

The Western Australian Audit of Surgical Mortality (WAASM)

2017 REPORT



ROYAL AUSTRALASIAN
COLLEGE OF SURGEONS



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CHAIRMAN'S REPORT

It is 15 years since the Western Australian Audit of Surgical Mortality (WAASM) commenced and a number of changes have been made to refresh this report. Notably, it has had a face-lift, with more use of infographics to make for quicker, simpler reference in the Executive Summary. The credit for this lies with the WAASM staff and I congratulate them.

The dominant themes of the WAASM's activities in 2016 were end of life matters and futile care. These themes have been reported, in terms of reasons for no operation, in every previous WAASM report. The overwhelming conclusion is that this is not very well managed. We all, and this includes the WAASM, need to give this matter greater attention.

The standout event of 2016 was the WAASM symposium on 'Futile Care and End of Life Matters'. This was very well received by a capacity audience of over 200 attendees. As this is a topic of considerable current public interest, a media representative from The West Australian, was invited to attend and subsequently wrote two follow-up articles. A presentation summarising the symposium was delivered at the Annual Scientific Congress (ASC) in Adelaide in May 2017. A full recording of the symposium is available on the WAASM website, and for those unable to attend this, merits attention.

Saving lives has always been a surgeon's *raison d'être* and end of life care is a matter to which we have traditionally given less attention. It is now a high priority. The Australian Commission on Safety and Quality in Healthcare has published a National Consensus Statement. The week before the ASC, it was the subject of the leading report in the *Economist* magazine. Of interest, several of the invited non-medical speakers at the symposium raised the cost of futile care and the responsibility of all in recognising and managing this.

The importance of improving end of life care was emphasised in the prospective 12-week Perth Emergency Laparotomy Audit (PELA) which the Western Australian (WA) general surgeons undertook at the end of 2016. Although this was not conducted under the auspices of the WAASM, and the PELA was directed to general surgeons, there are widespread lessons for all surgeons, hospitals and indeed the WAASM. These lessons are considered in section nine of this report.

Two points deserve particular emphasis here. The first is that the initial PELA proposal was widely endorsed by the WA general surgeons, who readily took part despite the lack of Qualified Privilege (QP). It is difficult to believe this would have occurred 15 years ago and it is a reflection of the changed attitudes that have occurred over this period. The WAASM has been fundamental in generating that change and trust. The second is that all previous emergency laparotomy audits have acknowledged that a significant limitation in their reports has been the lack of denominator data, that is, patients admitted with an acute abdomen who died without a laparotomy. The WAASM has data on all patients with an acute abdomen under the care of a general surgeon who did not have a laparotomy, and so the PELA has been able to address this deficiency. Australia, through the Australian and New Zealand Audit of Surgical Mortality (ANZASM), is probably the only country that can tackle this issue. The proportion of patients who died was surprisingly high, particularly in those over 80 years and at very high risk. Each year the WAASM has reported on futile care, in terms of reasons for no operation. This is relevant not only to all surgeons, but to all clinicians, and serves to emphasise the importance of learning from the symposium.

This report also outlines a project being undertaken jointly with the University of Western Australia (UWA). This project is using the ANZASM data to examine the impact of process and regulatory changes (section 10). It has considerable potential and the ANZASM data is an ideal and valuable test bed. The results will be fascinating.

At a national level, the role of the QP provided to the ANZASM has again been robustly debated. The Royal Australasian College of Surgeons (RACS) is under considerable pressure to promote safety and quality, and to be more open and transparent with its associated audits. Many perceive QP as being a hindrance to transparency, and question why the ANZASM is protected by the privilege it affords. The clear implication is that if the RACS does not open itself to greater scrutiny, the jurisdictions will adopt a more proscriptive approach. The WA Department of Health has been leading discussions around the QP protection the ANZASM currently enjoys. The WA cancer audits, which are a direct consequence of previous WAASM reports, are not protected by QP.

Until this year, all ANZASM activities have been covered by QP. It has now been agreed by the RACS that the WAASM can advise the WA Department of Health of deaths it has processed. The WA Department of Health can then match these deaths against their data collections to confirm those that have been reviewed via the WAASM. Under QP, the WAASM cannot provide the names of the participating surgeons or the information that is contained in the reports by the surgeons and assessors and there is no suggestion this is being contemplated. At present, the place of QP generally remains under active discussion.

There is increasing evidence that open publication improves outcomes, and there is, and will be, increasing patient and public demand. This is not an unreasonable request given that patients and taxpayers pay for health care. However, decisions about their health are based on less information than they can obtain when considering the purchase of a camera, car or a holiday. In general, Australia has been slow to respond to this demand for open publication. That this topic has been discussed by the WA Clinical Senate this year is testimony to how matters are changing. Surgeons have everything to gain by being closely involved with the inevitable changes, and a huge amount to lose if they resist.

RJ Aitken
Chairman, WAASM

SHORTENED FORMS

AHD	advance health directive
ANZASM	Australian and New Zealand Audits of Surgical Mortality
ASA	American Society of Anesthesiologists
CCU	critical care unit
CNR	case note review
CPD	continuing professional development
DVT	deep vein thrombosis
FLA	first-line assessment
HDU	high dependency unit
ICU	intensive care unit
MET	medical emergency team
NELA	national emergency laparotomy audit
PELA	Perth emergency laparotomy audit
QP	qualified privilege
RAAS	Research, Audit and Academic Surgery
RACS	Royal Australasian College of Surgeons
SCF	surgical case form
SLA	second-line assessment
UWA	University of Western Australia
WA	Western Australia
WAASM	Western Australian Audit of Surgical Mortality

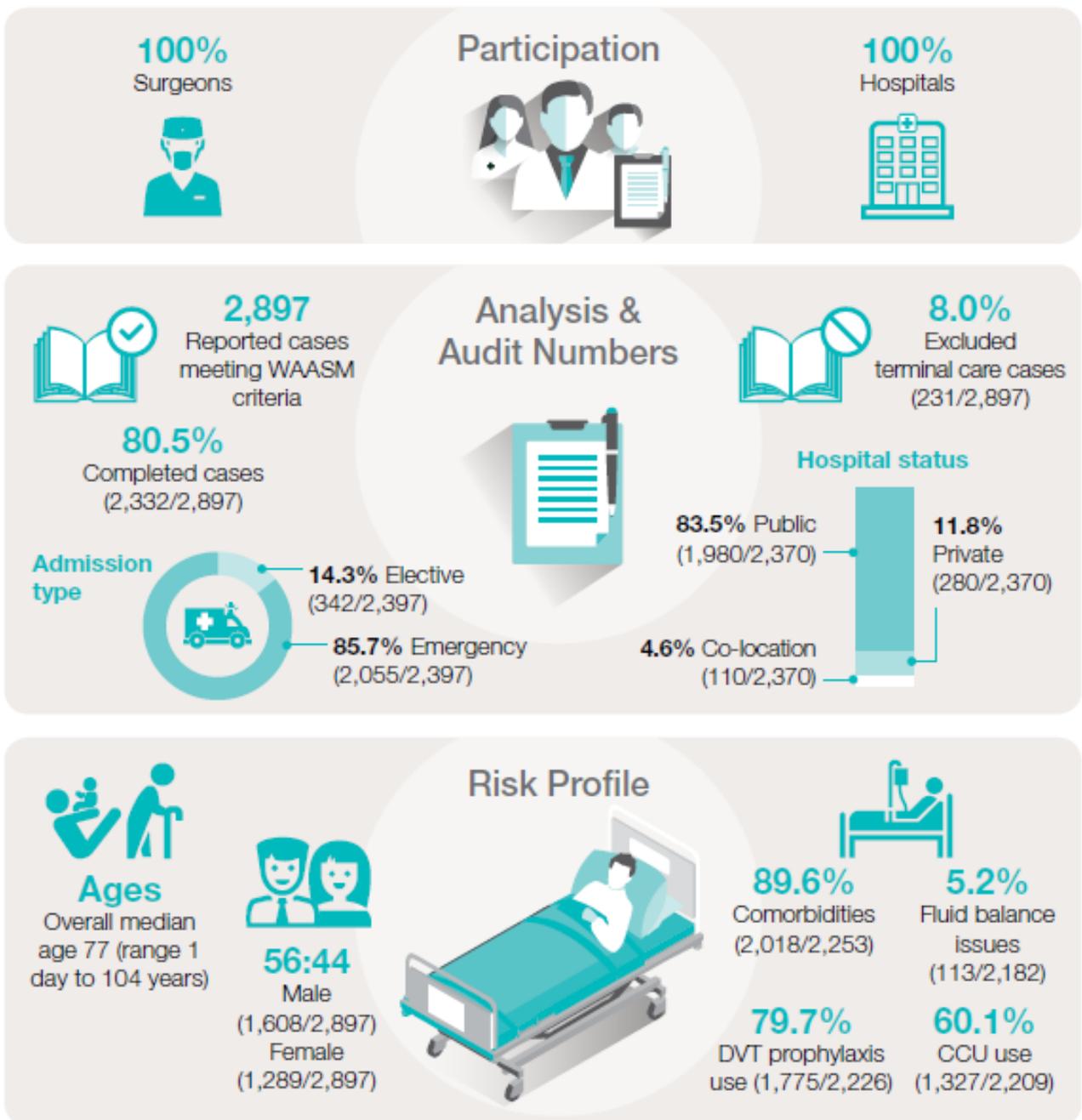
EXECUTIVE SUMMARY

Background

The WAASM is an external, independent, peer-reviewed audit of the process of care associated with surgically-related deaths in Western Australia (WA). The WAASM was established in 2001, is funded by the WA Department of Health and has protection under federal legislation.

Reporting period

The data analysed for this report covers cases reported to the WAASM from **1 January 2012 to 31 December 2016**. Please note that the denominator may sometimes change in this report. This is mainly due to questions left unanswered by surgeons, which result in missing data.





Patient Transfers



28.8%
Patients transferred
(632/2,191)

7.6%
Delay in transfer
(44/582)

4.8%
Inappropriate transfer
(28/587)

2.5%
Inappropriate level of care
(14/554)

6.7%
Insufficient clinical information
(37/553)

65.7%
Patients that had surgery
(1,596/2,428)

15.5%
Unplanned returns to theatre
(235/1,513)

Operations



84.5%
Surgeons who made the decision to operate
(1,907/2,256)

5.4%
Operations abandoned on finding a terminal situation
(104/1,920)

62.0%
Consultant surgeons who performed surgery
(1,398/2,256)



Infection



31.9%
Patients with clinically significant infection
(584/1,829)

Most common infections

40.2%
Pneumonia
(233/580)

26.9%
Septicaemia
(156/580)

19.3%
Intra-abdominal sepsis
(112/580)



14.3%
Cases referred to SLA
(341/2,377)

Peer Review Outcomes



13.1%
Adverse events
(77/588)

60.8%
Adverse events that caused death
(45/74)



25.2%
Clinical management issues
(588/2,332)



33.3%
Definitely preventable adverse events that caused death
(15/45)

RECOMMENDATIONS

The WAASM makes the following recommendations:

Audit management

- Collaborate closely with the WA regional office during the WA, SA and NT Annual Scientific Meeting (August 2017) to further raise awareness of the audits of surgical mortality.
- Continue to maintain and promote the mandatory use of the Fellows Interface (online platform) for submission of surgical case forms (SCFs) and first-line assessments (FLAs), and provide support and assistance to WA surgeons throughout the process.
- Participate in the ANZASM's development and testing of ongoing enhancements to the Fellows Interface and the National Audit System. These improvements include: migrating the Fellows Interface to the newer, more secure Delegate's Interface format; viewing the FLA form and the SCF adjacently on screen for ease of assessment completion; and the ability for surgeons working in multiple regions to switch locations at time of login.
- Maintain the high return rate of SCFs (98.6%; 573/581) set in 2015.

Research and reporting on audit data

- Finalise and produce a two page hospital performance summary report that identifies trends in potentially preventable mortalities covering a five- year period and distribute to the WA Department of Health and private hospitals.
- Continue to progress the joint initiative between the WAASM and the UWA, which aims to utilise the ANZASM data to examine the impact of process and regulatory changes on audit data quality.

Clinical management

- Initiate a formal and close collaboration with WA anaesthetists; thereby ensuring that cases with potential anaesthetic components are identified and reviewed.
- Monitor trends in the proportion of surgical patients who die from clinically significant infections for the next two years. Between 2013 and 2016, clinically significant infections were reported in 31.9% (584/1,829) of cases. Pre-admission infections comprised 45.7% (258/564) and infections acquired during admission were reported for 54.3% (306/564) of cases.
- Monitor trends in the proportion of preoperative diagnostic delays reported by treating surgeons, given the potential impact on mortality. Between 2012 and 2016, such preoperative delays were reported in 6.3% (141/2,221) of surgical mortalities.

Education

- Disseminate audit findings through reports and publications.
- Following a successful 12 week pilot study on emergency laparotomies in WA, and increasing national interest, conduct a symposium on 'The Perth Emergency Laparotomy Audit – Where to Now?' in conjunction with the 2017 WA, SA and NT Annual Scientific Meeting.

1. INTRODUCTION

1.1 Background

The WAASM is an external, independent, peer-reviewed audit of the process of care associated with surgically-related deaths in WA. The project is funded by the WA Department of Health.

The WAASM commenced in June 2001 as a pilot study under the management of the UWA. In 2005, the WAASM's management was transferred to the Research, Audit and Academic Surgery (RAAS) division of the RACS. In the same year, the RACS formed the ANZASM with the purpose of establishing similar mortality audits in other states and territories. All Australian states and territories are now participating.

1.2 Objectives

The objective of the audit is to improve the safety and quality of surgical care through a peer review process. A vital part of the process is the provision of feedback and information to surgeons, with the aim of educating, facilitating change and ultimately, improving practice. The audit is a patient safety and quality initiative designed to highlight emerging trends in outcomes from surgical care and system errors. Its focus is on education and performance improvement.

1.3 Structure and governance

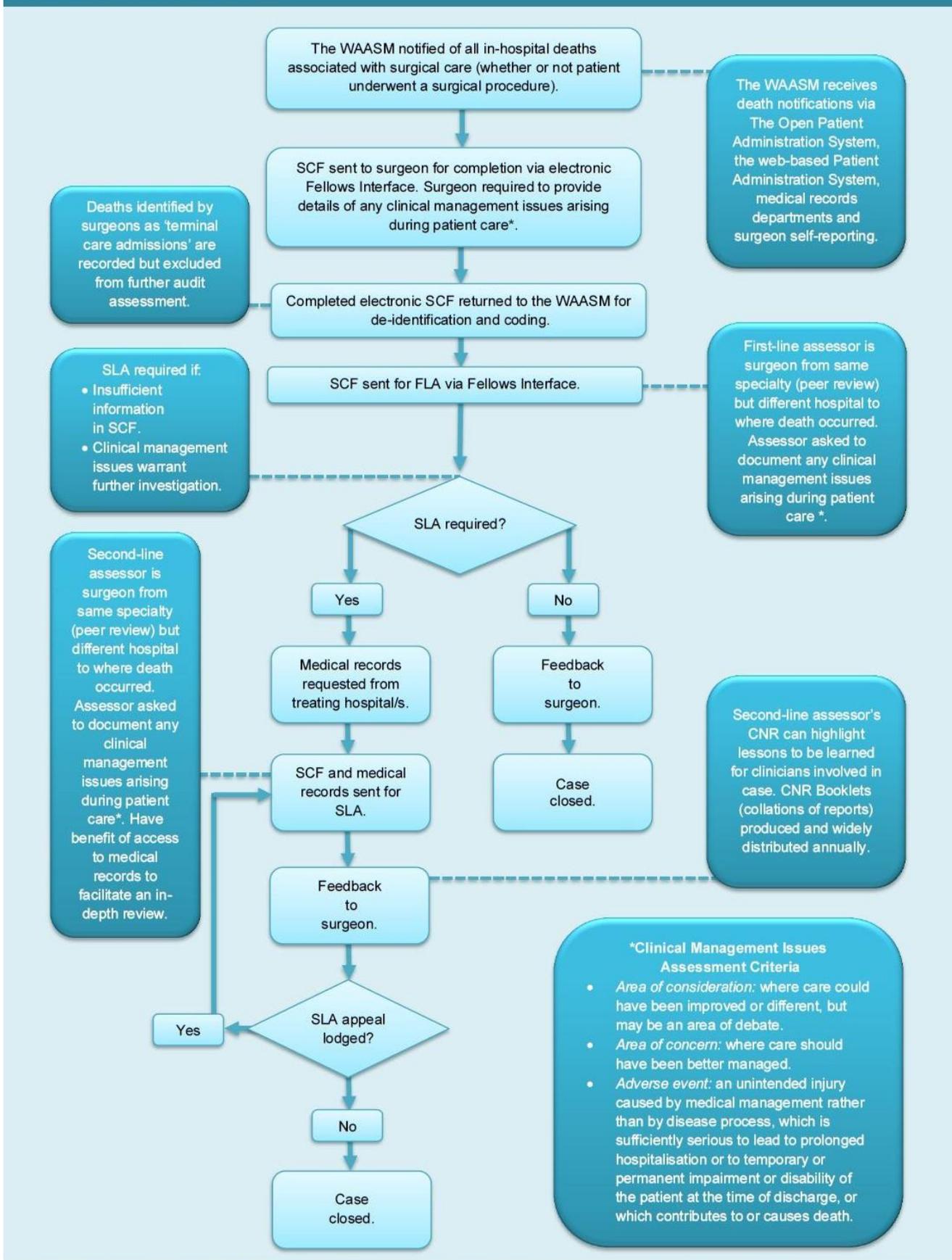
The WAASM project falls under the governance of the ANZASM. The WAASM governance structure is illustrated in Figure 1. The WAASM receives protection under the Commonwealth Qualified Privilege Scheme, part VC of the *Health Insurance Act 1973* (gazetted 25th July, 2016).



1.4 Audit process

The WAASM audit process is outlined below (Figure 2).

Figure 2: WAASM audit process



WAASM: Western Australian Audit of Surgical Mortality; SCF: Surgical Case Form; FLA: First-line Assessment; SLA: Second-line Assessment; CNR: Case Note Review

1.5 Data analysis

The WAASM audits all deaths occurring in WA hospitals while the patient was under the care of a surgeon. Terminal care cases are excluded from the full audit process. The 2017 report covers deaths reported to the WAASM from 1 January 2012 to 31 December 2016, censored on 31 March 2017. The full audit process can take up to 3 months or more from notification of death to completion. Some 2016 cases were still under review as of the census date, and the case outcomes were not available for this report. Numbers in previous reports may vary from this report because some cases were completed after the census dates of the previous reports.

Data is entered and stored in the Bi-national Audit System database and analysed using the Statistical Package for Social Sciences (version 24), and Microsoft Office Excel (2010). The total number of cases used in the analyses may vary as each data point may not have been completed for every case reported.

2. AUDIT OVERVIEW

- 2,897 deaths met the WAASM criteria during the five year reporting period.
- 80.5% (2,332/2,897) of cases completed the entire audit process.
- There was a 7.5% decrease in deaths under a surgeon per 100,000 population over the five year reporting period.
- 92.0% of SCFs were returned during the five year reporting period.
- 29 hospitals were associated with the 2,897 cases that met the WAASM criteria.

2.1 Audit numbers

Participation in the WAASM has been a mandatory requirement since 2010 and monitored through RACS CPD since 2013. During the period 1 January 2012 to 31 December 2016, the WAASM was notified of 2,980 deaths. Of these, 2,897 met the WAASM criteria (see Table 1).

Audit period	Deaths reported	Excluded error [*]	Deaths meeting WAASM criteria
2012	601	9	592
2013	593	27	566
2014	598	20	578
2015	596	15	581
2016	592	12	580
Total	2,980	83	2,897

^{*} Cases reported as WAASM deaths that do not fall within the WAASM inclusion criteria
 WAASM: Western Australian Audit of Surgical Mortality.
 Refer to Appendix A.3 for further information on data.

Deaths that occur while a patient is under the care of a surgeon are reported to the WAASM by the WA Department of Health and the hospital medical record department. The surgeon involved in the care of the patient can now also self-report the death using the online Fellows Interface. Over the reporting period, the WAASM has observed an overall relative decrease of 7.5% (23.9 in 2012 to 22.1 in 2016) in the rate of deaths under a surgeon per 100,000 population (see Table 2).

Audit period	Deaths falling within WAASM criteria	Estimated WAASM reported surgical mortality rate per 100,000 population ¹
2012	592	23.9
2013	566	22.3
2014	578	22.5
2015	581	22.3
2016	580	22.1

WAASM: Western Australian Audit of Surgical Mortality
 Refer to Appendix A.3 for further information on data.

Cases are left open for two years from the notification of death. As at the census date, 80.5% (2,332/2,897) of cases had completed the entire audit process. There were 5.2% (152/2,897) of cases pending and a large proportion of these came from 2016 (4.3%; 126/2,897). While the 2016 audit period has a higher number of pending cases, it is expected that this number will decrease and become more in line with the earlier years as more of these cases are finalised. A total of 14.3% (413/2,897) of cases were excluded from the audit as a result of terminal care admissions, being treated by surgeons not participating in the audit (for the year 2012) or being lost to follow-up (see Figure 3).



Patients admitted under the care of a surgeon with a decision made after investigations for terminal care were excluded from the full audit process and this accounted for 8.0% (231/2,897) of cases during the reporting period. The return rate for SCFs during the reporting period was 92.0% (2,665/2,897). There were 91.3% (2,434/2,665) of SCFs sent for FLA.

The FLA is a critical assessment and many cases can be closed at this point if the treating surgeon supplies adequate information in the SCF. Figure 4 shows the breakdown of FLAs returned by year. The rate of FLA returns over the reporting period was 97.7% (2,377/2,434).



Some cases need to undergo further review and are therefore referred for an SLA. The need for an SLA may be due to the treating surgeon not supplying adequate information for the first-line assessor to be able to make a judgement, or the first-line assessor being of the view that the case needs to be investigated further. Of the 2,377 FLAs returned over the reporting period, 14.3% (341/2,377) were referred for an SLA. Table 3 shows the breakdown of cases referred for an SLA by year.

Table 3: Second-line assessments

Audit period	FLAs returned	Cases referred for SLA	%
2012	457	70	15.3
2013	494	76	15.4
2014	534	75	14.0
2015	478	70	14.6
2016	414	50	12.1
Total	2,377	341	14.3

FLA: First-line Assessment; SLA: Second-line Assessment.
Refer to Appendix A.3 for further information on data.

2.2 Surgeon participation

All active surgeons in WA are currently participating in the WAASM. As at December 2016, 69.1% (344/498) of surgeons used the Fellows Interface for completing and submitting SCFs and FLAs. The Fellows Interface is a web-based application developed by the RACS specifically for the audits of surgical mortality. It is intended to be a faster, more efficient and convenient way to complete forms.

Table 4: Surgeon involvement in deaths meeting WAASM criteria

Audit period	Deaths meeting WAASM criteria	SCF returns*	%	Surgeons associated with SCF returns
2012	592	475	80.2	152
2013	566	520	91.9	159
2014	578	565	97.8	168
2015	581	573	98.6	169
2016	580	532	91.7	194

*Includes terminal care cases.
SCF: Surgical Case Form; WAASM: Western Australian Audit of Surgical Mortality.
Refer to Appendix A.3 for further information on data.

The SCF return rate has improved over the years, with an overall rate of 92.0% (2,665/2,897). While the 2016 audit period currently has a slightly lower return rate, it is expected that this will increase to become more in line with the earlier years as additional cases are finalised. There has also been a steady increase in the number of surgeons associated with returned SCFs (see Table 4).

It is worth noting that since 1 January 2017, the WAASM mandated the online submission of SCFs and FLAs. Currently 99.4% (483/486) of surgeons use the Fellows Interface to complete and submit SCFs and FLAs.

Table 5: Deaths meeting WAASM criteria by specialty

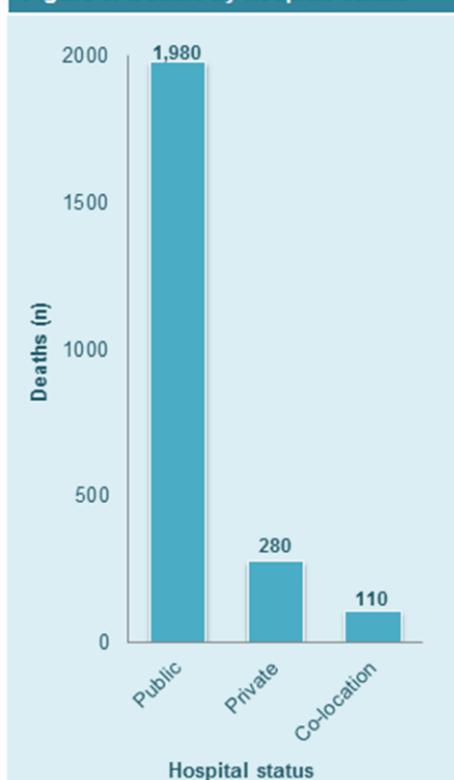
Surgical specialty	Number of cases	%
General Surgery	987	39.4
Neurosurgery	464	18.5
Orthopaedic Surgery	446	17.8
Vascular Surgery	235	9.4
Cardiothoracic Surgery	193	7.7
Urology	81	3.2
Plastic Surgery	55	2.2
Otolaryngology Head & Neck Surgery	27	1.1
Obstetrics & Gynaecology	6	0.2
Paediatric Surgery	5	0.2
Ophthalmology	4	0.2

WAASM: Western Australian Audit of Surgical Mortality.
Refer to Appendix A.3 for further information on data.

Table 5 shows the number of cases reported to the WAASM from each surgical specialty (where the information was provided on the SCF). General Surgery reported the most deaths at 39.4% (987/2,503), followed by Neurosurgery with 18.5% (464/2,503).

2.3 Hospital participation

All eligible hospitals in WA where surgery is performed currently participate in the audit (52 hospitals). Over the reporting period, there were 29 hospitals associated with the 2,897 cases meeting the WAASM criteria.

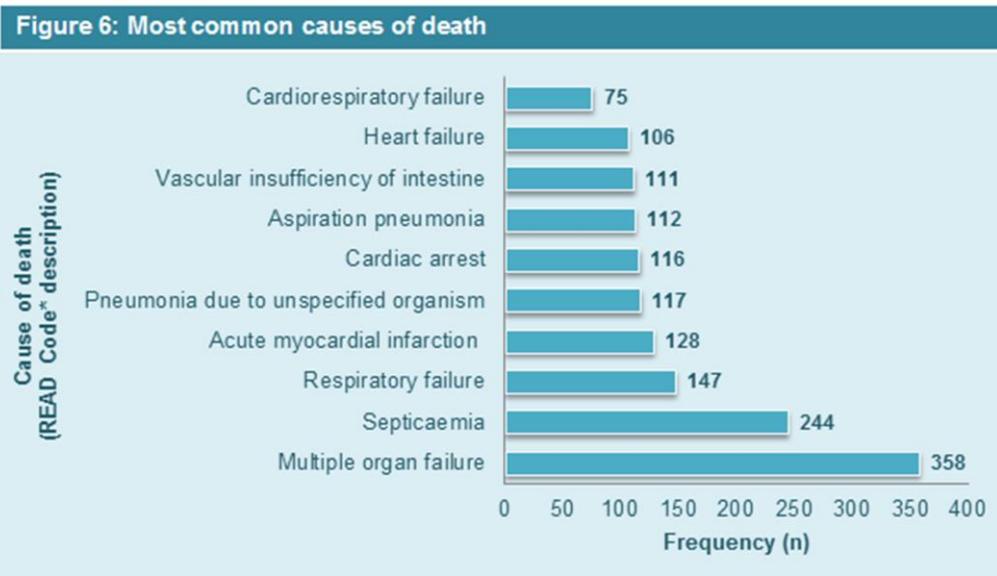
Figure 5: Deaths by hospital status

Refer to Appendix A.2 for further information on data.

Figure 5 shows the number of patients admitted to public, private or co-location hospitals (where the information was provided on the SCF). Public hospitals accounted for over three-quarters (83.5%; 1,980/2,370) of admissions, while private and co-location hospitals had 11.8% (280/2,370) and 4.6% (110/2,370) of admissions respectively.

2.4 Causes of death

The cause of death is recorded in the SCF by the treating surgeon. This is based on the diagnosis of the patient during the last admission, taking into account test results, operations and post mortem reports when available. The most frequent causes of death were multiple organ failure, septicaemia, respiratory failure, acute myocardial infarction and pneumonia (see Figure 6). Some cases have more than one cause of death listed.



*READ Code: Surgical diagnoses categorised using coded thesaurus of clinical terms (READ Codes). READ Codes are a clinical decision tree that contains terms, synonyms, and abbreviations covering all aspects of patient care. It is a precursor to ICD9 coding. Refer to Appendix A.2 for further information on data.

3. DEMOGRAPHICS

- Males comprised 55.5% and females 44.5% of surgical deaths over the five year reporting period.
- The median age at death was 77 years.
- Most surgical mortalities occurred in males and females aged 81-90 years.
- There was a 2.5% increase in the proportion of surgical mortalities in private hospitals over the five year reporting period.
- During the five year reporting period, emergency admissions were 85.7% and elective admissions were 14.3%.

3.1 Age and gender distribution

This section gives an overview of patient demographics over the reporting period.

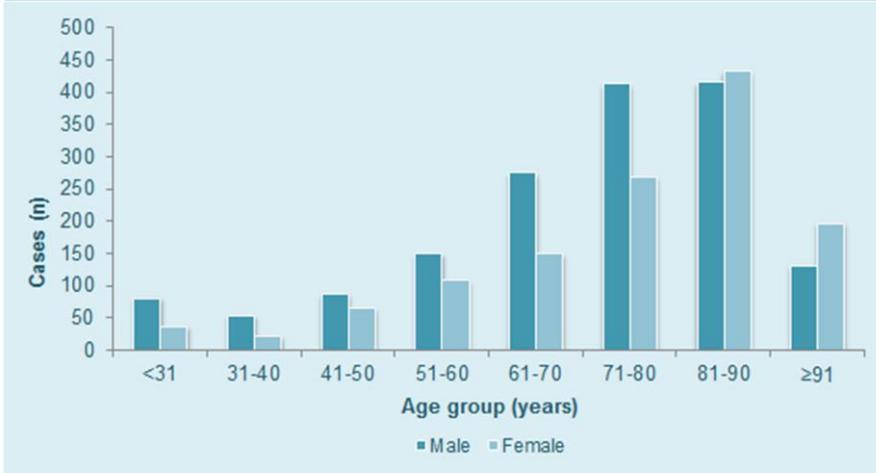
Table 6: Median age by gender

Gender	Number of cases	Median age (years)	Interquartile range (years)
All patients	2,897	77	64-86
Males	1,608	75	62-84
Females	1,289	80	67-88

Refer to Appendix A.3 for further information on data.

The median age at death for all patients was 77 years (interquartile range, 64-86). Males comprised 55.5% (1,608/2,897) and females 44.5% (1,289/2,897) of all deaths (see Table 6).

Figure 7: Cases by age group and gender

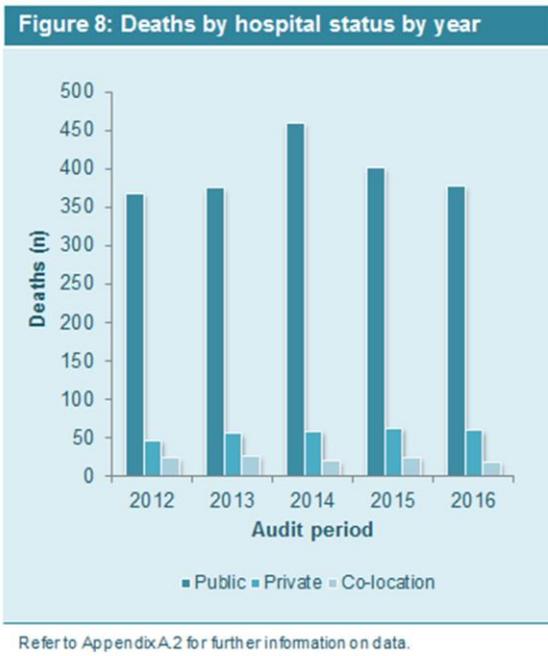


Refer to Appendix A.2 for further information on data.

Most surgical mortalities occurred in males and females between 81 to 90 years of age (Figure 7). There was a change in the gender trend as age increased. Males predominated in the first six age categories (from the aged less than 31 years group to the 71 to 80 year group), while females predominated in the last two categories (81 to 90 years, and greater than 91 years).

3.2 Hospital status

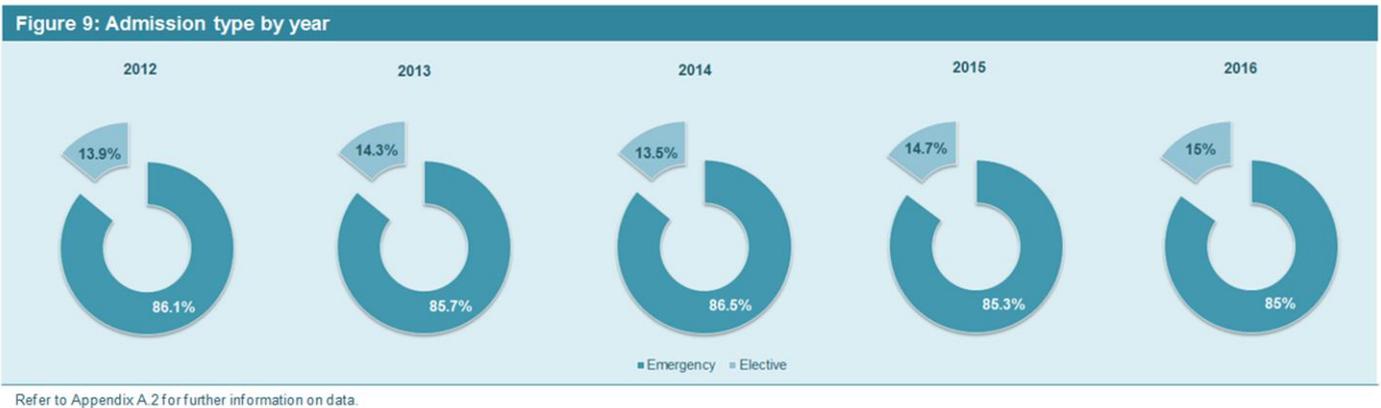
The status of hospital (public, private or co-location) to which patients were admitted is shown in Figure 8.



There was a 2.5% increase in the proportion of mortalities in private hospitals, from 10.5% (46/437) in 2012 to 13.0% (59/454) in 2016.

3.3 Admission type

The admission type of audited cases indicates whether patients were admitted as emergencies or electively (see Figure 9).



The majority of patients were admitted as emergencies for acute life-threatening conditions. Emergency admissions accounted for 85.7% (2,055/2,397) of all cases where data was available, with the remaining 14.3% (342/2,397) being elective admissions.

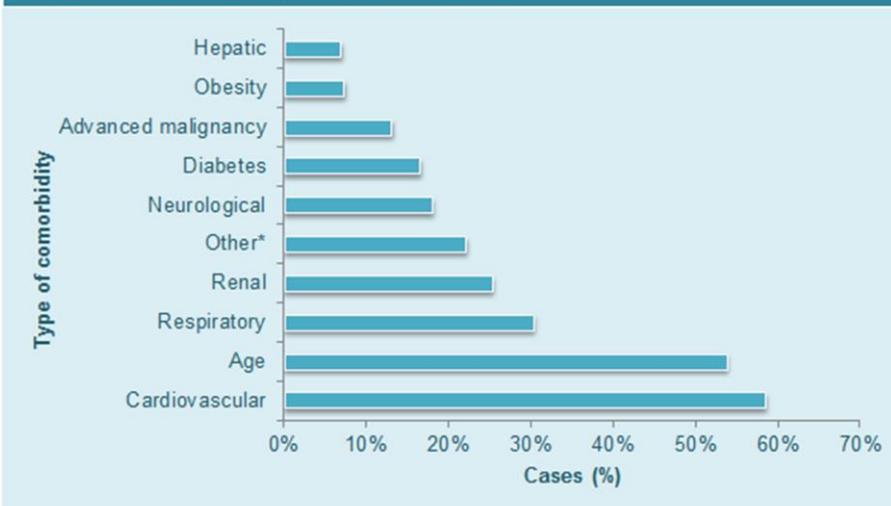
4. CLINICAL RISK PROFILE

- Over the five year reporting period, 89.6% of patients had one or more comorbidities.
- The most commonly assigned ASA Grade was grade 4 (43.4%).
- There was a preoperative diagnostic delay in 6.3% of cases over the five year reporting period.
- Of the 6.3% of cases with a preoperative diagnostic delay, 36.0% of cases were associated with the surgical unit.
- During the five year reporting period, 5.2% of patients had fluid balance issues.

4.1 Comorbidities

Surgeons were asked on the SCF to indicate if there were any known significant co-existing factors (comorbidities) associated with each patient. A patient could have one or more comorbidities associated with an increased risk of death (see Figure 10).

Figure 10: Cases with specific comorbidities



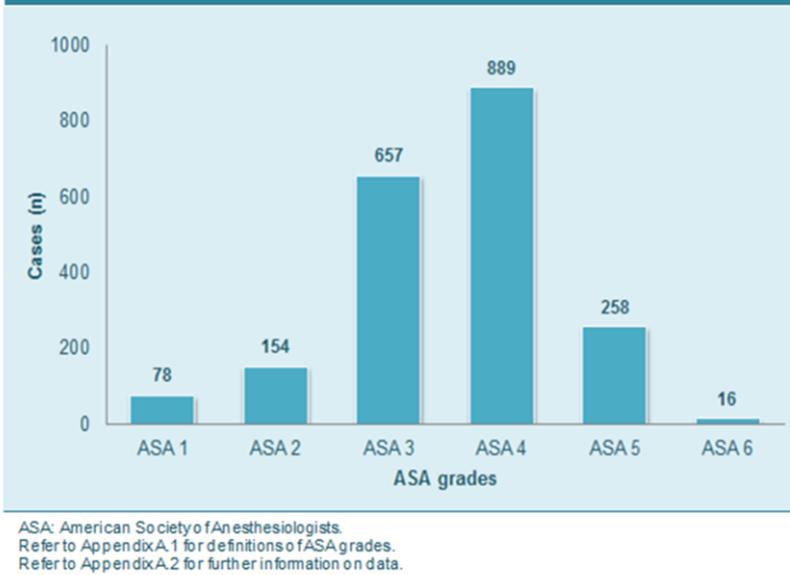
*Other includes comorbidities other than those listed on the surgical case form and may include the presence of other chronic illnesses, haematological or drug-related conditions, vasculopathy, hypertension, dementia, malnutrition, alcoholism and cachexia. Refer to Appendix A.2 for further information on data.

Nearly all patients (89.6%; 2,018/2,253) had at least one significant comorbidity that increased their risk of death. The most frequently occurring comorbidities were cardiovascular disease (58.5%; 1,317/2,253), advanced age (53.8%; 1,211/2,253) and respiratory disease (30.3%; 683/2,253).

4.2 American Society of Anesthesiologists grades

The American Society of Anesthesiologists (ASA) grade is an internationally recognised measure of a patient's preoperative physical status. It is a simple but important indication of the overall health status of a patient. ASA grade definitions can be found in Appendix A.1.

Figure 11: Frequency of A SA grades

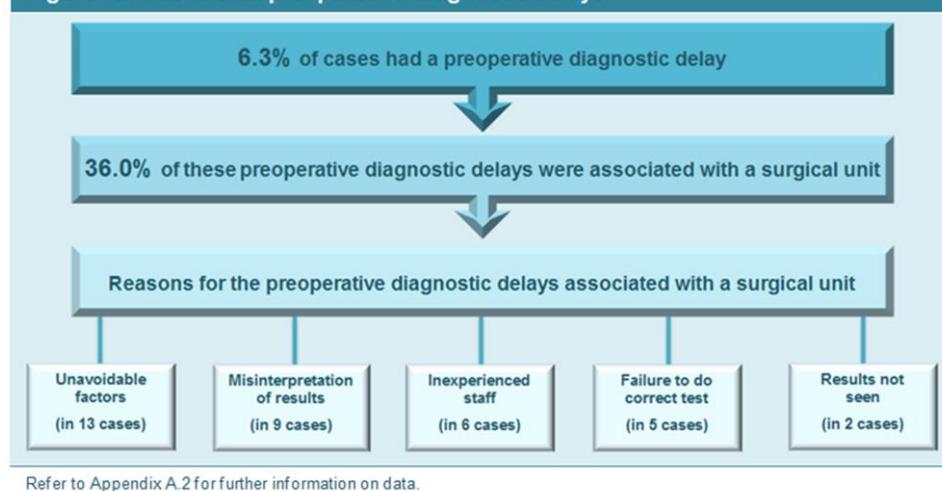


Patients were assigned ASA grade 4 (severe degree of systemic disease) in 43.4% (889/2,050) of cases. ASA grade 3 (moderate degree of systemic disease) was the second most commonly assigned ASA grade (32.0%; 657/2,050).

4.3 Preoperative diagnostic delays

Surgeons were asked to indicate if there was a preoperative delay in the confirmation of the main surgical diagnosis. There may be many reasons for delay, and delays in diagnosis may be associated with the surgical unit, medical unit, general practitioner or emergency department.

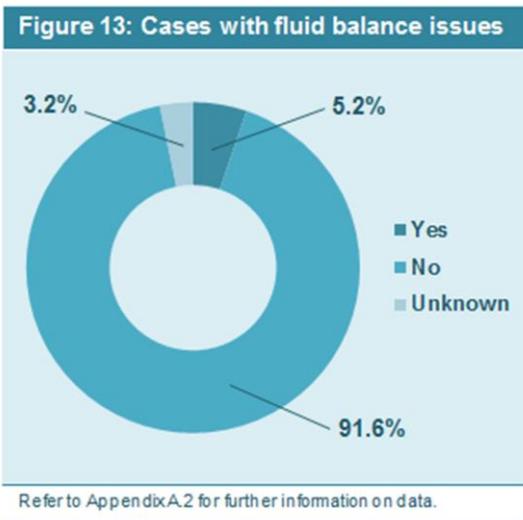
Figure 12: Cases with preoperative diagnostic delays



Overall, a preoperative delay in diagnosis was indicated by the treating surgeon in 6.3% (141/2,221) of cases, and of these delays, 36.0% (36/100) were associated with the surgical unit.

4.4 Fluid balance

Fluid balance issues can be quite difficult to manage, especially in frail, elderly patients (see Figure 13).



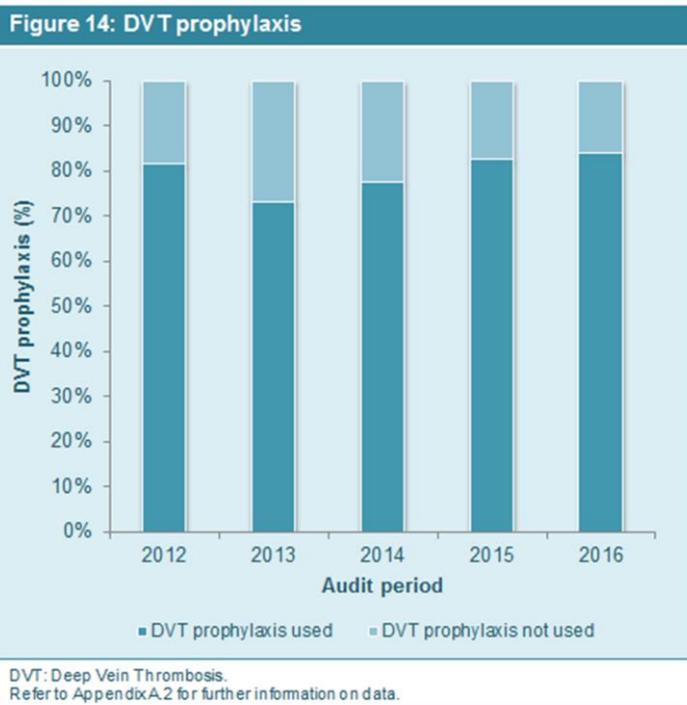
Over the reporting period, the treating surgeon indicated that there was an issue with fluid balance in 5.2% (113/2,182) of cases. It was observed that there were more fluid balance issues in operative cases (6.1%; 92/1,510) than in non-operative cases (3.1%; 21/669).

5. CLINICAL RISK MANAGEMENT

- Over the five year reporting period, 79.7% of patients received DVT prophylaxis.
- Heparin was the most frequently used DVT prophylaxis agent (42.4%).
- During the five year reporting period, 39.9% of patients did not receive critical care support.

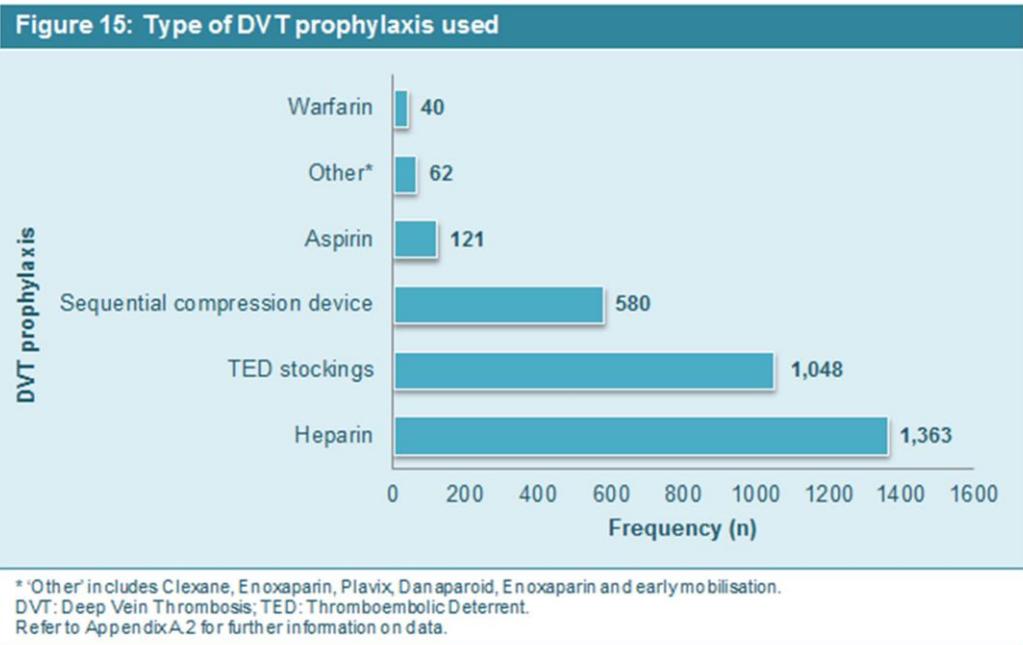
5.1 Deep vein thrombosis prophylaxis

Treating surgeons are asked on the SCF whether deep vein thrombosis (DVT) prophylaxis was used and, if not, the reason it was withheld. Figure 14 shows the breakdown of use and non-use of DVT prophylaxis by year.



Overall, DVT prophylaxis was used in 79.7% (1,775/2,226) of cases. In the 20.3% (451/2,226) of cases in which it was not used, it was because it was not appropriate (69.0%; 271/393), there was an active decision to withhold it (28.8%; 113/393) or it was not considered (2.3%; 9/393).

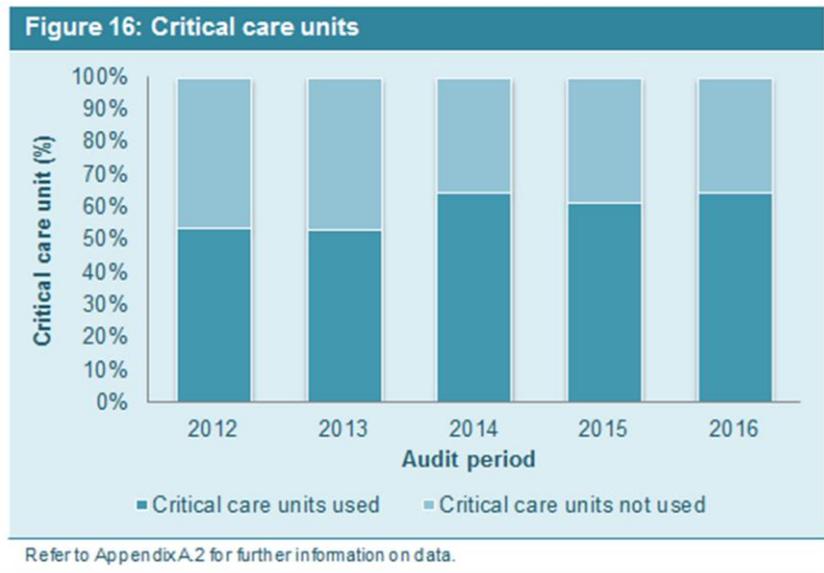
The treating surgeon is also asked to record the type of DVT prophylaxis used. The frequency of use of the different types of DVT prophylaxis is illustrated in Figure 15.



More than one type of DVT prophylaxis agent was used for most patients. Heparin (42.4%; 1,363/3,214) and TED stockings (32.6%; 1,048/3,214) were the most frequently used prophylaxis agents.

5.2 Allocation of critical care units

The treating surgeon is asked to indicate whether or not a patient received support in a critical care unit (CCU) during the admission (see Figure 16). This includes care in either an intensive care unit (ICU) or high dependency unit (HDU).



Across the reporting period, CCUs were utilised in 60.1% (1,327/2,209) of cases. There has been a 10.7% (53.6%; 172/321 in 2012 to 64.3%; 294/457 in 2016) rate increase in the use of CCUs over the reporting period.

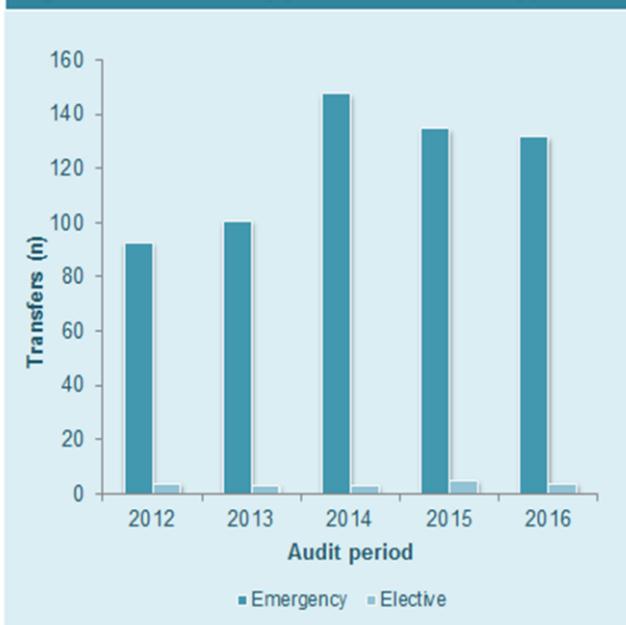
6. TRANSFERS

- During the five year reporting period, 28.8% of patients had a preoperative transfer.
- The greatest proportion of transfers occurred in emergency admissions (97.0%).
- Over the five year reporting period, 7.6% of cases had transfer issues related to 'delay in transfer'.

6.1 Frequency of transfers

Treating surgeons indicated that 28.8% (632/2,191) of patients had a preoperative transfer between hospitals. Such transfers occur in response to the need for a higher level of care or for specific expertise. Figure 17 shows the breakdown of transfers by year and admission type.

Figure 17: Transfers by year and admission type

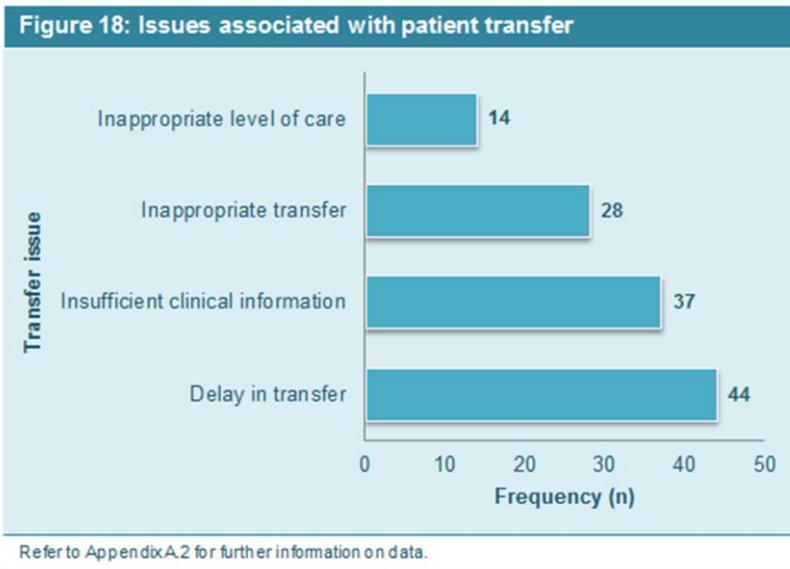


Refer to Appendix A.2 for further information on data.

The greater proportion of transfers occurred in emergency admissions (97.0%; 609/628). The frequency of elective admission transfers remained steady over the reporting period.

6.2 Transfer issues

There were no issues raised by the treating surgeons for the majority of transfers. Figure 18 shows the frequency of transfer issues raised by treating surgeons, with some cases having more than one issue.



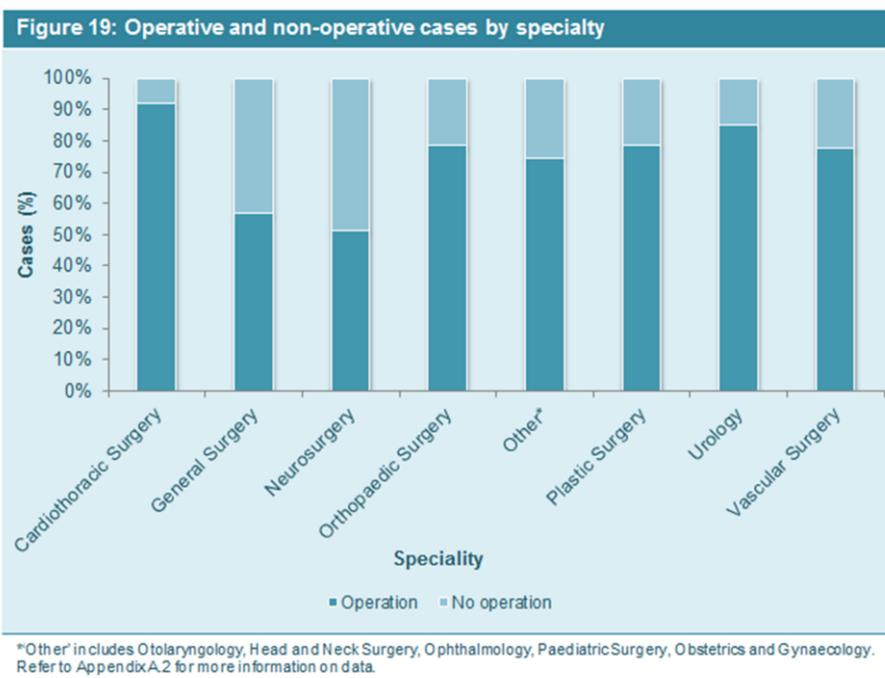
The most frequently reported transfer issue was 'delay in transfer' (7.6%; 44/582).

7. OPERATIVE AND NON-OPERATIVE DEATHS

- During the five year reporting period, 65.7% of patients had one or more operations.
- Of the 65.7% of patients that had operation(s), consultant surgeons made the decision to proceed to theatre in 84.5%.
- Of all operative patients, 34.2% had postoperative complications.
- Of the non-operative cases, 48.6% were associated with 'an active decision not to operate'.
- Between 2013 and 2016, a clinically significant infection was reported in 31.9% of patients.

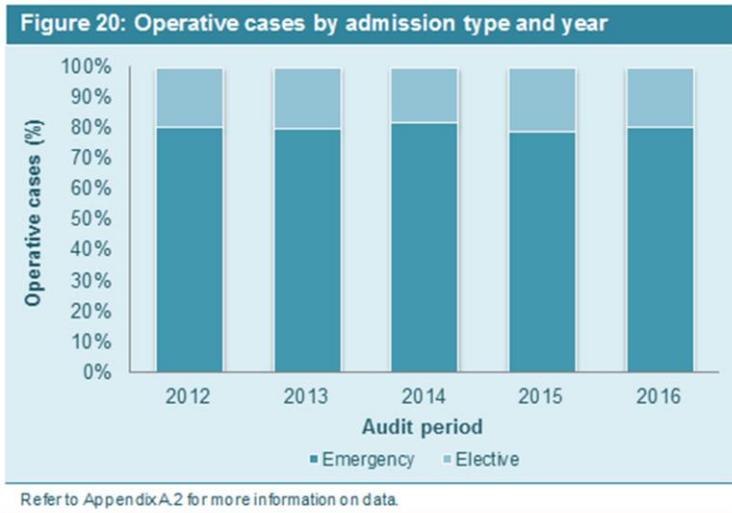
7.1 Operative cases

The majority of surgical patients admitted to hospitals undergo one or more surgical procedure. Figure 19 shows the breakdown of operative and non-operative cases by specialty.



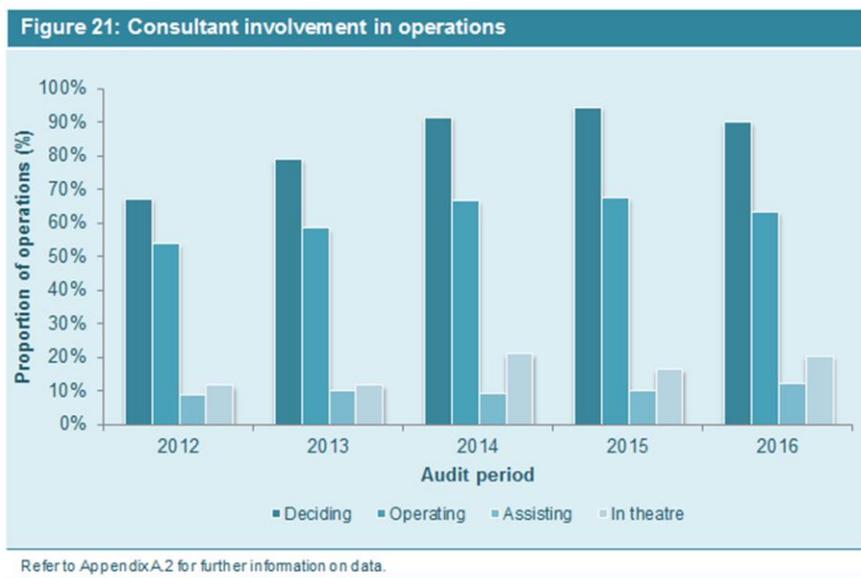
Overall, 65.7% (1,596/2,428) of patients had one or more operations. Cardiothoracic Surgery had the highest rate of cases in which an operation was performed (91.9%; 170/185) while Neurosurgery had the lowest rate (51.1%; 236/462).

The proportion of emergency and elective admissions involving an operation remained steady over the reporting period (see Figure 20). Overall, there were 2,256 surgical procedures performed on 1,596 patients.

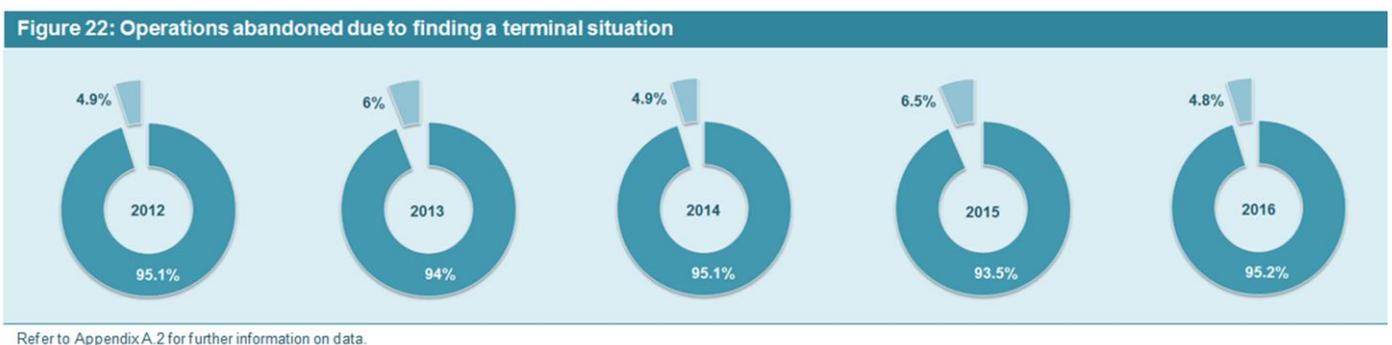


Over the reporting period, 80.2% (1,263/1,574) of patients that had one or more operation were admitted as an emergency.

In the SCF, consultant surgeons are asked to indicate their involvement in these procedures (see Figure 21).



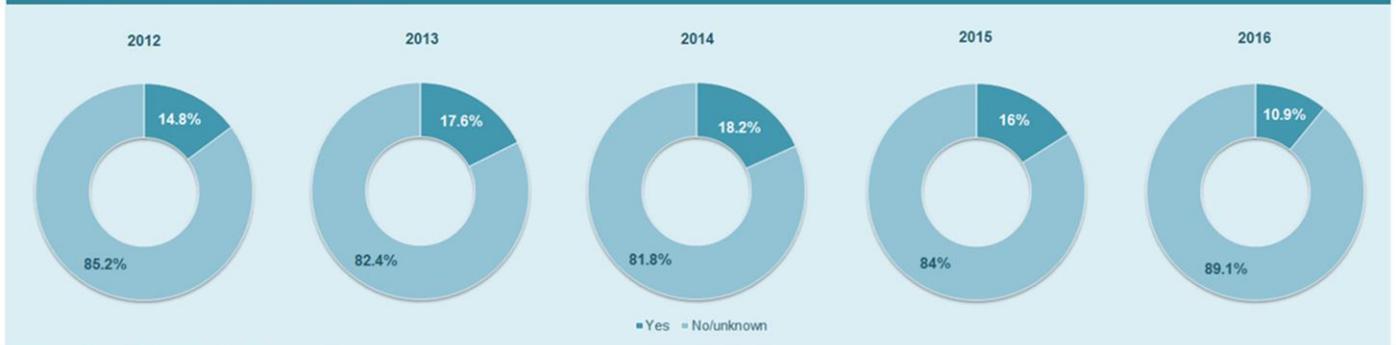
The consultant surgeon made the decision to proceed to surgery in 84.5% (1,907/2,256) of the reported procedures. A consultant surgeon operated in 62.0% (1,398/2,256) of reported procedures. The number of consultant surgeons deciding to proceed to theatre, as well as consultant surgeons operating has increased over the years.



A patient may have more than one procedure performed. Overall, an operation was abandoned on finding a terminal situation in 5.4% (104/1,920) of operative cases. This proportion has remained relatively steady over the reporting period.

The treating surgeon is asked to report on any unplanned returns to the operating theatre after an initial surgical procedure (see Figure 23). Unplanned returns to the operating theatre may indicate that there was a complication from the previous procedure.

Figure 23: Unplanned returns to theatre

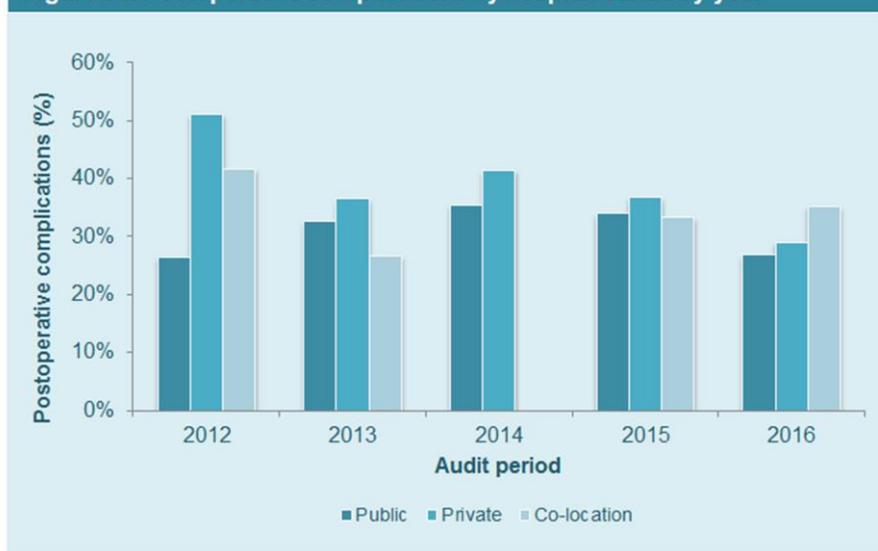


Refer to Appendix A.2 for further information of data.

Overall, 15.5% (235/1,513) of patients who underwent an operation had an unplanned return to theatre. The rate of unplanned returns to theatre has decreased over the reporting period. It should be noted that some 2016 cases have yet to complete the full audit process.

Many operative procedures are free of complications. However, when complications occur, it is considered a major contributor to surgical mortality. The treating surgeon is asked to report on any complications that occurred following an operative procedure. It is possible for a patient to have more than one postoperative complication. Figure 24 provides a breakdown of postoperative complications by hospital status and year.

Figure 24: Postoperative complications by hospital status by year



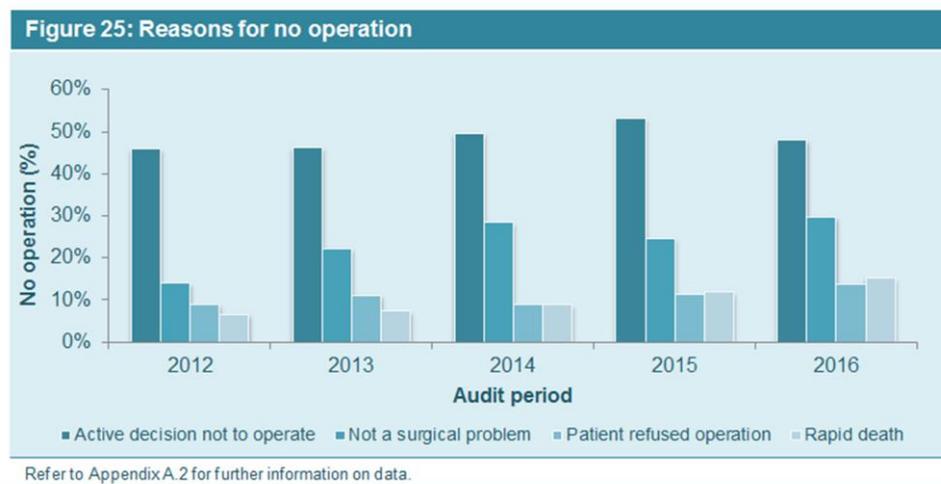
Refer to Appendix A.2 for further information on data.

Over the reporting period, 32.4% (517/1,596) of operative patients had a postoperative complication. There was a total of 622 complications amongst 517 operative patients. The most frequently reported postoperative complications were tissue ischemia, postoperative bleeding and sepsis.

Overall, postoperative complications were most frequently reported in private hospitals (38.4%; 99/258), followed by public hospitals (31.4%; 387/1,234) and then co-location hospitals (27.6%; 21/76). A higher proportion of elective patients (59.8%; 186/311) had a postoperative complication compared to emergency patients (25.9%; 327/1,263).

7.2 Non-operative cases

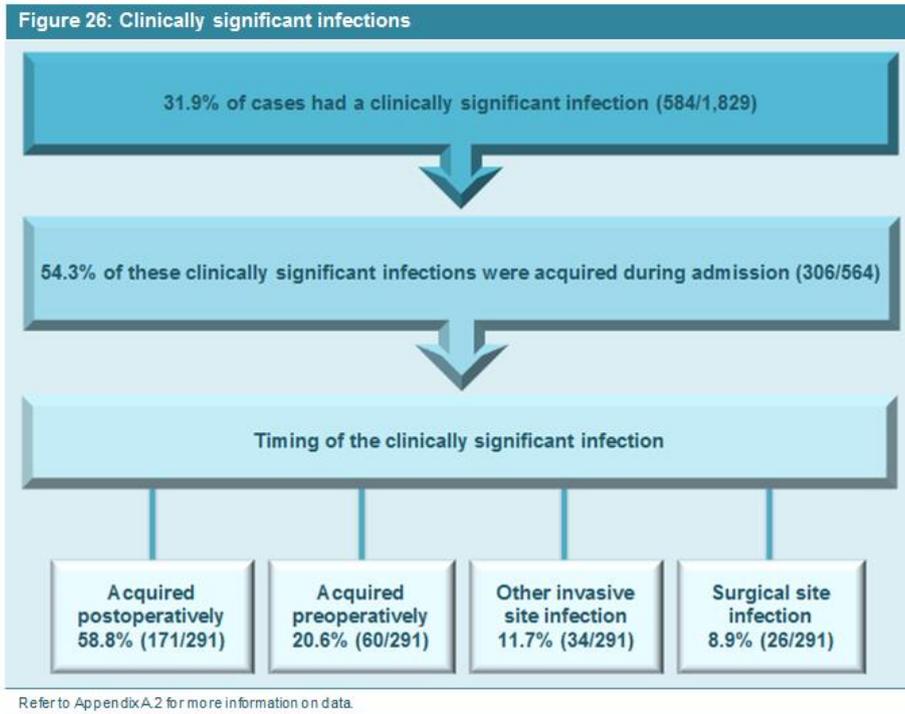
Not all surgical patients underwent surgery. For some patients, surgeons considered that an operation was not the best treatment option (see Figure 25).



Over the reporting period, 34.3% (832/2,428) of patients did not undergo an operation. A patient may not have an operation for a variety of reasons. Over the reporting period, the proportion of patients who did not undergo an operation due to an active decision by the treating surgeon was 48.6% (404/832), and this has gradually increased over the years. While the 2016 audit period has a lower number compared with earlier years, it is expected that this number will increase and become more in line with the earlier years as more of the cases are finalised. This possibly reflects better discussions with patients and their families regarding end of life care.

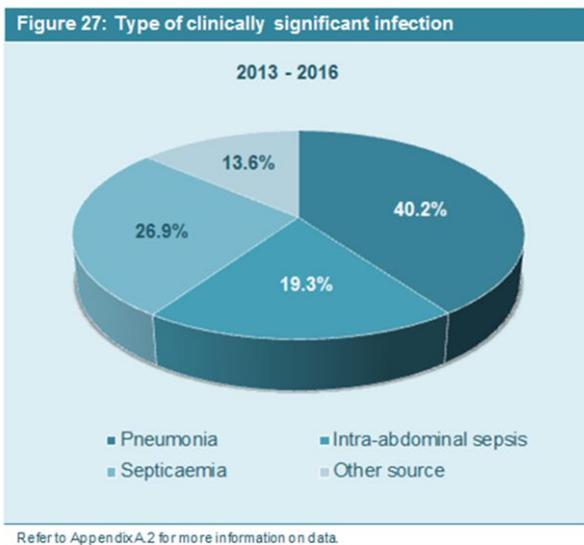
7.3 Infections

The audit began collecting data on infections in 2013. Infections are a significant contributory cause of death in surgical patients. Figure 26 illustrates the stage at which these clinically significant infections were acquired.



The proportion of patients who died with a clinically significant infection between 2013 and 2016 was 31.9% (584/1,829). Treating surgeons reported that the infection was acquired prior to admission in 45.7% (258/564) of cases. In 54.3% (306/564) of cases the infection was acquired during admission, and of these infections over half were acquired postoperatively (58.8%; 171/291).

The types of infections reported by treating surgeons are shown in Figure 27.



The most common type of clinically significant infection reported between 2013 and 2016 was pneumonia, accounting for 40.2% (233/580) of cases. Septicaemia accounted for 26.9% (156/580) of cases, while intra-abdominal sepsis and other source accounted for 19.3% (112/580) and 13.6% (79/580) of cases respectively. Where information was provided, treating surgeons reported that the antibiotic regime was appropriate in 94.9% (539/568) of cases. In 4.0% (23/568) of cases, the appropriateness of the antibiotic regime was unknown, and in 1.1% (6/568), it was considered inappropriate.

8. PEER REVIEW OUTCOMES

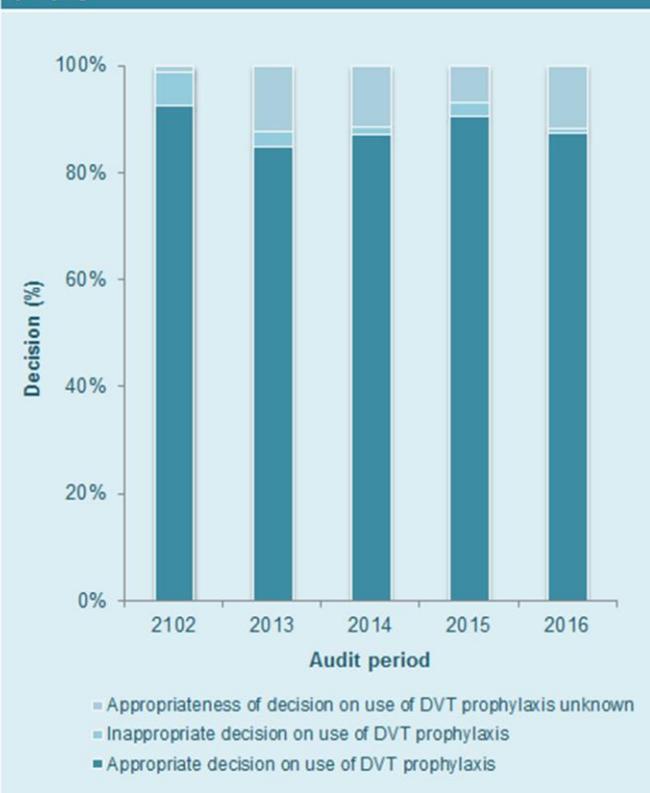
- During the five year reporting period, assessors reported an appropriate decision on the use of DVT prophylaxis in 88.3% of cases.
- In 6.7% of cases in which critical care units were not used, assessors were of the opinion that patients would have benefitted from the use of a critical care unit.
- Assessors identified 588 clinical management issues in 385 cases during the five year reporting period.
- Of the 588 clinical management issues identified, 13.1% (77/588) of these were classified as adverse events.
- Of the adverse events identified, 60.8% (45/74) caused the death of a patient.
- Of the adverse events that caused the death of a patient, 33.3% (15/45) were considered definitely preventable.

The peer review process is a retrospective assessment of the clinical management of patients who died whilst under the care of a surgeon. All assessors must therefore decide whether or not the management of the patient was appropriate. All cases, with the exception of terminal care admissions, undergo an FLA. At this stage, the case will either be closed or go for an SLA, which includes a review of the patient's record. The analysis in this section uses data from the SLA when cases underwent both an FLA and an SLA. Data from the FLA is used for cases not referred for SLA.

8.1 Decision on deep vein thrombosis prophylaxis

As part of the assessment process, the assessors are asked to indicate whether they think the decision on DVT prophylaxis was appropriate. Figure 28 shows assessor opinions on the appropriateness of DVT prophylaxis by year.

Figure 28: Assessor opinion on appropriateness of DVT prophylaxis decision

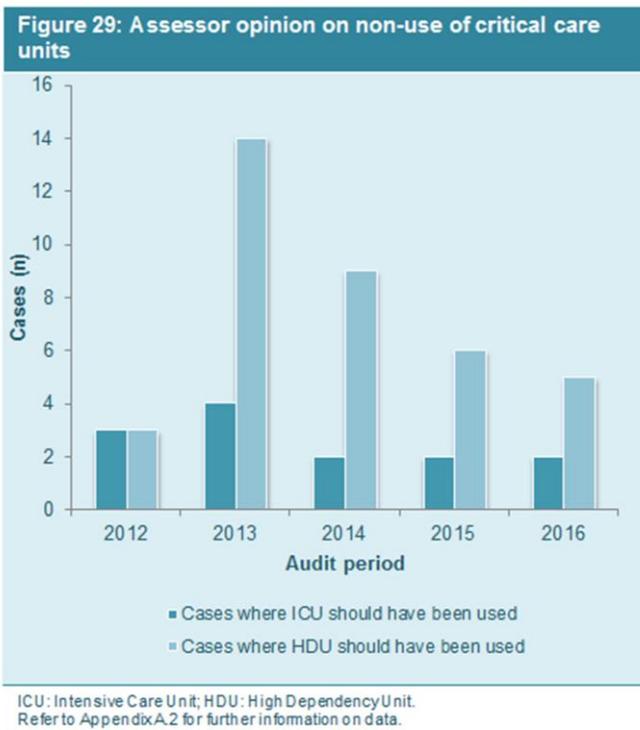


DVT: Deep Vein Thrombosis.
Refer to Appendix A.2 for further information on data.

Over the reporting period, assessors indicated that the decision to use or withhold DVT prophylaxis was appropriate in 88.3% (1,573/1,782) of cases. In 2.6% (47/1,782) of cases, assessors reported that there had been an inappropriate decision on the use of DVT prophylaxis. Although this is only a small percentage, any death secondary to inappropriate DVT prophylaxis protection must be considered potentially preventable. Assessors could not comment on the appropriateness of the DVT prophylaxis decision in 9.1% (162/1,782) of cases.

8.2 Non-use of critical care units

When treating surgeons indicate that a CCU (ICU or HDU) was not used in the management of a patient, assessors are asked to consider whether the patient would have benefitted from the use of a CCU. Figure 29 provides a summary of assessor opinions on the non-use of CCUs by year.



Assessors were of the opinion that 1.7% (13/748) and 5.0% (37/739) of patients would have benefitted from the use of ICU and HDU respectively.

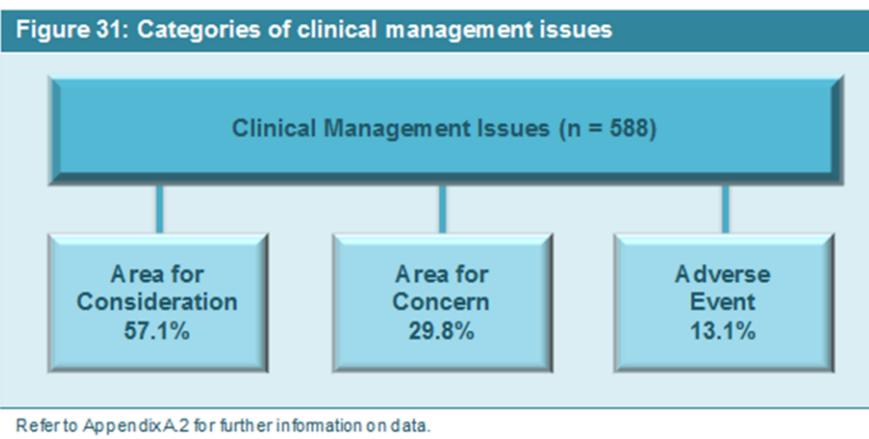
8.3 Clinical management issues

An overview of the proportion of cases in which clinical management issues were identified is provided in Figure 30.



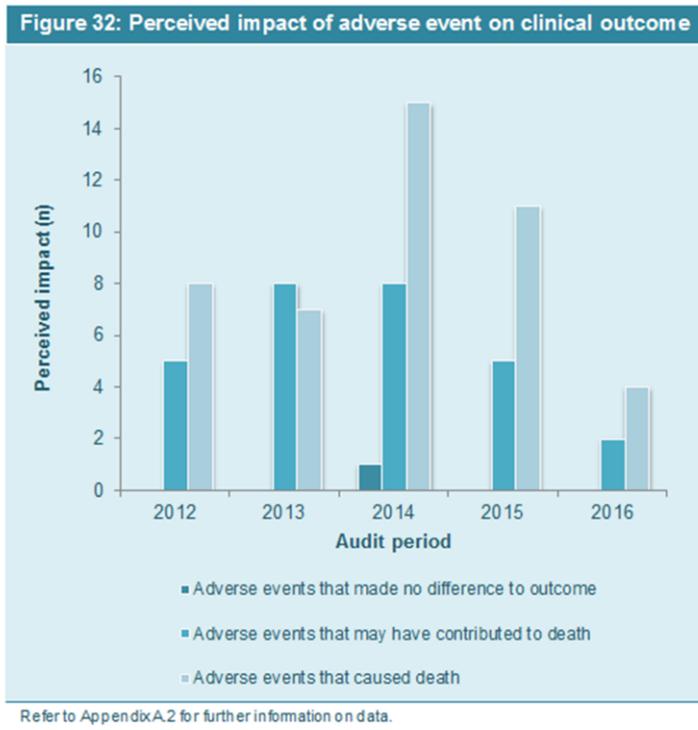
Over the reporting period, 16.5% (385/2,332) of cases had one or more clinical management issues. There were no clinical management issues identified in 83.5% (1,947/2,332) of cases, with death resulting from the disease process.

Assessors may identify more than one clinical management issue for each patient. Please note that Figures 31 – 33 show data based on the number of incidents rather than the number of patients.



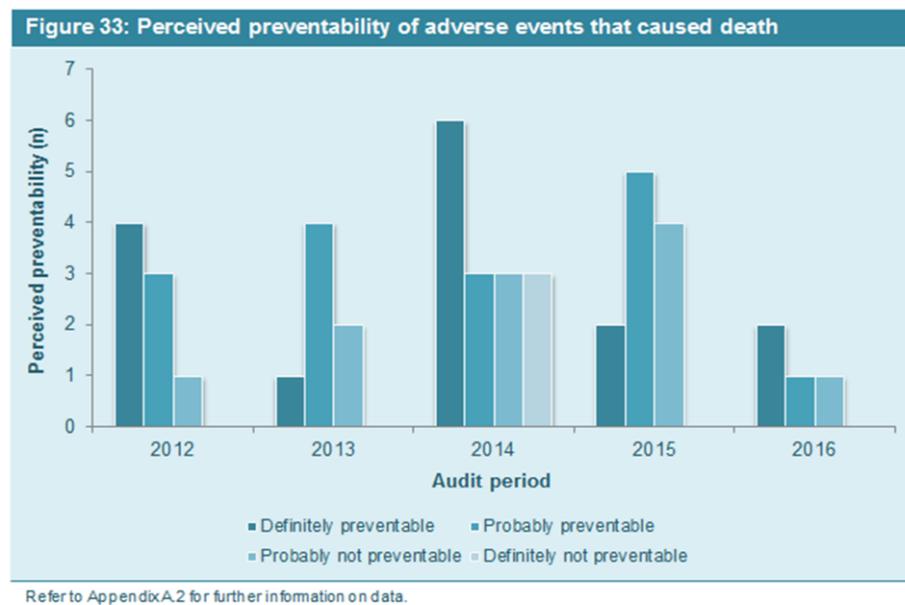
There were 588 clinical management issues identified in 385 completed cases. Figure 31 provides an overview of the classification of identified clinical management issues. Over the reporting period, more than half (57.1%; 336/588) of the clinical management issues were areas for consideration. Areas for concern and adverse events comprised 29.8% (175/588) and 13.1% (77/588) of clinical management issues respectively.

Assessors are asked to indicate the degree of impact that an adverse event may have had on the clinical outcome. Figure 32 shows a breakdown by year of the impact of adverse events on clinical outcomes, as perceived by assessors.



Of the adverse events identified over the reporting period, assessors perceived that 37.8% (28/74) may have contributed to death and that 60.8% (45/74) caused the death of the patient.

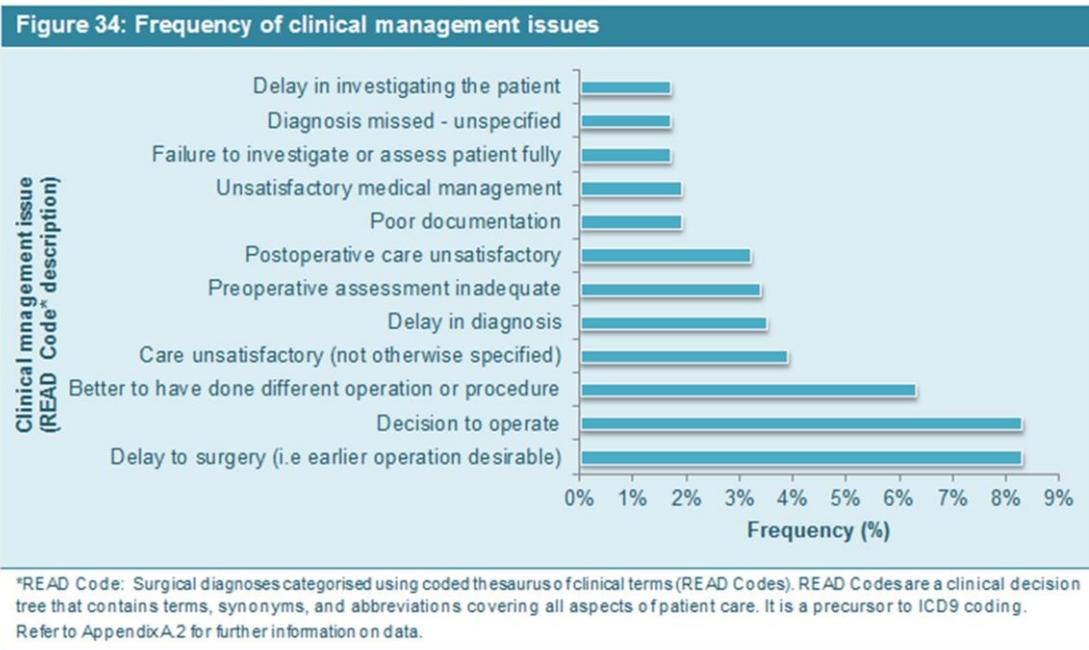
Assessors are also asked whether or not adverse events that cause the death of a patient were preventable, as shown in Figure 33.



Over the reporting period, assessors indicated that 6.7% (3/45) of adverse events that caused the death of the patient were definitely not preventable and that 24.4% (11/45) were probably not preventable. Assessors considered that 35.6% (16/45) of adverse events that resulted in the death of a patient were probably preventable, and that 33.3% (15/45) were definitely preventable. In 2016, assessors indicated that there were four adverse events that caused the death of a patient. Assessors considered that two of these adverse events were definitely preventable, one probably preventable and the other probably not preventable.

8.4 Frequency of clinical management issues

The frequency of specific clinical management issues is shown in Figure 34.



The assessor identified more than one clinical management issue in some patients. Delay to surgery and the decision to operate were the most frequent clinical management issues.

9. END OF LIFE MATTERS AND FUTILE CARE – LESSONS TO LEARN FROM THE WAASM

This is a personal reflection by Mr James Aitken, generated from the 2016 WAASM symposium, a request to present a summary at the Adelaide 2016 ASC, a symposium hosted by the Australian Medical Association, a special edition of the Economist magazine and the PELA. The overwhelming message is that surgeons manage this issue poorly and there is considerable scope for improvement.

End of life discussions relevant to surgeons may occur at home, and not be surgery specific, or prior to surgery. There is an opportunity for surgeons to provide general input to the former, but they have an absolute responsibility to manage the latter.

In the emergency setting, documenting goals of care should be standard practice for surgeons. The reality is that it is not so. In preparation for his presentation at the WAASM symposium, Dr Tim Paterson, Consultant in Intensive Care, reviewed General Surgery patients in the Sir Charles Gairdner Hospital HDU and found that none had their goals of care documented, while only 30% of those in the ICU had their risks documented. His experience with the medical emergency team (MET) mirrored those of Dr Matt Anstey, Senior Medical Advisor to the Australian Commission on Safety and Quality in Health Care, another speaker at the WAASM symposium who reported results from a Canberra hospital. On average, three medical teams have reviewed a patient before a MET is called. Very few of these teams document a care plan, should this predictable event occur, and the MET then have to determine what is required for a patient who by definition is no longer competent. Such poor care is totally preventable. In New Zealand, many hospitals will not permit a patient to leave the emergency department until their goals of care have been discussed and documented.

In elective settings, surgeons should be ready to engage in such discussions during preoperative consultations, especially in high-risk situations. However, few doctors use the follow-up clinic as an opportunity, or trigger, to initiate discussion with patients who survived an emergency admission regarding their wishes should they have another high-risk emergency admission. These consultations should encourage 'dinner discussions', but differing and strongly held family opinions are more common than appreciated, and whilst such informal discussions are important, a correctly executed legal document is essential.

Another speaker at the WAASM symposium was the Honourable Jim McGinty, former WA Minister of Health and Attorney General, and thanks to him WA has a robust legal framework for Advance Health Directive (AHD), Enduring Power of Guardianship and Power of Attorney. However, they are not widely used and less than 10% of the general public have an AHD, and in the presumably interested and educated symposium audience, only 17%. End of life discussions with patients is time consuming and the necessity for a specific Medicare number being raised on several occasions to reflect the longer discussion maybe considered. An additional problem for general practitioners caring for a family is the potential for conflict between the patient, to whom they have an immediate duty of care, and the family with whom they have to deal with after the patient's death, and who indeed may also be their patients.

Honourable Jim McGinty argued that admission to a residential aged care facility should prompt completion of an AHD and Dr Penny Flett, former Chief Executive Officer of Brightwater Care Group, agreed that this was a "bread and butter" issue for the residential aged care sector. The experience of hospital clinicians is that this does not happen. Residents are often sent to hospital inappropriately and the AHD, should one actually exist, is not easily and quickly located and, if it is found, may not be legally valid.

In Albany, Dr Kirsten Auret, a palliative care physician, has set out to improve matters and now an AHD can be sent to the regional hospital and registered in a secure manner. Before doing so the legal validity of the AHD is confirmed. Both the patient notes and the hospital electronic record are flagged so that if the patient presents, carers know there is a valid AHD they can easily access. In only 18 months, the take up has been almost exponential and more than half of the registered AHD have been accessed. It would not seem difficult to replicate this in a metropolitan setting.

Western Australia is not unique in managing this poorly. In April, the *Economist* reported a joint international study it undertook with the Kaiser Family Foundation. They found a minority in all countries had expressed their

end of life wishes in a written document and, based on their experience with friends and family, most anticipated they would not receive the end of life care they wished.

By chance, the WAASM offered the PELA a real time reflection as to how we manage this matter. Although preoperative risk assessment was a key component of the PELA, a third of patients were not risk assessed. The mortality in these patients was double those prospectively risk assessed, probably because the acuity of those not risk assessed was not appreciated, so their level of care was not appropriately escalated. If the risk of the surgery was not calculated, the patient could not have been given informed consent, despite the predicted mortality for many being greater than 10%. Objective assessment of risk has never been easier and there are various risk prediction programmes, many immediately available on-line.

Through the WAASM, the PELA was also able to address an important related matter. A recognised limitation of all previous emergency laparotomy audits has been the lack of a denominator, that is, those patients who presented with an acute abdomen but who did not have surgery. In the WAASM, a quarter of those aged greater than or equal to 80 years who presented with an acute abdomen and died did not have an emergency laparotomy. When comparing PELA to the similar National Emergency Laparotomy Audit (NELA) in England and Wales, there were a smaller proportion of patients aged greater than or equal to 80 years and a smaller proportion in the highest risk group, with a better outcome in both groups.

The importance of avoiding futile care has been highlighted in every WAASM report, and over this time the number of emergency admissions who died without an operation has almost doubled. It may be that the low mortality in WA is secondary to a degree of patient selection. However, avoiding futile surgery in high-risk patients is an entirely appropriate care pathway. It is not the only reason, as the WA mortality was lower than NELA in patients with a risk assessment of less than 5% and 5%-10%. We are currently looking at two years' worth of the WAASM data and although not finalised, the figures on approximately 350 patients appears to be similar.

It would seem reasonable for the WAASM to consider reporting important aspects of end of life care, such as whether the goals of care was completed and documented in the notes. This will not reduce mortality, but it will contribute to a more dignified death. When there is little or nothing surgery can offer, it becomes the most important aspect of care.

10. A CLOSER LOOK: AUDIT DATA QUALITY

The WAASM, in collaboration with the Centre for Safety at the UWA, has been examining the impact of process and regulatory changes to surgical audit data quality. Below is an update, as provided by the UWA researchers.

Understanding surgical audit data quality: examining the impact of process and regulatory changes *(Irene Chua, Joseph Carpini, Sharon Parker & Mark Griffin)*

Background

The ANZASM is a national audit of surgical mortality designed to inform, educate, facilitate change, and improve the quality of practice in surgical settings². To achieve these ends, the audit must face the challenging task of ensuring the quality of its data². This begets the question of data quality. Several studies have recently investigated the quality of the data collected by the ANZASM^{3,4,5}. While these studies have supported the overall quality of the data, the transition from paper-based system to an electronic-based system may have had profound implications for the quality of the data collected by the ANZASM and its subsidiaries.

The majority of the existing literature focuses on individual perceptions of electronic information systems (e.g., ease of use or speed)⁶, and does not consider the quality of data captured by electronic systems versus traditional paper-based systems. Several issues have also been noted in terms of the quality of data capture. Firstly as noted by Raju et al.², it is difficult to capture all issues arising from all surgical deaths across different specialties using the one standardised SCF. Next, most studies have also failed to consider potential moderators of the relationship, such as experience of the individual completing the form. Finally, a hallmark of an audit is to provide valuable information and actions to be taken. As such, the quality of data collected will largely shape the ultimate findings and recommendations of the audit.

Objectives

In a collaborative effort to address the current gaps in the literature, the ANZASM and the UWA research team, led by Winthrop Professors Parker and Griffin, aim to address the following objectives: first, investigate whether the transition from paper to electronic forms had an impact on the quality of audit data and second, the impact of the transition on the total amount of time a case is open.

Study 1 - Overview

Since the report published in 2016⁷, study 1 (semi-structured interviews) has been completed. In study 1, we attempted to identify the impact of the transition from a paper-based to an electronic-based reporting system on the experiences of consultant surgeons and to gain a better understanding of the audit process as a whole. Short qualitative semi-structured interviews were conducted with 10 consultant surgeons from various specialties, namely General Surgery, Urology, Orthopaedic Surgery, Vascular Surgery and Cardiothoracic Surgery. The interview questions were generated to gain a more in-depth understanding of their general audit experience, motivation behind completion of the mortality audit forms and any other relevant information. Various factors such as workload, ease of use and online prompts, quality of data and depth of response to the different audit formats were examined. Familiarisation with the data involved listening to recorded interviews and repeated reading of the transcribed data⁸. These were then transcribed verbatim and data was coded following an emergent themes approach^{8,9}. The codes were further explored and grouped under common headings, or categories, that best described the content of the data.

In general, the analyses from the interview have identified several strengths of, as well as opportunities for, the mortality audit and these are briefly highlighted below. First, from a practical perspective, improvements such as the inclusion of a hyperlink in the audit email sent to surgeons requesting the completion of the audit forms would improve the ease of use by providing users with more convenience. Next, more information or guidance could be provided in the audit forms, especially over ambiguous fields such as those of “root-cause analysis” and the “definable complications”. This is likely to result in improvements in the quality of data obtained from these fields and thus more robust findings.

Second, from a driving innovation perspective, it was noted that there were recurring themes emerging in the annual publication of the audit results - namely the use of DVT prophylaxis and intravenous hydration. Hence, to facilitate improvement in learning from mortality audits, different sets of questions could be rotated through

cycles to prevent stagnation in practices and improve robustness in data being collected. This would allow the audit to contribute to continued innovation and as a driving source of evidence-based practice.

Third, from an engagement perspective, there is also an opportunity to improve on the culture of participation in the mortality audit. The perceived value and motivation behind the participation in the audit is divisive. While some view the exercise as invaluable, others find the process laborious and unenjoyable. As such, it is important to re-emphasize the value of the audit process prior to requesting surgeons complete the audit form. This may result in participants being more motivated to participate in the audit, as they are more aware of the full range of benefits derived from the data they provide. Providing additional justification for participation may also result in quantifiable improvements in the overall quality of data obtained.

The findings from this stage of the study have provided us with valuable guidance to identify specific features in the dataset, as well as guide us towards an effective coding agenda for the analysis of audit data in the next stage of the study. A stratified sample of SCFs will be obtained from the ANZASM national database, and these will be coded using standardized coding agenda developed by the UWA research team with the assistance of the WAASM team. Advanced qualitative and quantitative data analyses will be done. It is hoped that in the next stage of the study, more in-depth findings on the quality of surgical mortality audit could be unveiled.

11. PERFORMANCE REVIEW

This section reviews progress relating to each of the recommendations in the 2016 WAASM report.

Audit management

Through the RACS WA Regional Office, increase the profile of the audit to the WA surgical trainees. This will familiarise trainees with the audit's purposes and processes, and be of assistance should surgeons delegate cases to them.

Throughout 2016, the WAASM liaised closely with the RACS WA Regional Office regarding raising awareness and understanding of the audit amongst surgical trainees. This included the presentation of information and dissemination of resources at the trainee induction evening held in November 2016.

Collaborate closely with the WA Regional Office to identify newly graduated surgical trainees, thereby ensuring early recruitment of new Fellows/Surgeons into the audit.

The WAASM is regularly advised of all newly graduated surgical trainees. Audit information packs (which include an invitation to participate in the WAASM, the audit participation form, the Fellows Interface user guidelines and a QP overview) are sent to all potential new audit participants.

Continue to improve surgeon recruitment to the online system (Fellows Interface) to 65% by December 2016 through promotion of new features and enhancements.

As at the end of December 2016, 69.1% (344/498) of surgeons were using the Fellows Interface. From 1 January 2017 the use of the Fellows Interface became mandatory for the completion of SCFs and FLAs, and registration is therefore anticipated to be close to 100%. In the lead up to this transition, all surgeons not already using the electronic platform were provided with several notifications of the upcoming change. Login details and user guidelines were distributed throughout December 2016.

Facilitate ANZASM processes to develop and test further enhancements to the Fellows Interface and the Bi-national Audit System. These include: one RACS portfolio single sign on, updates to the appearance of the Fellows Interface, and improvements to the case note tracker functionality.

The WAASM participated in all aspects of the ANZASM user acceptance testing throughout 2016 to facilitate enhancements to both the electronic Fellows Interface and the Bi-national Audit System. The 'single sign on' facility is now available to all surgeons. This provides the option of accessing the Fellows Interface with existing RACS login details via the RACS Portfolio, therefore alleviating the need to remember two usernames and passwords. The appearance of the Fellows Interface has been updated (user friendly colours and bigger radio buttons) and is continuously reviewed to enhance usability. The 'case note tracker' functionality has also been implemented to better enable monitoring of medical record requests and returns.

Further improve upon the high return rate of SCFs (96% in 2014).

Of the 581 deaths in 2015 meeting the WAASM criteria, SCFs were returned for 573 cases - a return rate of 98.6%. This is reflective of the redeveloped reminder system instigated by the WAASM during this period (including the use of mobile phone text reminders).

Research and reporting on audit data

Progress the joint initiative between the WAASM and the UWA which aims to examine the impact of process and regulatory changes using the WAASM/ANZASM data.

As outlined in Section 10, the joint initiative between the WAASM and the UWA continues to progress. The first part of the study, which used semi-structured interviews to explore surgeon experiences of the transition from paper to electronic-based reporting, is now complete. The analyses from the interview data have identified a range of strengths and opportunities for improvement. These findings have provided guidance for the second part of the study, which will involve both qualitative and quantitative analyses of data from a stratified sample of SCFs from the ANZASM national database.

Work with the ANZASM to enable reporting of patient Unit Record Number and Category 4 and 5 deaths under the Health Round Table to the WA Department of Health.

The process for reporting patient Unit Record Numbers to the WA Department of Health has now been established. Two sets of 6-month data for 2016 have been supplied to the WA Department of Health, covering the January-June and July-December periods. The protocol for reporting Category 4 and 5 deaths under the Health Round Table is still being discussed by the RACS.

Clinical management

Monitor trends in the inappropriate decisions on the use of deep vein thrombosis (DVT) prophylaxis as reported by assessors in 4% (63/1,646) of cases between 2011 and 2015.

There has been a slight decrease in the proportion of cases for which an assessor reported an inappropriate decision on the use of DVT prophylaxis, from 4% (63/1,646) between 2011 and 2015 to 2.6% (47/1,782) between 2012 and 2016.

Monitor trends in the non-use of critical care units where assessors were of the opinion that they should have been used. Between 2011 and 2015, this accounted for 7% (intensive care unit 2%; 18/780 and high dependency unit 5%; 36/780) of cases where critical care units were not used.

The proportion of cases where assessors were of the opinion that a critical care unit should have been used did not change much. Between 2012 and 2016, assessors reported that 6.7% of patients who did not receive care in a critical care unit would likely have benefitted from it (ICU 1.7%; 13/748 and HDU 5.0%; 37/739).

Explore the 12% (39%; 55/141 to 51%; 87/172) increase in the proportion of deaths where no operation occurred and involving an active decision not to operate between 2011 and 2014, as it relates to patients' end of life care.

An increase of 7.2% was observed between 2012 (46.1%; 82/178) and 2015 (53.3%; 80/150) in the proportion of cases in which an operation was not performed based on an active decision. The links between this active decision-making and patients' end of life care were explored as part of the WAASM 2016 symposium "Futile Care and End of Life Matters", outlined in further detail below and in Section 9 of this report.

Education

Produce at least one Case Note Review (CNR) booklet to educate, facilitate change and improve practice.

The WAASM produced two CNR booklets during 2016, one released in July and the other in December. The July edition explored issues relating to bariatric and cardiovascular surgery, delays in treating patients with ischaemic bowel, and postoperative care. The December booklet covered a broad range of topics, with themes including nasogastric tube usage, poor team coordination and bed pressures in HDUs.

Conduct a symposium around issues on 'end of life care'.

The 2016 WAASM Symposium, entitled "Futile Care and End of Life Matters", was held on Tuesday, 15 November and attracted over 200 attendees to the Harry Perkins Institute of Medical Research (North) in Nedlands. The 2.5 hour programme (see Appendix B.1) incorporated seven speakers and discussion time, and had RACS approval for CPD points. Recordings of individual presentations were made available on the WAASM website and the ANZASM App following the event.

All symposium attendees were provided with a hardcopy evaluation form as they arrived at the event. A survey return box was provided on the registration table, and attendees were also given the option of completing the survey online. There was a response rate of 62%. All respondents were provided with a Certificate of Attendance. Responses from attendees regarding key aspects of the symposium are outlined in Appendix B.2.

12. ACKNOWLEDGEMENTS

The WAASM would like to acknowledge the support and assistance of individuals and institutions that have helped in the development and continuation of this project, including the:

- participating surgeons
- first-line assessors
- second-line assessors
- hospital medical records departments
- WA Department of Health for funding the project
- Patient Safety Surveillance Unit, Clinical Services and Research Division, at the WA Department of Health for their continual commitment to, and support of, the WAASM
- RACS for their infrastructure and oversight of this project
- ANZASM Steering Committee

- **WAASM Management Committee:**

Mr James Aitken Clinical Director, WAASM Chair and general surgical representative

Mr Tom Bowles Consultant General Surgeon, rural surgical representative

Mr Ian Gollow Consultant Paediatric Surgeon, paediatric surgical representative

Mr Stuart Salfinger Consultant Obstetrician and Gynaecologist, obstetrics & gynaecology representative

Mr Rasa Subramaniam Consumer representative

Dr Jennifer Bruce Anaesthetic representative

- **WAASM staff:**

Dr Franca Itotoh WAASM Project Manager

Ms Natalie Zorbas-Connell WAASM Senior Project Officer

Ms Sonya Furneyvall WAASM Project Officer

- **RACS, Division of RAAS staff, particularly:**

Professor Guy Maddern Chair, ANZASM Steering Committee

A/Prof Wendy Babidge Director, RAAS Division

Mr Gordon Guy ANZASM Manager

APPENDIX A: DATA DEFINITIONS

Appendix A.1 American Society of Anesthesiologists grade definitions

ASA grade	Characteristics
1	A normal healthy patient
2	A patient with mild systemic disease and no functional limitation
3	A patient with moderate systemic disease and definite functional limitation
4	A patient with severe systemic disease that is a constant threat to life
5	A moribund patient unlikely to survive 24 hours, with or without an operation
6	A brain dead patient for organ donation

Appendix A.2 Figures

Figure 3: Audit case status

Definition	Deaths meeting the WAASM criteria and audit case status.
Data included	All data collected between 2012 and 2016. Pending cases comprised SCF, FLA & SLA pending. Excluded cases comprised 'Closed non-participant', 'Terminal care cases' and 'Lost to follow-up'.
Data excluded	'Excluded error' cases.

Figure 4: First-line assessments returned

Definition	All cases, except terminal care cases, are referred to first-line assessments.
Data included	All data collected between 2012 and 2016. Provides percentages of first-line assessments that have been returned ('First-line complete', 'First-line incomplete', 'Second-line pending' 'Medical records pending/received' and 'Closed')
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants' and 'Lost to follow-up' cases were excluded.

Figure 5: Deaths by hospital status

Definition	Deaths meeting the WAASM criteria.
Data included	All data collected between 2012 and 2016 where information on hospital status was reported (n=2,370). 'Co-location' indicates hospitals with both public and private health services.
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants' and 'Lost to follow-up' cases were excluded. Data missing for 64 cases.

Figure 6: Most common causes of death

Definition	Counts and percentages of most common causes of death.
Data included	All data collected between 2012 and 2016 (n=3,717). Only the ten most common causes of death are displayed. A case can have more than one cause of death listed.
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants' and 'Lost to follow-up' cases were excluded.

Figure 7: Cases by age group and gender

Definition	Counts of cases allocated by age groups and gender.
Data included	All data collected between 2012 and 2016.
Data excluded	'Excluded error' cases.

Figure 8: Deaths by hospital status by year

Definition	Counts of cases admitted to public, private or co-location hospitals as allocated by year.
Data included	All data collected between 2012 and 2016 where information on hospital status was reported (n=2,370).
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants' and 'Lost to follow-up' cases were excluded. Data missing for 64 cases.

Figure 9: Admission type by year

Definition	Percentages of emergency and elective admissions.
Data included	All data collected between 2012 and 2016 where information on admission type was reported (n=2,397).
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants' and 'Lost to follow-up' cases were excluded. Data missing for 37 cases.

Figure 10: Cases with specific comorbidities

Definition	Percentage of cases associated with comorbidities.
Data included	All data collected between 2012 and 2016 where information on comorbidity was reported (n=2253).
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants', 'Lost to follow-up' and cases with no comorbidity were excluded. Data missing for 181 cases.

Figure 11: Frequency of ASA grades

Definition	Counts of ASA grades.
Data included	All data collected between 2012 and 2016 where information on ASA grades was reported (n=2,052).
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants' and 'Lost to follow-up' cases were excluded. Data missing for 382 cases.

Figure 12: Cases with preoperative diagnostic delays

Definition	Counts and percentages of preoperative delay in confirmation of main surgical diagnosis.
Data included	All data collected between 2012 and 2016 where information on preoperative diagnostic delay was reported (n=2,221).
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants', 'Lost to follow-up' and cases with no preoperative diagnostic delays were excluded. Data missing for 213 cases.

Figure 13: Cases with fluid balance issues

Definition	Percentage of cases with fluid balance issues.
Data included	All data collected between 2012 and 2016 where information on fluid balance was reported (n=2,182).
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants' and 'Lost to follow-up' cases were excluded. Data missing for 252 cases.

Figure 14: DVT prophylaxis

Definition	Percentages of cases of DVT prophylaxis use/non-use in surgical case forms.
Data included	All data collected between 2012 and 2016 where information on use (n= 1,775) and non-use (n= 451) of DVT prophylaxis was reported.
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants' and 'Lost to follow-up' cases were excluded. Data missing for 208 cases.

Figure 15: Type of DVT prophylaxis used

Definition	Counts of DVT prophylaxis agents used in surgical case forms.
Data included	All data collected between 2012 and 2016 where information on the type of DVT prophylaxis agent was reported (n= 3,214).
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants', 'Lost to follow-up' and cases where DVT prophylaxis was not used were excluded.

Figure 16: Critical care units

Definition	Percentages of utilisation/non-utilisation of critical care units (consisting of intensive care and high dependency units).
Data included	All data collected between 2012 and 2016 where information on utilisation (n= 1,327) and non-utilisation (n= 882) of critical care units was reported.
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants' and 'Lost to follow-up' cases were excluded. Data missing for 225 cases.

Figure 17: Transfers by year and admission type

Definition	Counts of cases involving a patient transfer by year and admission type.
Data included	All data collected between 2012 and 2016 where information on emergency (n=609) and elective (n=19) transfer was reported.
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants', 'Lost to follow-up' and cases with no transfer were excluded. Data missing for 4 cases.

Figure 18: Issues associated with transfers

Definition	Counts of cases associated with transfer issues.
Data included	All data collected between 2012 and 2016 where information on transfer issues was reported.
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants', 'Lost to follow-up' and cases with no transfer were excluded.

Figure 19: Operative and non-operative cases by speciality

Definition	Percentages of operative and non-operative cases allocated by surgical speciality.
Data included	All data collected between 2012 and 2016 where information on operative and non-operative status was reported. Surgical specialty 'Other' includes Otolaryngology, Head and Neck, Ophthalmology, Paediatrics and Obstetrics and Gynaecology. Cardiothoracic Surgery (n=185), General Surgery (n=959), Neurosurgery (n=462), Orthopaedic Surgery (n=435), Others (n=39), Plastic Surgery (n=51), Urology (n=74), Vascular Surgery (n=222).
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants' and 'Lost to follow-up' cases were excluded. Data missing for 7 cases.

Figure 20: Operative cases by admission type and year

Definition	Percentages of emergency and elective admissions that involved an operation.
Data included	All data collected between 2012 and 2016 where information on admission type was reported (n=1,574).
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants', 'Lost to follow-up' and non-operative cases (n=832) were excluded. Data missing for 22 cases.

Figure 21: Consultant involvement in operations

Definition	Percentages of consultants making decisions, operating, assisting and supervising in theatre.
Data included	All data collected between 2012 and 2016 where information on number of operations performed was reported (n=2,256).
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants', 'Lost to follow-up' and non-operative cases (n=832) were excluded.

Figure 22: Operations abandoned due to finding a terminal situation

Definition	Percentages of operations abandoned on the finding of a terminal situation.
Data included	All data collected between 2012 and 2016 where information on operations abandoned was reported (n=1,920).
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants', 'Lost to follow-up' and non-operative cases (n=832) were excluded. Data missing for 336 cases.

Figure 23: Unplanned returns to theatre

Definition	Percentages of unplanned returns to theatre.
Data included	All data collected between 2012 and 2016 where information on unplanned returns to theatre was reported (n=1,513).
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants', 'Lost to follow-up' and non-operative cases (n=832) were excluded. Data missing for 83 cases.

Figure 24: Postoperative complications by hospital status by year

Definition	Percentages of postoperative complications.
Data included	All data collected between 2012 and 2016 where information on postoperative complication was reported (n=507).
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants', 'Lost to follow-up', non-operative cases (n=832) and operative cases with no postoperative complications (n=995) were excluded. Data missing for 10 cases.

Figure 25: Reasons for no operation

Definition	Percentages of audited cases in which no operation was performed.
Data included	All data collected between 2012 and 2016 where information on reasons for no operation was reported (n=832).
Data excluded	Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants', 'Lost to follow-up', and operative cases (n=1,596) were excluded. Data missing for 6 cases.

Figure 26: Clinically significant infection

Definition	Percentages of clinically significant infection.
Data included	All data collected between 2013 and 2016 where information on clinically significant infections was reported (n=564).
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants', 'Lost to follow-up', and non-clinically significant infection cases (n=1,829) were excluded. Data missing for 20 cases.

Figure 27: Type of clinically significant infection

Definition	Percentages of type of clinically significant infection.
Data included	All data collected between 2013 and 2016 where information on type of clinically significant infections was reported (n=580).
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants', 'Lost to follow-up', and non-clinically significant infection cases (n=1,829) were excluded. Data missing for 4 cases.

Figure 28: Assessor opinion on appropriateness of DVT prophylaxis decision

Definition	Percentages of appropriateness of DVT prophylaxis decision as reported by assessors.
Data included	All data collected between 2012 and 2016 using the highest level of assessment in completed cases where appropriateness of DVT prophylaxis decision was reported (n=1,782).
Data excluded	'Excluded error', 'Surgical case pending', Terminal care cases', 'Closed non-participants', 'Lost to follow-up' and Neurosurgery cases. Data missing for 87 cases.

Figure 29: Assessor opinion on non-use of critical care units

Definition	Counts of cases where use of critical care units (consisting of intensive care and high dependency units) would have been beneficial.
Data included	All data collected between 2012 and 2016 using the highest level of assessment in completed cases where information on critical care units was reported (ICU; n=748, HDU; n=739).
Data excluded	'Excluded error', 'Surgical case pending', Terminal care cases', 'Closed non-participants', 'Lost to follow-up' and Neurosurgery cases. Data missing ICU; 82 cases, HDU; 91 cases.

Figure 30: Cases with clinical management issues

Definition	Percentages of cases with clinical management issues.
Data included	All data collected between 2012 and 2016 with the highest level of assessment in completed cases where information on clinical management issues was reported (n=385).
Data excluded	'Excluded error', Surgical case pending', Terminal care cases', 'Closed non-participants', 'Lost to follow-up' and cases with no clinical management issues (n=1,947).

Figure 31: Categories of clinical management issues

Definition	Percentages of categories of clinical management issues.
Data included	All data collected between 2012 and 2016 with the highest level of assessment in completed cases where information on the categories of clinical management issues was reported (n=588).
Data excluded	'Excluded error', Surgical case pending', Terminal care cases', 'Closed non-participants', 'Lost to follow-up' and cases with no clinical management issues (n=1,947). Data missing for 4 cases.

Figure 32: Perceived impact of adverse event on clinical outcome

Definition	Counts of adverse events.
Data included	All data collected between 2012 and 2016 with the highest level of assessment in completed cases where information on adverse events contributing to death or not was reported (n=74).
Data excluded	'Excluded error', Surgical case pending', Terminal care cases', 'Closed non-participants', 'Lost to follow-up' and cases with no clinical management issues (n=1,947). Data missing for 3 cases.

Figure 33: Perceived preventability of adverse event that caused death

Definition	Counts of adverse events.
Data included	All data collected between 2012 and 2016 with the highest level of assessment in completed cases where information on preventability of adverse events causing death was reported (n=45).
Data excluded	'Excluded error', Surgical case pending', Terminal care cases', 'Closed non-participants', 'Lost to follow-up' and cases with no clinical management issues (n=1,947). No missing data.

Figure 34: Frequency of clinical management issues

Definition	Percentages and descriptions (in READ Codes) of the 12 most common clinical management issues.
Data included	All data collected between 2012 and 2016 where information on clinical management issues was reported.
Data excluded	'Excluded error', Surgical case pending', Terminal care cases', 'Closed non-participants', 'Lost to follow-up' and cases with no clinical management issues (n=1,947).

Appendix A.3 Tables

Table 1: Deaths reported to the WAASM

Definition	Count of deaths reported to the WAASM.
Data included	All data collected between 2012 and 2016. Total number of deaths reported to WAASM, including 'Excluded error' cases.
Data excluded	No exclusions.

Table 2: Number of deaths under a surgeon per 100,000 population

Definition	Number of deaths meeting WAASM criteria per year as a function of surgical mortality rates per 100,000 population.
Data included	All data collected between 2012 and 2016. Population data compiled from the Australian Bureau of Statistics (based on projected data as population data is only available for up until September 2016).
Data excluded	'Excluded error' cases.

Table 3: Second-line assessments

Definition	Counts and percentages of cases referred to second-line assessments.
Data included	All data collected between 2012 and 2016, where the first-line assessor recommended an SLA.
Data excluded	'Excluded error', 'Surgical case pending', 'Terminal care cases', 'Closed non-participants' and 'Lost to follow-up' cases were excluded.

Table 4: Surgeon involvement in deaths meeting WAASM criteria

Definition	Counts and percentages of surgical mortality data in relation to surgeon involvement in cases.
Data included	All data collected between 2012 and 2016. Counts of surgeons associated with deaths reported. Terminal care cases included in counts of surgical case forms returned.
Data excluded	'Excluded error', 'Surgical case pending', 'Closed non-participants' and 'Lost to follow-up' cases were excluded.

Table 5: Deaths meeting WAASM criteria by speciality

Definition	Counts and percentages of surgical mortality data in relation to surgeon speciality.
Data included	All data collected between 2012 and 2016 (n=2,503).
Data excluded	'Excluded error' cases. Data missing for 394 cases.

Table 6: Median age by gender

Definition	Median age by gender for all cases from 2012 to 2016.
Data included	All data collected between 2012 and 2016.
Data excluded	'Excluded error' cases.

APPENDIX B: WAASM SYMPOSIUM 2016

Appendix B.1 WAASM symposium flyer 2016



A Symposium by the Western Australian Audit of Surgical Mortality

Futile Care and End of Life Matters

Commencing 6pm

Tuesday, 15 November 2016

Harry Perkins Institute of Medical Research (QEII)

Speaker	Title	Provisional Subject/Title
James Aitken	Chairman	Introduction
Preparing for the Inevitable		
Hon Jim McGinty AM	Former WA Minister of Health and Attorney General	Parliament's role in End of Life matters
Dr Penny Flett AO	Former CEO Brightwater Care Group	The aged care sector's role in preparing for the End of Life
Dr Matt Anstey	Senior Medical Advisor Australian Commission on Safety and Quality in Health Care	End of Life care - a national policy perspective
Managing Dying in the Acute Patient		
Dr Tim Paterson	Consultant in Intensive Care	Management of the patient with borderline outcome
Mr Stephen Honeybul	Consultant Neurosurgeon	Futile care or no treatment
Zaza Lyons Albie Lyons		Difficult decisions in stressful situations - a mother and son reflect
James Aitken	Chairman	Discussion (to conclude at 8.30pm followed by refreshments).

For more information or to register

Email: waasm@surgeons.org or call the WAASM on 08 6389 8650

Places are limited - please register your interest as soon as possible.

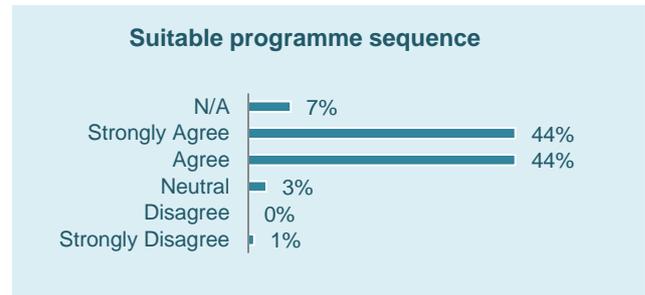
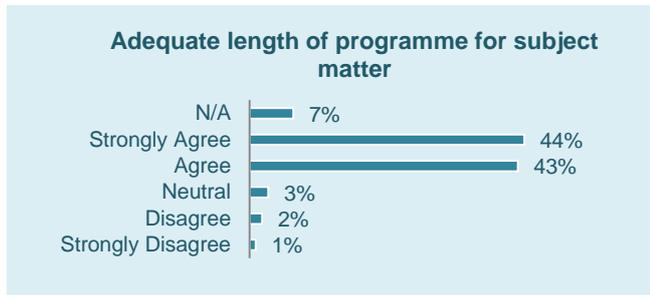
This activity qualifies for 3 RACS CPD points in *Maintenance of Knowledge and Skills*



Appendix B.2 Overview of WAASM symposium ‘Evaluation Findings’

Symposium Structure

A large majority of attendees felt the length of the programme was adequate in covering the symposium topics (87%) and that the sequence of presentations was suitable (88%).

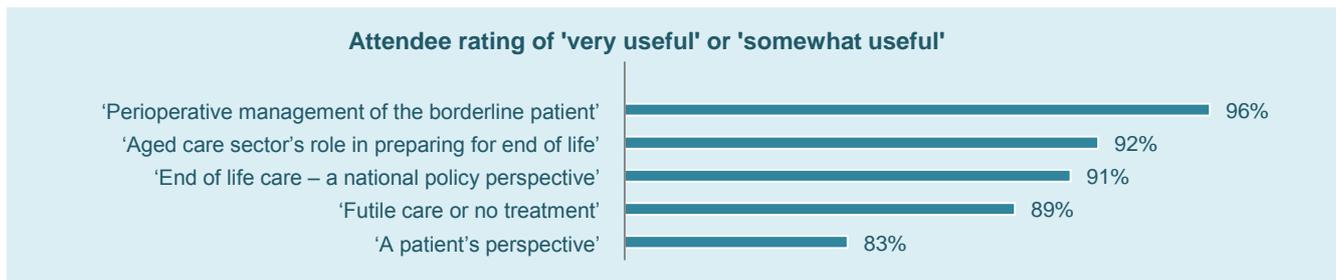


Note: N/A; not applicable

However, given the 6-9pm timeframe, it was suggested that a mid-way break and/or the provision of refreshments prior to the event (for those coming straight from work) would have been beneficial. *“.....There needs to be refreshments, i.e. water on arrival or a short intermission. Drinks at the end – too late mid-week and a missed opportunity to mingle with colleagues and discuss items of interest with the speakers.....”*

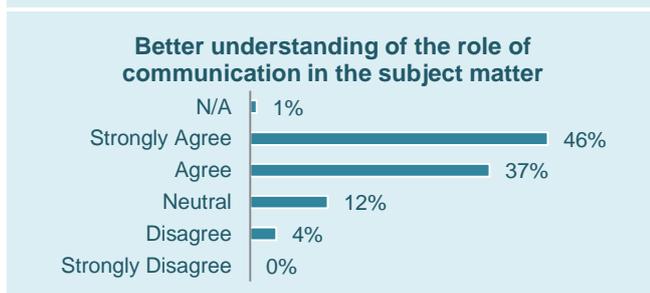
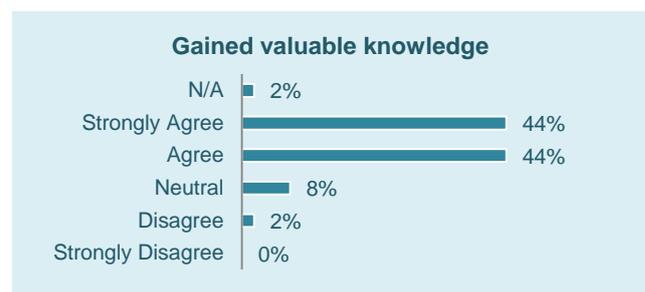
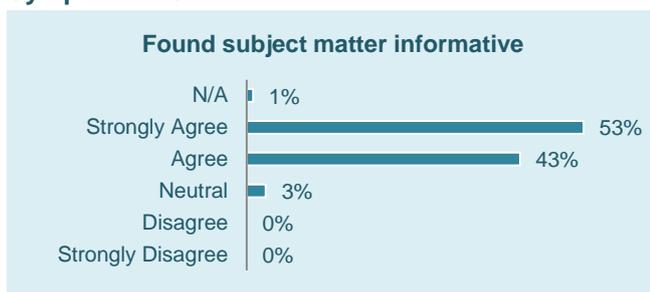
Symposium Topics

Overall, the evening’s programme was well received and attendees found all topics to be ‘very useful’ or ‘somewhat useful’.



Whilst the topics provided an awareness of the issues at hand, feedback suggested that the offering of ‘solutions’ or ‘tools’ in addressing the issues would have been beneficial.

Symposium Outcomes



The full report on the evaluation findings is available at: http://www.surgeons.org/media/25031524/2016-11-15_rpt_waasm_2016_symposium_evaluation_report_final.pdf

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