Victorian Audit of Surgical Mortality
at the Royal Australasian College of Surgeons


# Victorian Audit of Surgical Mortality (VASM)
# First-Line Assessment
# Validation Audit
# 2017 Report

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## OBJECTIVE

The objective of this audit was to examine the agreement between two independent assessors performing first-line assessments on the same case. The primary assessor was the Fellow who performed the original assessment using the standard audit process. The second, or 'validation assessor', was a random selection of first-line assessors from the relevant subspecialty and without knowledge either of the outcome of the original assessment or that they were completing a validation assessment (see Figure 1 for further details).

## MATERIAL AND METHODS

A 10.0% (145/1,446) sample of closed cases from 2016 were randomly selected for review (see Table 1 for further details). The second first-line assessments were done using paper based forms from the relevant specialty and without knowledge either of the outcome of the original assessment or that they were completing a validation assessment.

At completion of the audit, a comparison was made of the recommendations from each assessor.

## SCOPE

To identify any areas of concern and differences arising from the comparison of the two validation procedures.

## PROCEDURE

The first phase was to select the random validation cases and prepare a data set and queries in an Access database. Three tables were designed and displayed the original finding of the primary assessor's data and validation assessor's data and differences (see Table 5, 6 and 7 for further details).

The next step was to prepare a list for selecting the appropriate assessors, using paper based forms. Then the original case record and assessment forms were printed from BAS. The validation letters were written replicating the text from the database so that the validating assessor was blinded from knowing that the assessment was a validation. The letters for the first phase were sent out on 20th April 2017.

The second phase reflected the receipt of the incoming assessment forms and entering them into pre-prepared VASM data tables in the validation database. The cut-off date for form receipt was the 15th August 2017 and by this date VASM had received 64.8% (94/145) of the original selection.

The final phase was the data verification and validation of differences on the 94 forms received. The data was cross referenced between the original and validation tables. All validation and original documentation will be stored securely and files will be kept for a period of seven years.

Interrater agreement was calculated using the KAPPAETC module in Stata 15.0 (Stata Corporation, College station, TX) and the Gwet AC score was reported along with the 95% Confidence Interval (Table 3). Numbers in the parenthesis (n) represent the number of cases analysed. This number varies as some data fields were not completed by the assessors.

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.

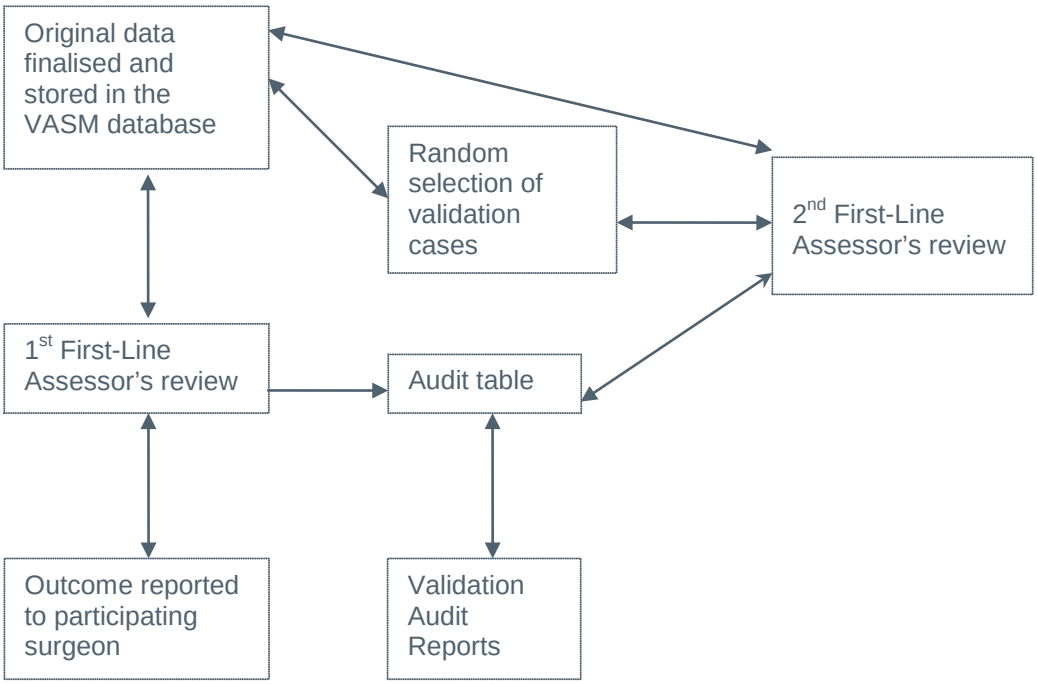
A p value less than 0.05 is considered statistically significant.

The percentage of differences (Table 5) was calculated by dividing the number of differences identified by the total number of fields checked.

## AUDIT DIAGRAM

Arrows indicate audit flow of architecture checks.

*Figure 1: Audit diagram of architecture checks*




## AUDIT PROCEDURE RESULTS

Sample number: 1,446 cases
Validation selection: All specialities

*Table 1: Specialty distribution of cases selected for review*

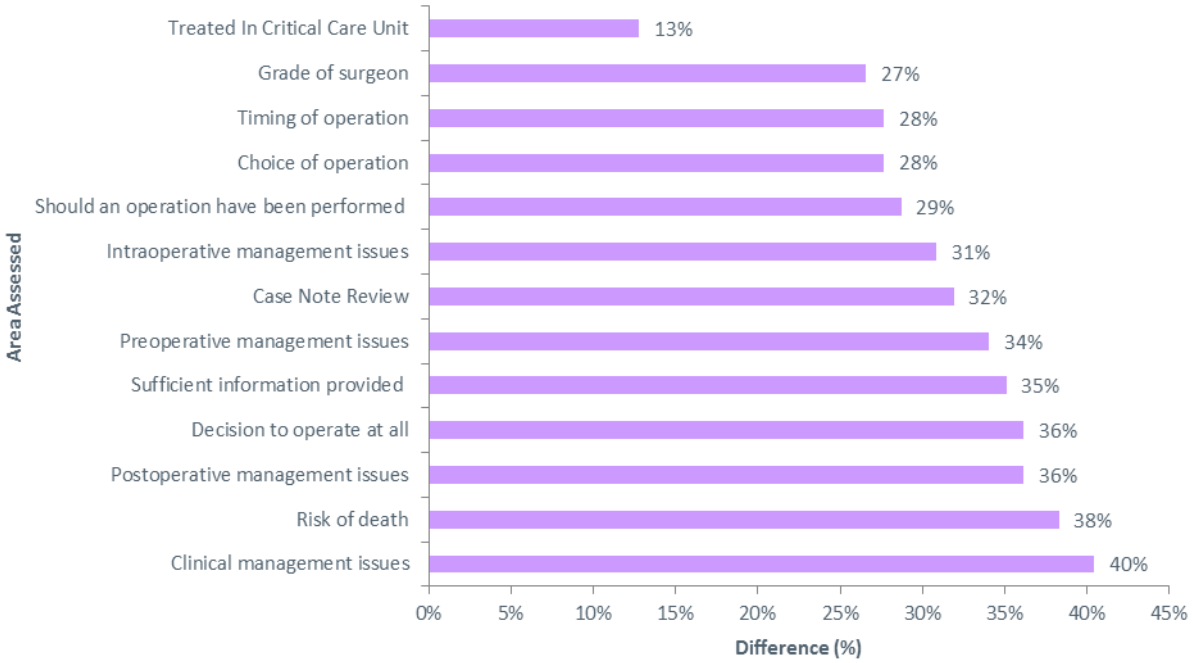
| Specialty | Audited Cases | Validation Selection | |
|---|---|---|---|
| **Cardiothoracic Surgery** | 224 | 11 | 4.9% |
| **General Surgery** | 513 | 39 | 7.6% |
| **Neurosurgery** | 199 | 8 | 4.0% |
| **Obstetrics & Gynaecology** | 15 | 1 | 6.7% |
| **Orthopaedic Surgery** | 256 | 17 | 6.6% |
| **Otolaryngology Head and Neck** | 16 | 2 | 12.5% |
| **Paediatric Surgery** | 13 | 1 | 7.7% |
| **Plastic Surgery** | 41 | 3 | 7.3% |
| **Urology** | 52 | 4 | 7.7% |
| **Vascular Surgery** | 117 | 8 | 6.8% |
| **Total** | **1,446** | **94** | **6.5%** |

## AUDIT REPORT RESULTS

These data points in Figure 2 below outline the questions detailed on the first-line assessment form. It shows the differences between the original and the second first-line assessments.

There were some specialties that deviated from the average due to the limited number of cases included in this validation project for that group.

*Figure 2: Summary of differences in areas assessed*




There were quite a high number of blank/missing fields on both the original and the validation between the original and second-line assessment assessments (Tables 6 and 7). This means that the analysis of data is constrained and has the potential for bias.

The original source fields with the highest missing data were in the 'preoperative management issues' (17.0%; 16/94), 'intraoperative management issues' (17.0%; 16/94), and 'choice of operation' (17.0%; 16/94).

The validation source fields with the highest missing data were also in the 'should an operation have been performed' (19.1%; 18/94), 'postoperative management issues' (12.8%; 12/94), and 'grade of surgeon' (11.7%; 11/94).

The overall difference between for all data points the original and validation assessments was 8.2% (475/5,828).

## Validation Outcomes

The following section describes the areas where there were differences between the original and second assessor and if missing data points were identified.

### 1. Adequacy of information provided by treating surgeon on operative management issues

In 33 cases (35.1%), the adequacy of information provided by the treating surgeon was raised by the primary assessor but the validation assessor felt the information provided was sufficient to draw conclusions.
Note: there were four blank fields in the original assessment and no blank field in the validation assessment. This field had the highest missing data points in the validation assessment pool.

## 2. Should an operation have been performed

In 27 cases (28.7%), the validation assessor disagreed on the appropriateness of the operative procedure.
Note: there were 14 blank fields in the original assessment and 18 blank fields in the validation assessment. This field had the highest missing data in the validation assessment pool.

## 3. Preoperative management issues

In 32 cases (34.0%), the validation assessor disagreed with the initial assessment of adequacy of the preoperative management, based on the information submitted by the surgeon.
Note: there were 16 blank fields in the original assessment and six blank fields in the validation assessment. This field was one of three fields that had the highest missing data in the original assessment pool.

## 4. Intraoperative management

In 29 cases (30.9%), the validation assessor disagreed with the adequacy of the intraoperative management.
Note: there were 16 blank fields in the original assessment and nine blank fields in the validation assessment. This field was one of three fields that had the highest missing data in the original assessment pool.

## 5. Postoperative management issues

In 34 cases (36.2%), there were differences in views between postoperative management.
Note: there were nine blank fields in the original assessment and 12 blank fields in the validation assessment.

## 6. Decision to operate at all

In 34 cases (36.2%), there was a difference of opinion regarding the decision to operate.
Note: there were ten blank fields in the original assessment and seven blank fields in the validation assessment.

## 7. Choice of operation

In 26 cases (27.7%), there was a difference of opinion regarding the choice of operation.
Note: there were 16 blank fields in the original assessment and six blank fields in the validation assessment. This field was one of three fields that had the highest missing data in the original assessment pool.

## 8. Timing of operation

In 26 cases (27.7%), there was a difference of opinion regarding the timing of surgery.
Note: there were 13 blank fields in the original assessment and eight blank fields in the validation assessment.

## 9. Grade of surgeon

In 25 cases (26.6%), the validation assessor deemed the grade of the surgeon operating as an issue based on the information submitted by the surgeon. This was due to inadequate communication between the trainee and the consultant.
Note: there were three blank fields in the original assessment and 11 blank fields in the validation assessment.

## 10. Risk of death

In 36 cases (38.3%), there was disagreement. However, when these differences were reviewed the differences were slight (e.g. small vs. minimal, moderate vs. considerable).
Note: there were eight blank fields in the original assessment and one blank field in the validation assessment. This field had the least missing data on the forms.

## 11. Use of critical care support

Differences in opinion on the value of critical care support were frequent occurring in 12 cases (12.8%).
Issues identified included the utilisation of Intensive Care Unit or High Dependency Unit. Deep Vein Thrombosis (DVT) prophylaxis and fluid balance were also amalgamated across the data points as they were very similar in their meaning and value.
Note: there were no blank fields in the original assessment and three blank fields in the validation assessment.

## 12. Area of consideration, concern or adverse event

In 38 cases (40.4%), there were differences noted in regard to the overall perception of clinical management issues, which was the most common difference between primary and validation assessors. Although primary and validation assessors came to the same conclusions in 56 cases (59.6%), there were some variations in opinion in regard to the degree of criticism.

In total, the pool of original assessments had 55 instances of clinical management issues identified, consisting of 15 areas of concerns and five adverse events. The validation pool identified 41 instances of clinical management issues, consisting of nine areas of concern and two adverse events. Of the serious clinical management issues identified, there were three instances (42.9%) where the issues were mentioned but were categorised differently (e.g. concern versus adverse events).

## 13. Disparity between perceptions of need for second-line assessment (case note review)

*Table 2: Specialty distribution of Case Note Review (SLA referral) variance*

| Specialty | Initial Assessment | | Validation Assessment | |
|---|---|---|---|---|
| **Cardiothoracic Surgery** | 1 | 9.1% | 3 | 27.3% |
| **General Surgery** | 10 | 25.6% | 8 | 20.5% |
| **Neurosurgery** | 1 | 12.5% | 2 | 25.0% |
| **Obstetrics & Gynaecology** | 1 | 100.0% | 0 | 0.0% |
| **Orthopaedic Surgery** | 6 | 35.3% | 5 | 29.4% |
| **Otolaryngology Head and Neck** | 1 | 50.0% | 1 | 50.0% |
| **Paediatric Surgery** | 1 | 100.0% | 0 | 0.0% |
| **Plastic Surgery** | 0 | 0.0% | 0 | 0.0% |
| **Urology** | 1 | 25.0-% | 0 | 0.0% |
| **Vascular Surgery** | 2 | 25.0% | 2 | 25.0% |
| **Total** | **24** | **25.5%** | **21** | **22.3%** |

The initial assessment pool included a mixture of cases, some that required a second-line review. In past validation audits, the validation pool purely consisted of cases that did not require a second-line review. However, the inclusion criterion for this validation audit was slightly altered to include the mixture of cases to identify any potential patterns when a second-line review is requested for a case.

In 70 out of 94 cases (74.5%), the initial assessor felt there was no need for second-line review. Whereas the validation assessor felt that no second-line review was required in 73 out of the 94 cases (77.7%).

The validation assessor felt a second-line review was required in 14 cases (20.0%) from the pool where the original assessor felt no second-line review was necessary.

In seven cases (50.0%) of disagreement, the initial assessor had identified the relevant clinical issues questioned by the validation assessor but felt a second-line review would not add to the outcome.

In three cases (21.4%) of disagreement the validation assessor believed that there was insufficient information to come to a conclusion, which was the reason for the second-line assessment referral.

In four cases (28.6%) of disagreement there were issues raised by the validation assessor. The main issues identified were predominately areas of consideration such as decision to operate, delay in treatment, management of treatment, inadequate preoperative investigations and level of experience of operating Fellow. There was one area of concern identified which was related to the treating consultant not being present at the operation.

## CONCLUSION

This validation audit was undertaken to give some perspective on intra-assessor variation between surgeons reviewing cases reported to VASM. The validation process of 94 peer reviews found a high concordance level between the original and validation first-line assessment.

In 25.5% cases, the initial assessor felt there was a need for second-line review versus 22.3% during the validation process, therefore more SLA reviews were conducted under the first FLA review commendations.

The lowest area of agreement was the assessor's perception of clinical management issues due to the variance in the severity of issues. However, the issues were usually identified in the additional comments of the assessment and not seen as severe enough to be listed in the clinical management issues question. The assessment process itself involves some degree of subjectivity so complete agreement between observers is not expected.

## RECOMMENDATIONS

- Continue to support the current review process.
- Encourage assessors to utilise the VASM assessment guidelines.
- Carefully evaluate the questions related to use of critical care services and DVT prophylaxis and look at changes that will provide clearer outcomes.
- Make sure that all fields on the form have been completed and there are no blank fields (reinforce compulsory electronic data submission).
- Develop a validation assessment method for second-line assessments.
- Develop assessor peer review process workshop to assist in completing assessments.
- Repeat this review in two years.

## APPENDIX

*Table 3: Concordant validity between the original and validation first-line assessors*

| Concord Area | n | Concord. | Gwet's AC score | 95% CI | *p* value |
|---|---|---|---|---|---|
| **Case Note Review** | 94 | 68.09% | 0.49 | 0.31–0.68 | <0.0001 |
| **Sufficient information provided** | 94 | 64.89% | 0.45 | 0.25–0.64 | <0.0001 |
| **Should an operation have been performed** | 74 | 90.54% | 0.90 | 0.82–0.97 | <0.0001 |
| **Preoperative management issues** | 82 | 73.17% | 0.68 | 0.56–0.81 | <0.0001 |
| **Intraoperative management issues** | 79 | 82.28% | 0.80 | 0.69–0.90 | <0.0001 |
| **Postoperative management issues** | 75 | 80.00% | 0.77 | 0.66–0.89 | <0.0001 |
| **Decision to operate at all** | 78 | 91.03% | 0.91 | 0.83–0.98 | <0.0001 |
| **Choice of operation** | 82 | 82.93% | 0.81 | 0.71–0.91 | <0.0001 |
| **Timing of operation** | 80 | 85.00% | 0.83 | 0.73–0.92 | <0.0001 |
| **Grade of surgeon** | 78 | 88.46% | 0.88 | 0.79–0.96 | <0.0001 |
| **Risk of death** | 92 | 63.04% | 0.57 | 0.44–0.69 | <0.0001 |
| **Treated In Critical Care Unit** | 88 | 93.18% | 0.89 | 0.80–0.98 | <0.0001 |
| **Clinical management issues** | 89 | 62.92% | 0.29 | 0.08–0.50 | 0.008 |

The case note review (SLA referral) and the clinical management section are valuable comparison tools when comparing the two assessments pools.

*Table 4: Differences between reviewers showing areas assessed and by specialty*

Cases recorded here are the differences between initial and validation assessment.

| | Specialty | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Areas Assessed** | **Cardiothoracic Surgery** | **General Surgery** | **Neurosurgery** | **Obstetrics & Gynaecology** | **Orthopaedic Surgery** | **Otolaryngology Head and Neck** | **Paediatric Surgery** | **Plastic Surgery** | **Urology** | **Vascular Surgery** | **Total** |
| **Case Note Review** | 2 | 13 | 3 | 1 | 5 | 2 | 1 | 0 | 1 | 2 | **30** |
| **Sufficient information provided** | 3 | 15 | 2 | 1 | 5 | 2 | 1 | 1 | 1 | 2 | **33** |
| **Should an operation have been performed** | 3 | 12 | 3 | 1 | 4 | 1 | 0 | 0 | 1 | 2 | **27** |
| **Preoperative management issues** | 4 | 15 | 2 | 1 | 5 | 1 | 1 | 1 | 0 | 2 | **32** |
| **Intraoperative management issues** | 2 | 12 | 2 | 1 | 5 | 1 | 1 | 1 | 2 | 2 | **29** |
| **Postoperative management issues** | 4 | 17 | 2 | 1 | 3 | 1 | 1 | 1 | 2 | 2 | **34** |
| **Decision to operate at all** | 2 | 18 | 2 | 1 | 6 | 2 | 0 | 1 | 1 | 1 | **34** |
| **Choice of operation** | 3 | 12 | 2 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | **26** |
| **Timing of operation** | 3 | 12 | 3 | 1 | 3 | 0 | 1 | 1 | 1 | 1 | **26** |
| **Grade of surgeon** | 1 | 14 | 2 | 1 | 3 | 0 | 0 | 1 | 1 | 2 | **25** |
| **Risk of death** | 3 | 17 | 2 | 1 | 6 | 1 | 0 | 2 | 3 | 1 | **36** |
| **Treated In Critical Care Unit** | 1 | 5 | 1 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | **12** |
| **Clinical management issues** | 3 | 17 | 3 | 1 | 8 | 1 | 1 | 0 | 2 | 2 | **38** |
| **Total Differences** | **34** | **179** | **29** | **12** | **60** | **13** | **8** | **11** | **16** | **20** | **382** |

*Table 5: Summary of differences between reviewers by specialty*

Cases recorded here are the percentage of differences between initial and validation assessment.

| Specialty | Cardiothoracic Surgery | General Surgery | Neurosurgery | Obstetrics & Gynaecology | Orthopaedic Surgery | Otolaryngology Head and Neck | Paediatric Surgery | Plastic Surgery | Urology | Vascular Surgery | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total cases (n)** | 11 | 39 | 8 | 1 | 17 | 2 | 1 | 3 | 4 | 8 | **94** |
| **Fields checked (n)** | 682 | 2418 | 496 | 62 | 1054 | 124 | 62 | 186 | 248 | 496 | **5,828** |
| **Differences (n)** | 34 | 179 | 29 | 12 | 60 | 13 | 8 | 11 | 16 | 20 | **382** |
| **Differences (%)** | **4.9%** | **7.4%** | **5.9%** | **19.4%** | **5.7%** | **10.5%** | **12.9%** | **5.9%** | **6.5%** | **4.1%** | **6.5%** |

*Table 6: Number of blank fields in the original source form fields*

Cases recorded here are the numbers of blank fields in the original assessment.

| | Specialty | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Areas Assessed** | **Cardiothoracic Surgery** | **General Surgery** | **Neurosurgery** | **Obstetrics & Gynaecology** | **Orthopaedic Surgery** | **Otolaryngology Head and Neck** | **Paediatric Surgery** | **Plastic Surgery** | **Urology** | **Vascular Surgery** | **Total** |
| **Case Note Review** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Sufficient information provided** | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **4** |
| **Should an operation have been performed** | 4 | 3 | 2 | 0 | 3 | 0 | 1 | 0 | 0 | 1 | **14** |
| **Preoperative management issues** | 4 | 5 | 3 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | **16** |
| **Intraoperative management issues** | 4 | 5 | 3 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | **16** |
| **Postoperative management issues** | 3 | 3 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | **9** |
| **Decision to operate at all** | 3 | 2 | 2 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | **10** |
| **Choice of operation** | 4 | 3 | 4 | 1 | 3 | 0 | 1 | 0 | 0 | 0 | **16** |
| **Timing of operation** | 2 | 4 | 3 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | **13** |
| **Grade of surgeon** | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | **3** |
| **Risk of death** | 2 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | **8** |
| **Treated In Critical Care Unit** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Clinical management issues** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Total Differences** | **28** | **27** | **22** | **5** | **19** | **0** | **4** | **2** | **0** | **2** | **109** |

*Table 7: Number of blank fields in the validation source form fields*

Cases recorded here are the numbers of blank fields in the validation assessment.

| | Specialty | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Areas Assessed** | **Cardiothoracic Surgery** | **General Surgery** | **Neurosurgery** | **Obstetrics & Gynaecology** | **Orthopaedic Surgery** | **Otolaryngology Head and Neck** | **Paediatric Surgery** | **Plastic Surgery** | **Urology** | **Vascular Surgery** | **Total** |
| **Case Note Review** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Sufficient information provided** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Should an operation have been performed** | 2 | 9 | 2 | 1 | 3 | 0 | 0 | 0 | 0 | 1 | **18** |
| **Preoperative management issues** | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | **6** |
| **Intraoperative management issues** | 1 | 5 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | **9** |
| **Postoperative management issues** | 2 | 7 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | **12** |
| **Decision to operate at all** | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | **7** |
| **Choice of operation** | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | **6** |
| **Timing of operation** | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | **8** |
| **Grade of surgeon** | 1 | 7 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | **11** |
| **Risk of death** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| **Treated In Critical Care Unit** | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | **3** |
| **Clinical management issues** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Total Differences** | **7** | **49** | **2** | **1** | **7** | **0** | **0** | **7** | **0** | **8** | **81** |

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