumour	16
4	Incision and drainage of wound	17
4	Irrigation of bowel NEC	10
4	Irrigation of organ NOC	14
4	Other graft of skin	17
4	Skin flap and skin graft operations	25
4	Split autograft of skin	21
4	Surgical biopsy (admin)	15
5	Abdominoperineal excision of rectum and end colostomy	10
5	Anastomosis of ileum to colon NEC	17
5	Anterior resection of rectum and anastomosis NEC	29
5	Anterior resection of rectum and exteriorisation of bowel	65
5	Colectomy and ileostomy NEC	16
5	Colon operations and sigmoidoscopy of rectum	35
5	Colon operations or rectal sigmoidoscopy NOS	14
5	Extended right hemicolectomy and end to end anastomosis	24
5	Extended right hemicolectomy and ileostomy HFQ	22
5	H/O: colostomy	11
5	H/O: ileostomy	23

5	Left hemicolectomy and anastomosis NEC	14
5	Loop colostomy	14
5	Partial colectomy NEC	23
5	Reversal of Hartmann's procedure	15
5	Right hemicolectomy and anastomosis NEC	89
5	Right hemicolectomy+end to end anastomosis of ileum to colon	15
5	Sigmoid colectomy and exteriorisation of bowel NEC	98
5	Total colectomy and ileostomy NEC	27
6	Burrhole(s) for drainage chronic subdural haematoma	16
6	Burrhole(s) for ventricular external drainage	260
6	Cerebral angiogram	11
6	Cerebral angiogram + embolisation/coil	37
6	Craniotomy for biopsy	12
6	Craniotomy for chronic subdural haematoma	35
6	Craniotomy for decompression of infarct	11
6	Craniotomy for other / unknown	11
6	Drainage of ventricle of brain NEC	12
6	Evacuation of intracerebral haematoma NEC	19
6	Evacuation of subdural haematoma	56
6	Insertion of cranial monitor	43
6	Intracranial pressure monitoring	61
6	Supratentorial craniectomy for traumatic intracranial haematoma	10
7	Closure of ileostomy	12
7	Closure of perforated duodenal ulcer	12
7	Creation of ileostomy	51
7	Endoscopic division of adhesions of peritoneum	47
7	Excision of ileum	118
7	Fibreoptic sigmoidoscopic snare resection lower bowel lesion	10
7	Freeing of adhesions of organ NOC	17
7	Freeing of adhesions of peritoneum	57
7	Insertion of nasogastric tube	10
7	Jejunostomy	13
7	Open drainage of abdominal abscess NEC	13
7	Open insertion of feeding tube into stomach	19
7	Operations on duodenal ulcer	12
7	Oversewing of small bowel	16
7	Partial gastrectomy and anastomosis of stomach to duodenum	11
7	Primary repair of femoral hernia	21
7	Primary repair of incisional hernia	28
7	Primary repair of inguinal hernia	22
7	Repair of umbilical hernia	17
7	Splenectomy NEC	22
7	Total gastrectomy and interposition of jejunum	11
8	Biopsy of lesion of lung NEC	20
8	Bronchoscopy normal	23
8	Decortication of pleura	18
8	Drainage of pleural cavity NEC	13
8	Endoscopic pleurodesis NEC	22
8	Endoscopic pleurodesis using talc	21
8	Exploratory thoracotomy NEC	12
8	Extra corporeal membrane oxygenation	95
8	Insertion of tube drain into pleural cavity	25
8	Open drainage of pleural cavity	11
8	Open pleurodesis NEC	20
8	Thoracoscopic approach	68

8	Thoracotomy approach NEC	77
8	Tracheostomy	54
9	Clipping of aneurysm of cerebral artery	12
9	Craniectomy unspecified	49
9	Craniotomy for clipping of aneurysm	46
9	Craniotomy for evacuation of non-traumatic haematoma	59
9	Craniotomy for evacuation post-op/recurrent haematoma	10
9	Craniotomy for excision / drainage of abscess	13
9	Craniotomy for intra- and extradural haematomas	14
9	Craniotomy for other tumour resection	29
9	Craniotomy for traumatic extradural haematoma	11
9	Evacuation of haematoma NEC	64
9	Exploratory open craniotomy	19
9	Posterior fossa craniectomy for infarct decompression	28
10	Colonoscopy normal	40
10	Diagnostic endoscopic retrograde exam bile+pancreatic ducts	21
10	Diagnostic gastroscopy NEC	34
10	Endosc retrogr cholangiopancreatography+biopsy bile/panc NEC	30
10	Endosc retrograde cholangiopancreatography & biopsy Vater	17
10	Gastric irrigation - lavage	24
10	Gastroscopy normal	141
10	Operative colonoscopy	10
11	Axillo-bifemoral bypass graft	13
11	Endarterectomy and patch repair of femoral artery	11
11	Fasciotomy leg NEC	20
11	Insertion of iliac artery stent	20
11	Open embolectomy of femoral artery	27
11	Open thrombectomy of vein of lower limb	10
11	Other angiograms	38
11	Other bypass of femoral artery or popliteal artery	17
11	Percutaneous transluminal angioplasty of femoral artery	17
11	Prosthetic graft thrombectomy	12
11	Repair of femoral artery NEC	17
11	Replace aneurysm ascend aorta by anast of aorta/aorta NEC	11
11	Replacement of aneurysmal bifurcation of aorta	68
11	Vein graft thrombectomy	32
12	[V]Cystoscopy normal	18
12	Diagnostic cystoscopy	19
12	Endoscopic insertion of ureteric stent	29
12	Endoscopic insertion of urethral stent	11
12	Endoscopic replacement of ureteric stent	17
12	Manual bladder washout	18
12	Other therapeutic cystoscopy	30
12	Rigid cystoscopic diathermy of lesion of bladder	13
12	Rigid cystoscopy and transurethral resection bladder lesion	11
12	Transurethral resection of male bladder neck	11
12	Unspec cystoscopy and transurethral resection bladder lesion	17
13	Amputation above knee	24
13	Amputation below knee	29
13	Amputation of toe	35
14	Cholecystectomy planned	16
14	Endoscopic cholecystectomy	17
14	Total cholecystectomy NEC	39
15	Other cannulation NOS	17
15	Percutaneous cholangiography	19

15	Removal of shunt +/- insertion external drain	13
15	Haemorrhage control by packing	27
	Total	**7,186**

H/O: history of; NEC: not elsewhere classified; NOC: not otherwise classified; NOS: not otherwise specified; TUR: transurethral resection.
Note: a total of 5,348 surgical case forms had been reviewed.

Indexation categories:

1: Laparotomy/laparoscopy approach, n=1,287(17.9%)
2: Orthopaedic, n=867(12.1%)
3: Cardiac, n=689 (9.6%)
4: Wound care, n=756 (10.5%)
5: Colorectal, n=561 (7.8%)
6: Neurosurgical trauma, n=594 (8.3%)
7: Other abdominal and hernia, n=539 (7.5%)
8: Thoracic and tracheostomy,n=479 (6.7%)
9: Neurosurgical non-trauma, n=354 (4.9%)
10: GI endoscopy, n=317 (4.4%)
11: Vascular, n=313 (4.4%)
12: Urology, n=194 (2.7%)
13: Amputations, n=88 (1.2%)
14: Hepatobiliary, n=72 (1.0%)
15: Miscellaneous, n=76 (1.1%)

6. Trending in clinical management issues

Preventable clinical management issues are identified by assessors during the peer-review process. Table 7 provides an overview of all preventable clinical management issues identified by assessors (for those cases that underwent both first- and second-line assessment, it is the information provided by the latter that is used in this overview). The higher the frequency of an issue, the greater the need for strategies to improve surgical care in that clinical arena.

Table 7: Classification of preventable clinical management issues

Index	Read Code Text	Number of Cases
1	Decision to operate	87
1	Better to have done different operation or procedure	74
1	Better to have performed more limited surgery	11
1	Open surgery, organ related technical	10
1	Surgeon too junior	10
1	Operation would have been better delayed	4
1	Inadequate surgical assistance	3
1	Better to have had more extensive surgery	3
1	Operation would have been better deferred or delayed	2
1	Inadequate drainage of peritoneal abscess/sepsis	2
1	Operation should have been done	2
1	Operation better deferred to daytime	2
1	Laparoscopic surgery, organ related technical	1
1	Failure to stop intraoperative bleed during laparoscopic operation	1
1	Better not to have been treated laparoscopically	1
1	Wrong surgical approach used	1
1	Operation should not have been done or was unnecessary	1
1	More aggressive treatment of infection needed	1
1	Other (incorrect/inappropriate therapy)	1
1	ERCP failed	1
2	Delay to surgery (i.e. earlier operation desirable)	44
2	Delay in diagnosis	27
2	Delay in recognising complications	25
2	Delay in transfer to surgical unit	18
2	Delay in transfer to tertiary hospital	11
2	Delay starting medical treatment	6
2	Delay in investigating the patient	5
2	Delays	4
2	Delay to operation caused by missed diagnosis	4
2	Delay to reoperation	4
2	Duration of operation too long	3
2	Delay in patient presenting	2
2	Delay in transfer to surgeon by physicians	1
2	Delay to blood transfusion	1
2	Delay to surgery whilst obtaining a CT scan	1
2	Delay in transfer to HDU	1
2	Delay in transfer to HDU postoperatively	1
3	Preoperative assessment inadequate	30
3	Failure to recognise severity of illness	17
3	Failure to investigate or assess patient fully	14
3	Diagnosis missed - unspecified	6
3	Cardiac preoperative assessment inadequate	4
3	CT scan should have been done preoperatively	4
3	Resuscitation inadequate	4
3	Diagnosis related complications	3
3	Diagnosis missed by medical unit	3
3	Diagnosis missed by surgeons	2
3	Diagnosis missed by radiologist	2
3	Cardiac monitoring inadequate	2
3	Nutritional care unsatisfactory	2
3	Over anticoagulation before admission	1

3	Preoperative investigations either not seen or confused	1
3	Problems during transfer	1
3	Assessment problems	1
3	Laboratory pre-operative assessment inadequate	1
3	Failure to treat malnutrition	1
4	Failure to use DVT prophylaxis	8
4	No protocol for DVT prophylaxis	6
4	Incorrect/inappropriate therapy	4
4	Patient-related factors	4
4	Wrong dose of drug used	3
4	Blood/blood products complication	3
4	Earlier operation desirable - no theatre available	3
4	Failure to use a drug for treatment or prophylaxis NEC	3
4	Unsatisfactory management of hypotension	3
4	Adverse events related to treatment guidelines/protocols	3
4	Treatment did not conform to guidelines/protocols	3
4	Reaction to drugs	2
4	Under anticoagulation	2
4	Delay starting DVT prophylaxis	2
4	Failure to insert a drain	2
4	Unsatisfactory management of coagulopathy	2
4	Too early removal of nasogastric tube	2
4	No interventional radiologist	2
4	Patient lost to follow up from previous episode	1
4	Equipment not available	1
4	Wrong drug used	1
4	Over anticoagulation	1
4	Over anticoagulation during admission	1
4	Failure to use antibiotic prophylaxis	1
4	Poor terminal care management	1
4	Lack of hospice beds	1
4	Inappropriate surgical admission	1
4	Incorrect use of drains or catheters	1
4	Failure to catheterise preoperatively	1
4	Displacement of tracheostomy tube	1
4	Drug interaction	1
5	Unsatisfactory medical management	51
5	Postoperative care unsatisfactory	12
5	Inadequate postoperative assessment	9
5	Delay in recognising a bleeding complication	8
5	Delay in recognising a cardiac complication	7
5	Fluid balance unsatisfactory	7
5	Drugs related complication	6
5	Adverse factors in management	5
5	Delay in recognising anastomotic leak	5
5	Fluid and electrolyte resuscitation inadequate	5
5	Postoperative fluid balance unsatisfactory	3
5	Inadequate postoperative cardiac assessment	3
5	Delay in recognising a respiratory complication	2
5	Fluid overload	2
5	Postoperative fluid overload	2
5	Postoperative cardiac monitoring inadequate	2
5	Delay in obtaining cardiac arrest team	1
5	Premature discharge from hospital	1
5	Postoperative nutritional care unsatisfactory	1
5	Inadequate postoperative vascular assessment	1
5	Premature discontinuation of treatment	1
6	Aspiration pneumonia	6
6	General complications of treatment	3
6	Pneumonia as a general complication of treatment	1
6	Upper GI complication	1
6	Bleeding or coagulation problems not related to operative technique	1
6	Extension of ischaemia after open surgery	1

6	Equipment related complication	1
6	Complications of dressings	1
7	Poor documentation	24
7	Communication failures	15
7	Failure to communicate with senior staff	4
7	Poor communication between physician and surgeon	2
7	Poor communication between nursing and surgical staff	2
7	Failure of communication - unspecified	1
7	Failure of communication due to poor case notes	1
7	Poor documentation on fluid charts	1
8	Anastomotic leak after open surgery	3
8	Anticoagulation causing postoperative bleeding	2
8	CVA due to arterial injury	2
8	Heart complication	2
8	Secondary haemorrhage	2
8	Perforation of colon after open surgery	2
8	Accidental arterial puncture	2
8	Intraoperative bone fracture	2
8	Injury to small bowel during laparoscopic operation	2
8	Intraoperative bleeding during laparoscopic operation	2
8	Postoperative bleeding related to endoscopic operation	2
8	Small bowel complication	1
8	Small bowel complication of laparoscopic operation	1
8	Postoperative intracranial haematoma	1
8	Pulmonary embolus	1
8	Oesophageal perforation	1
8	Injury to lung during open surgery	1
8	Injury to small bowel during open surgery	1
8	Colonic complication of open surgery	1
8	Injury to pancreas during open surgery	1
8	Injury to heart during open surgery	1
8	Arterial occlusion related to open surgery	1
8	Postoperative bleeding after open surgery	1
8	Unpreventable adverse events, open surgery	1
8	Perforation of small bowel during laparoscopic operation	1
8	Injury to common bile duct during laparoscopic operation	1
8	Splenic complication of laparoscopic operation	1
8	Venous bleeding, laparoscopic operation	1
8	Postoperative bleed after laparoscopic operation	1
8	Anastomotic leak related to laparoscopic operation	1
8	Perforation of colon during endoscopic operation	1
8	Anastomotic leak from colon after endoscopic operation	1
8	Perforation of gall bladder during endoscopic operation	1
8	Arterial complication of endoscopic operation	1
8	Injury caused by fall in hospital	1
8	Radiological surgery, organ related technical	1
9	Failure to use HDU	3
9	Failure to use HDU postoperatively	3
9	Premature discharge from HDU	3
9	Failure to use ITU, postoperatively	2
9	Premature discharge from ITU	2
9	Premature extubation	1
9	Cardiac arrhythmia complicating regional anaesthetic	1
9	Better not to have had a general anaesthetic	1
9	Cardiac complication during general anaesthetic	1
9	Hypotension complicating general anaesthetic	1
9	Wrong anaesthetic technique	1
10	Wound infection	1
10	Septicaemia - cause unspecified	1
10	Failure to heal wound after laparoscopic operation	1
10	Wound infection after endoscopic operation	1
10	Deep wound dehiscence after endoscopic operation	1
10	Failure to heal wound after endoscopic operation	1

Total	817

CVA: cerebrovascular accident; DVT: deep vein thrombosis; ERCP: endoscopic retrograde cholangiopancreatography; GI: gastrointestinal; HDU: high dependency unit; ITU: intensive therapy unit; NEC: not elsewhere classified.

Indexation categories:

1: Operative management issues, n=218 (26.7%)
2: Delay issues, n=158 (19.3%)
3: Preoperative care issues, n=99 (12.1%)
4: Protocol issues, n=70 (8.6%)
5: Postoperative care issues, n=134 (16.4%)
6: General complications of surgery, n=15 (1.8%)
7: Communication or poor documentation, n=50 (6.1%)
8: Adverse events, n=48 (5.9%)
9: Anaesthetic and critical care issues, n=19 (2.3%)
10: Septicaemia and wound, n=6 (0.7%)

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 allowing the treating surgeon to provide information and record their perspective. The treating surgeon is the only person in possession of the clinical nuances of the patient's course to death therefore this process is important to close the audit loop.

In 6.8% (366/5,348) of the audited cases the peer review process feedback form was returned by the treating surgeon.

Of those forms, 77.6% (284) related to first-line assessments and 22.4% (82) were associated with second-line assessments.

Overall, 82.8% (303/366) of treating surgeons agreed that the peer-review feedback was fair, 8.2% (30/366) remained neutral and 9.0% (33/366) disagreed with the assessors' opinions from the feedback reports. In total, 31.4% (115/366) of the surgeons provided additional comments along with their evaluation of the feedback reports.

The treating surgeon agreed that the peer-review feedback was a good source of information to improve surgical care at their institution in 68.6% (251/366) of the evaluations.

Figure 3: Treating surgeon's evaluation of the peer-review feedback

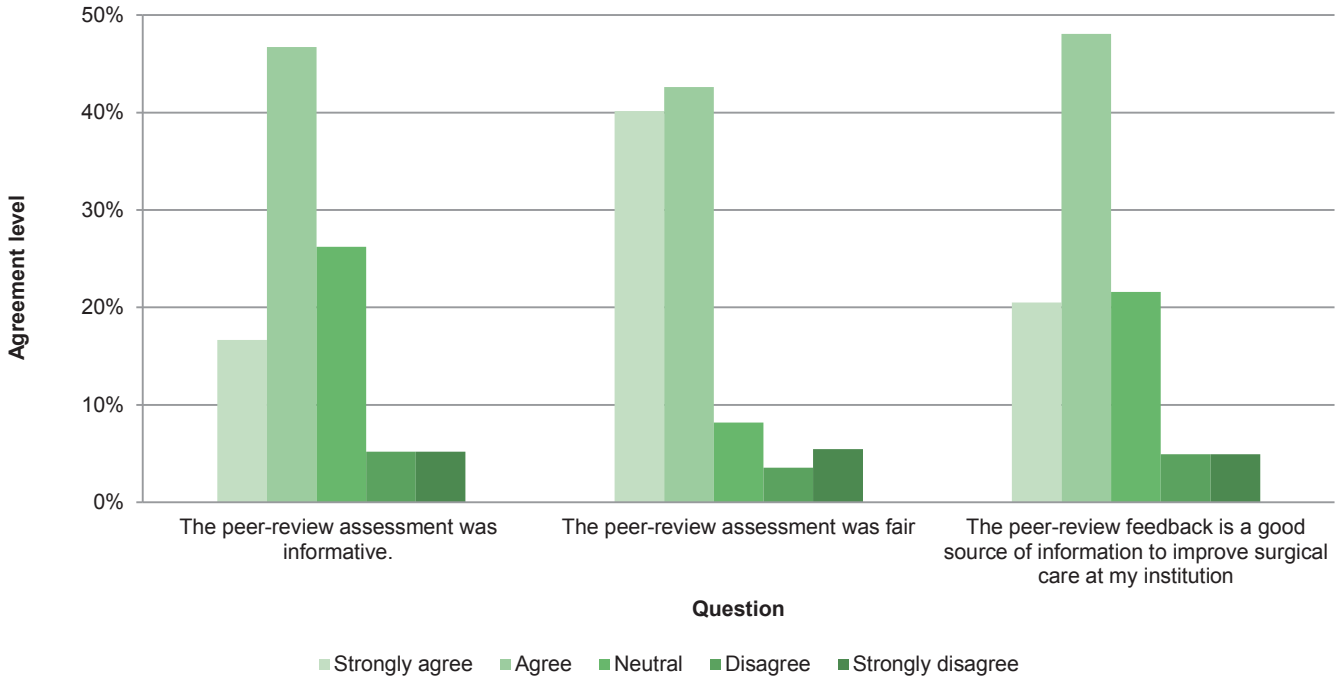


Table 8 shows a sample of surgeon comments on the VASM peer-review process.

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

Sample of comment extracts
The feedback has been taken on board and will influence future management.
I agree the assessment was entirely fair. I cannot disagree when it validates my practice! If there are deficiencies in care in a case it is much more educational… we learn through our mistakes!
The decisions were a shared process and responsibility between the cardiologist, anaesthetist, intensivist and myself as surgeon. I agree that the decision was taken too late, and the process of decision making although democratic was overly complex.
I concur with the assessor's review and certainly on reviewing the case soon after the event I had already considered all the points mentioned. A very fair and useful assessment.
There was no feedback - just "no deficiencies identified". The feedback exercise was somewhat underwhelming.
It is always difficult for an assessor to know all the features of a case so I am not critical of the assessor's thoughts but would make the following observations in response to the assessors report. Largely it reflects simply a difference of opinion.
The comments are reasonable and fair; however the acute situation of poor tissue perfusion and acidosis following the postoperative tamponade was corrected by commencement of (CPB) converted to extracorporeal membrane oxygenation (ECMO), after returning to theatre.
In this case, although I and other treating clinicians felt that there was more that we could do, the patient elected to limit treatment after the superficial haematoma wound washout (secondary to hip replacement). The patient's family supported the decision.

8. The Perceived Quality of the VASM Information

8.1 Introduction

The VASM completed three series of this qualitative project in response to the recommendations made by external auditors, Aspex Consulting.

The VASM was externally audited in 2015 by Aspex Consulting. The external audit suggested the update of a new KPI 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”.[6]

8.2 Method

Data was collected in the form of telephone interviews. A mixed methods approach was used to provide open-ended explorations into stakeholders’ views while also providing structured tools for annual trending reports.

The cohort was selected using stratified sampling[7] from a pool of participants representing different levels of management and administration, such as chief executive officers, surgical directors, quality assurance managers, health information managers, medical records staff and administration staff.

The interview utilised a specifically designed semi-structured questionnaire. The questionnaire consisted of seven closed questions that used a Likert scale[8] (1=not at all to 5=very well). Each of the closed questions was accompanied by an open-ended follow-up question designed to elicit further explanation and context. A copy of the questionnaire is included in Appendix 10.

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 done using a paper questionnaire for the Likert scale and audio recording for the additional comments. The responses from the Likert scale were entered and analysed using Microsoft Access Database 2010. The interview audio recordings were transcribed and the texts were analysed, with the coding entered into Microsoft Excel 2010.

The quantitative analysis was expressed in averages, counts and percentages. The qualitative aspect of the project utilised a content analysis approach. The overall goal of content analysis is to break the text into relatively small units and then submit the units to a descriptive treatment in both coding of the data and interpreting the quantitative counts of codes.[9] Content analysis aims to describe the phenomenon in a conceptual form where codes can be presented in a variety of ways.[10] 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 2014–2015 provided the basis for the qualitative methodology (there were no preconceived data points for the coding matrix).

8.3 Results

Data collection for the current project period was conducted between June and August 2017 via telephone interviews. During this time, 25 of 330 stakeholders were aimed to be interviewed. Contact by means of phone call, email or both were attempted with 25.8% (85/330) stakeholders. From the pool of stakeholders contacted, 34.1% (29/85) consented to the interview and 116.0% (29/25) were interviewed from the stakeholders target pool. The 29 respondents were from public and private Victorian health services and the DHHS governance.

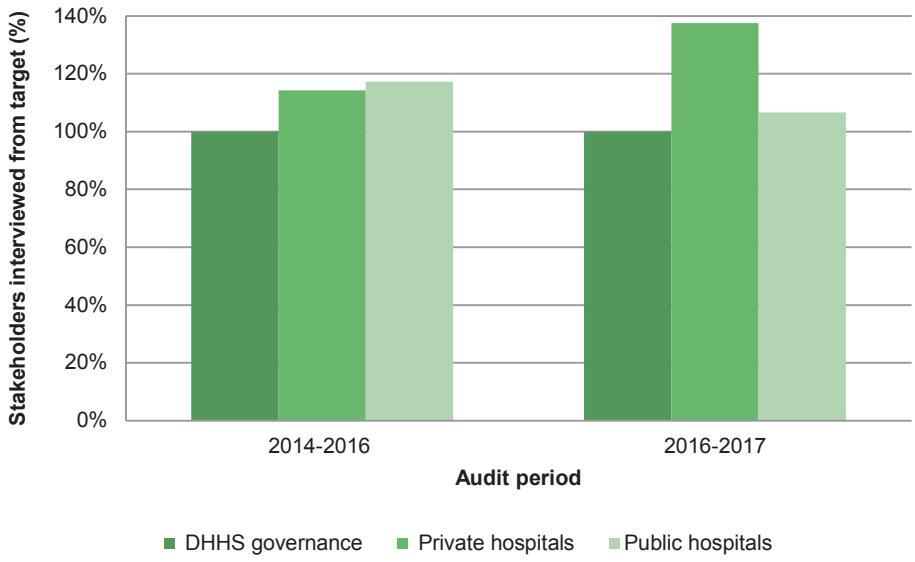
Table 9 and Figure 4 outline the roles of those interviewed over the project period.

Table 9: Role of participants interviewed

Role	2014–2016			2016–2017		
	Target n	Interview n	% from Target	Target n	Interview n	% from Target
Total DHHS governance	**3**	**3**	**100.0**	**2**	**2**	**100.0**
Private hospital administration	3	3	100.0	2	2	100.0
Private hospital medical Records	3	3	100.0	2	4	200.0
Private hospital management	8	10	125.0	4	4	100.0
Total private hospitals	**14**	**16**	**114.3**	**8**	**10**	**125.0**
Public hospital administration	6	7	116.7	3	3	100.0
Public hospital medical records	5	9	180.0	3	3	100.0
Public hospital management	18	18	100.0	9	11	122.2
Total public hospitals	**29**	**34**	**117.2**	**15**	**17**	**113.3**
Total stakeholders	**46**	**53**	**115.2**	**25**	**29**	**116.0**

DHHS: Department of Health and Human Services.

Figure 4: VASM stakeholders interviewed from the target pool



DHHS: Department of Health and Human Services.

The VASM office interviewed 115.5% (82/71) of target stakeholders during the period 2014 to 2017, which exceeded the initial target set for the project. This result was due to some stakeholders responding to voicemail and expressing their interest to participate in the project. For example, the management and medical records had more stakeholders interviewed than the target number in either the private or public sector. In 2014–2016, the management stakeholders from the private sector were 125.0% (10/8) while in 2016–2017, the interest came from the public sector, 122.2% (11/9). The medical records group had a similar trend, where the public sector had 180.0% (9/5) who agreed to be interviewed while in 2016–2017, 200.0% (4/2) came from private health services.

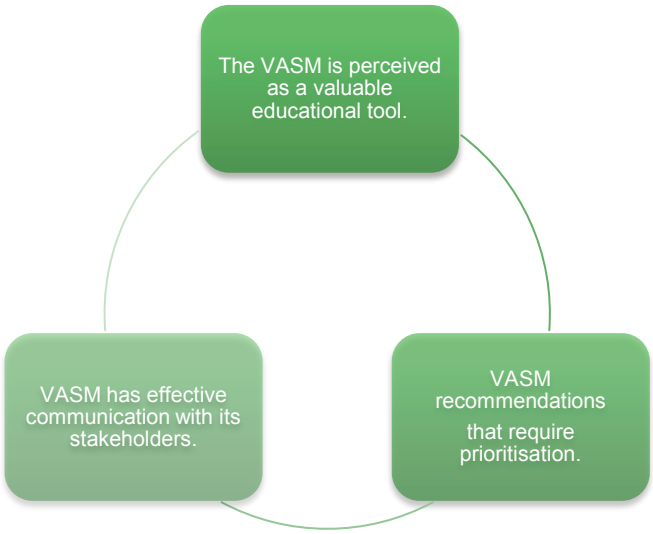
In Table 10, outlined the responses collected from the current period (2016−2017) compared with previous years (2014−2016). Participants were asked the same six questions relating to their perception of VASM and asked to grade their response in the form of a one to five rating (Likert scale).

Table 10: Quantitative results relating to perceptions of VASM

	2014−2016			2016−2017		
Question	**n**	**%**	**average**	**n**	**%**	**average**
How well do you understand the VASM audit process?	53/53	100.0	3.4	29/29	100.0	3.7
How comprehensively have you read information published by VASM over the past 12 months?	52/53	98.1	3.0	29/29	100.0	2.9
How would you rate the quality of the information reported by VASM?	49/53	92.5	4.0	27/29	93.1	3.6
How would you rate the quality of these educational workshops and seminars conducted by VASM?	12/53	22.6	4.3	12/29	41.4	2.7
How useful has the information from VASM been to you in your role?	51/53	96.2	3.0	29/29	100.0	3.0
How would you rate the effectiveness of communications with VASM?	51/53	96.2	4.1	29/29	100.0	4.2

The qualitative aspect of the project in 2016–2017 involved 29 semi-structured interviews. All participants agreed to the interview being recorded and the interviews were transcribed verbatim. However, two interviews (6.9%; 2/29) were not recorded due to technical issues and their comments for each rating scale were not accounted for in the following themes identified below. Three major themes and sub-themes per category emerged from the interviews outlined in Figure 5. Overall, data reached saturation.

Figure 5: Major categories regarding the perceived usefulness of the VASM



8.3.1: The VASM is perceived to be a valuable educational tool

Sub-themes: valuable, knowledge and understanding, and relevance

Valuable

VASM was still considered a valuable educational tool based on respondents' knowledge and understanding of the audit from either a general sense or from experience.

> *"It's very, very thorough, and it's very streamlined."* – Management.
>
> *"[Was] in negotiations with the College, worked together very early on to make the process work because we have a really strong view and understanding of the outcomes [as] the way you head for improvements."* – Management.

Respondents also considered VASM as valuable data for benchmarking, governance and to improve patient care. For example;

> *"Very important because I have to be aware of what goes wrong and make sure that you've covered all the safety issues so it doesn't happen here."* – Medical Records.
>
> *"At the moment in Victoria, the only source of real or any clinical monitoring or clinical governance you have in surgery is the VASM report…it is used as a benchmark."* – Management.
>
> *"VASM is one of the things we look at. We audit all of our cases and we also have a couple of large databases for all hospital deaths that we cross-linked to, so I understand how we work compared to our peers and it always good to know where to look."* – Management.

Those who read the VASM publications found it clinically useful and informative. The most commonly read publications were the annual report and the case note review booklet.

> *"It's very useful to discern meaning from the numbers."* – Management.
>
> *"The data and the way its collected is high quality and the reports are quite useful as well and seems pretty comprehensive."* – Medical records.
>
> *"Terrific, very detailed, very easy to read."* – Management.
>
> *"It's informative…the potential is always there, that if there's outcomes and recommendations made…we can apply them to what we do here."* – Management.
>
> *"It's been very useful because, as a clinician, it reflects on the cases I deal with so it gives me a chance to reflect on my work and implement any learning from there."* – Management/Clinician.

Knowledge and understanding

Some respondents indicated that their knowledge and understanding of VASM is limited to how relevant the audit is to their role or organisation. This sub-theme is similar to the results from previous years, for example;

> *"I only know and understand the processes as far as I would have to contribute every month filling in the VASM form."* – Medical Records.
>
> *"I understand it, from a perspective of providing the data but as far as the first-line assessors and second-line assessors, I don't really understand it as well from those perspectives I guess because I haven't really needed to."* – Medical Records.
>
> *"I'm not directly involved in what the criteria are; the manager of theatre will look at that data."* – Administration.
>
> *"It's not useful because I don't deal with it but our health information manager would find it very useful."* – Administration.

Relevance

Respondents reflected on VASM's role to closing the feedback loop, providing information relevant to smaller health services or to improve its processes based on stakeholder's experience.

Stakeholders from the management level indicated the need for a transparent feedback process about surgical performance for avoidable outcomes to improve their patient care. For example;

"From our perspective we see the aggregated data, so we can sort of use it to support improvements but we don't actually get the specific case details." – Management.

"Feedback or criticism on patient management directed currently to the treating surgeon, we understand the confidentiality of that; however in the interest of shared care at hospitals and opened disclosure, one suggestion would be to explore the possibly of also feedback to hospitals. This would be worthwhile for Mortality and Morbidity committees and learning opportunities. It's closing that loop." – Management.

"There's going to be increasing demand for…release some of that data. There's still time for VASM and contributors to be in charge of how that happens. I think VASM is in charge of its own destiny but it's going to have to change slightly." – Management/Clinician.

"Where we start to move into outcomes…that's where we'll get our most meaningful data. Counting the outcomes and looking at the outcomes is the way of the future and that's what we need to do." – Management.

Some indicated the VASM information is useful if it is relevant to those from smaller health services. For example;

"If you're going to have any of your education sessions, to come out to the country areas and then attract everyone to come here; it has to be relevant [the] information that we need." – Management.

"I know that a lot of the bigger hospitals where mortalities happen are always going to be more of priority but maybe what goes wrong as far as in the smaller facilities…some reporting on smaller facilities so we can relate more to it." – Medical Records.

"We don't have an emergency department so our mortality is very low. When we process our mortality there were a few cases that were relevant. Our mortality rate across the hospital is extremely low because of the nature of the work that we do." – Management.

While others provided feedback relevant to their own experiences of the VASM process. For example, when reporting the notification of death a respondent indicated,

"Some parts of the instructions were…says the admission under a surgeon and later on in the same document it says report things that were only the data from an actual surgical admission…it was a little contradictory." – Medical Records.

A few respondents outlined,

"It's very sensible to go on an online system… it's just trying to find my login to do it, it's a hold up for me at the moment, trying to get my cases done." – Management/Clinician.

"VASM has to be introduced to all surgeons and best that it is made compulsory, so that everyone gets an idea and get trained in to be an assessor [and view the process as] constructive in terms of getting in the situation." – Management.

"A second-line report… I'm meant to do it over the weekend and other things had gotten in the way and…I don't think there's a deadline date on it." – Management/Clinician.

8.3.2: VASM has effective communication with its stakeholders

Sub-themes: VASM communication is efficient and health services' communications need improvement

VASM communication is efficient

Overall, the VASM is still perceived to have effective and efficient communication directly with stakeholders. This includes email correspondence, ability to solve issues over the phone, and general report distributions. For example:

"Immediate feedback…they were very quick to get back to us. I feel quite comfortable when I see a VASM email come up they seem to have their structure sorted out." – Administration.

"Oh that's good yep 5. I got the emails, the information and reminders when I haven't submitted so yep." – Administration.

"Communications [have] been always good, because if I forgot to do something, I always get the reminder email." – Medical Records.

"We've been talking to the chair of VASM a lot because we've been inviting him here so our communications is very good." – Management.

"I think they're great. The responses are really quick. There's a query resolved often someone down the phone or when you submit the forms you've got acknowledgement almost immediately. They certainly do a great job." – Management/Clinician.

"It's very easy to communicate with and pretty prompt at responding." – DHHS Governance.

"We found it to be a very comfortable, sort of easy relationship to work with VASM." – DHHS Governance.

Very few respondents indicated that the VASM communication could improve. For example;

"From my perspective [it] is limited to the report." – Management.

"Communication is not enormous. I read the information from you." – Management/Clinician.

Health services' communication needs improvement

Respondents mentioned communication within their health services could improve. For example,

"We have difficulty with most, probably like most of services [where a patient] has been transferred to another hospital, so probably the communication back from that hospital if that patient's been passed away at another site, another hospital." – Medical Records.

"I just get a lot of comms and professional invitations but we need to distill out and say it's important to pass it on." – Management.

8.3.3: VASM recommendations that require prioritisation

Sub-theme: dedicate time to read publications and attend the events

Dedicate time to read publications

The VASM is perceived as useful although respondents expressed the need to dedicate time to read the VASM publications or attend educational events.

"I just don't have time to sit and read through everything. I'm not really looking into it with too much depth." – Medical Records.

"I haven't read comprehensively but I'd like to but I haven't had time. So I've read some reports." – Medical Records.

"I have read nothing comprehensively. I am a scanner and I hunt for something that I need at the time. I have a very clear system in my diary where things like that come up and I schedule them [if] I have no time and I reschedule it." – Management.

Dedicate time to attend the events

The reasons provided relate to being time poor, events being held too far away, the commute being too costly, and relevance of the event to an individual's role or organisation. For example:

"Time poor and probably distance as well. And as I said we haven't had any cases, if we reported a lot of cases well that might be different." – Medical Records.

"Being let out of the office to attend wouldn't be seen as a priority because resources are stretched as it is. Someone has to replace me and replace them." – Medical Records.

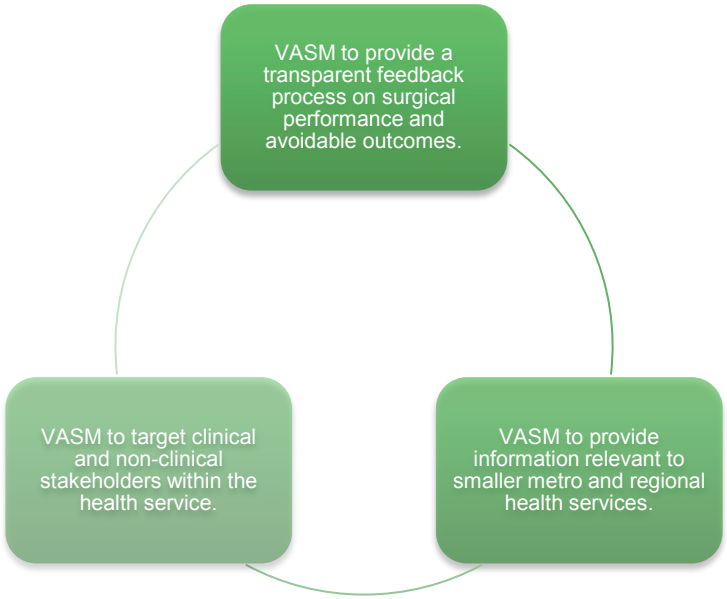
"Distance, cost and level of priority within my job." – Management.

"The distance is a factor for us, if they're only short; you know I've got to think of flights, and depending on what the timing is, there could be accommodation in that as well." – Management.

8.4 Recommendations

The feedback had a strong emphasis on VASM's role in providing transparent feedback for avoidable outcome processes to the health services. Figure 6 outlines the VASM's goals in these areas.

Figure 6: Recommendations for VASM's improvement



8.5 Limitations

Due to the nature of qualitative research the results from this small sample cannot be generalised to represent those of a broader population. Whilst the data did reach saturation, with such a diverse pool of participants there may have been intricate nuances between stakeholder groups that did not emerge.

8.6 Conclusion

The audit is still considered by stakeholders to be a valuable educational tool. Communication with VASM stakeholders was considered effective and efficient. The main recommendation was the need for a transparent feedback process for health services involving measurable outcomes, to enable further improvements in patient care. In general, 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 further patient care improvements in Victoria.

9. VASM performance review

Table 11: 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 ✓ In progress 1 July 2017
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 anaesthetic mortality referrals to the Victorian Consultative Council on Anaesthetic Mortality and Morbidity	✓ Completed 1 September 2017
Establishment of internal validation of the VASM audit processes 2013–2019 • First-line validation • Second-line validation • Surgical case form	✓ Completed 12 August 2013 ✓ Completed 12 August 2015 ✓ Completed 1 July 2017
Establishment of treating surgeon feedback process • First-line validation • Second-line validation	✓ Completed 1 January 2015
Establishment of individual hospital clinical governance reports	✓ Completed 1 January 2014
Establishment of hospital surgical performance reports	✓ Completed 1 July 2016
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) ✓ Completed 11 October 2017 (stage 3)
Establishment of reporting to Safer Care Victoria multidisciplinary panel review	✓ In progress 1 July 2017

Provision of educational seminars to Fellows, hospital administrators and other healthcare professionals on: • 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 • Can registries and audits improve patient outcomes? • Knowledge-based sharing in the health industry • How does VASM contribute to Safety in Surgery	✓ 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 ✓ Completed 21 February 2017 ✓ Completed 16 June 2017 ✓ Completed 1 July 2017
Provision of educational publications: • 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 ✓ Completed 19 July 2016
Provision of external evaluation of the VASM audit processes by Aspex Consulting	✓ Completed 27 December 2014 (stage 1) ✓ In progress 2017−2018 (stage 2)

VASM: Victorian Audit of Surgical Mortality; VMIA: Victorian Managed Insurance Authority; VSCC: Victorian Surgical Consultative Council.
First-line assessment and second-line assessment validation: examination of the agreement between two independent assessors performing assessments on the same case.

10. Appendix

10.1 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 constrains 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 you 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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Notes

Contact details

Victorian Audit of Surgical Mortality (VASM)
Royal Australasian College Of Surgeons
College of Surgeons' Gardens
250–290 Spring Street
East Melbourne VIC 3002 Australia

Web: www.surgeons.org/vasm
Email: vasm@surgeons.org
Telephone: +61 3 9249 1154
Facsimile: +61 3 9249 1130

Postal address:
Victorian Audit of Surgical Mortality (VASM)
GPO Box 2821
Melbourne VIC 3001 Australia