



# SCIDUA

Special Committee Investigating  
Deaths Under Anaesthesia

## Activities of the Special Committee Investigating Deaths Under Anaesthesia, 2015

Special Report



**NSW**  
GOVERNMENT

**Health**



CLINICAL  
EXCELLENCE  
COMMISSION

## © Clinical Excellence Commission 2016

All rights are reserved. In keeping with the NSW Government's commitment to encouraging the availability, dissemination and exchange of information (and subject to the operation of the *Copyright Act 1968*), you are welcome to reproduce the information which appears in this publication, as long as the user of the information agrees to:

- use the document for information only
- save or print a single copy for personal use only and not to reproduce any major extract or the entire document except as permitted under *Copyright Act 1968* (as amended) without the prior written permission of the State of New South Wales
- acknowledge the source of any selected passage, table diagram or other extract reproduced
- not make any charge for providing the Information to another person or organisation without the prior written consent of the State of New South Wales and payment of an agreed copyright fee
- not modify the information without the express prior written permission of the State of New South Wales
- include this copyright notice in any copy made:  
© - Copyright – Clinical Excellence Commission for and on behalf of the Crown in right of the State of New South Wales.

### National Library of Australia Cataloguing-in Publication entry

Title: Activities of the Special Committee Investigating Deaths Under Anaesthesia, 2015

ISSN: 2201-5116

SHPN: (CEC) 160048

### Suggested citation:

Clinical Excellence Commission (CEC), 2016. Activities of the Special Committee Investigating Deaths Under Anaesthesia, 2015. Sydney: CEC.

Any enquiries about or comments on this publication should be directed to:

Chair, SCIDUA

Clinical Excellence Commission

Locked Bag 8

Haymarket NSW 1240

Phone: (02) 9269 5530

Email: [CEC-SCIDUA@health.nsw.gov.au](mailto:CEC-SCIDUA@health.nsw.gov.au)

Clinical Excellence Commission

Printed by CEC

## Contents

FOREWORD	1
SCIDUA MEMBERSHIP, 2015	2
EXECUTIVE SUMMARY	3
1. SCIDUA	5
2. REPORTING DEATHS TO SCIDUA	5
3. LEGISLATIVE PROTECTION AND CONFIDENTIALITY	6
4. REPORTING	6
5. WHY THIS IS IMPORTANT	6
6. PROCESS	6
7. SYSTEM OF CLASSIFICATION	7
8. RESULTS	8
<b>8.1 Committee activities</b>	<b>8</b>
<b>8.2 Committee findings</b>	<b>9</b>
<b>8.3 Anaesthesia-related deaths</b>	<b>9</b>
8.3.1 No correctable factor identified	11
8.3.2 Anaesthesia-related with correctable factors	11
8.3.2.1 Inadequate airway maintenance	11
8.3.2.2 Inadequate pre-operative assessment	11
8.3.2.3 Inadequate monitoring	12
8.3.2.4 Poor planning	12
8.3.2.5 Anaesthetic technique	12
8.3.2.6 Anaesthetic drugs selection	12
8.3.2.7 Adverse event	12
8.3.2.8 Anaesthetic drug dosage	13
8.3.2.9 Post-operative management	13
8.3.2.10 Post-operative supervision	13

8.3.2.11	Inadequate pre-operative management	13
8.3.2.12	Inadequate post-operative resuscitation	13
8.3.2.13	Inadequate circulatory support and ventilation	14
8.3.2.14	Crisis Management	14
8.3.2.15	Inadequate anaesthetic management of resuscitation	14
8.3.2.16	Inadequate supervision or assistance	14
8.3.2.17	Poor organisation	14
<b>8.4</b>	<b>Description of anaesthesia-related deaths</b>	<b>15</b>
8.4.1	Age and sex	15
8.4.2	ASA physical status	16
8.4.3	Hospitals	17
8.4.4	Anaesthetists and anaesthesia	18
8.4.5	Surgery and urgency	19
8.4.6	Location of death	20
<b>8.5</b>	<b>Deaths in the operating theatre</b>	<b>21</b>
8.5.1	Anaesthesia-related deaths in the operating theatre	21
<b>8.6</b>	<b>Deaths associated with cemented hip arthroplasty</b>	<b>22</b>
<b>8.7</b>	<b>Deaths associated with haemorrhage</b>	<b>22</b>
<b>8.8</b>	<b>Inevitable deaths</b>	<b>22</b>
<b>8.9</b>	<b>Futile cases</b>	<b>23</b>
<b>8.10</b>	<b>Deaths not able to be assessed</b>	<b>23</b>
	APPENDIX A - SCIDUA NOTIFICATION FORM	24
	APPENDIX B - ANAESTHESIA MORTALITY	25
	APPENDIX C - AMERICAN SOCIETY OF ANESTHESIOLOGISTS PHYSICAL STATUS CLASSIFICATION	28
	APPENDIX D - HOSPITAL LEVEL	29
	APPENDIX E - URGENCY OF CASES	30
	ACKNOWLEDGEMENT	31

## Tables

Table 1: Cases reviewed and classified by SCIDUA in 2015	8
Table 2: Cases reviewed and classified by triage sub-committee in 2015	8
Table 3: Summary of committee activities in 2015	9
Table 4: Classification of cases reviewed in 2015	9
Table 5: Factors identified in anaesthesia-related deaths, 2015 (n=60)	10
Table 6: Classification of deaths in the operating theatre or procedural room by SCIDUA, 2015	21

## Figures

Figure 1: Age and sex distribution in anaesthesia-related deaths, 2015 (n=60)	15
Figure 2: Age and ASA distribution in anaesthesia-related deaths, 2015 (n=60)	16
Figure 3: Distribution of anaesthesia-related deaths by hospital type, 2015 (n=60)	17
Figure 4: Distribution of anaesthesia-related deaths by grade of anaesthetists and type of anaesthetics administered, 2015 (n=60)	18
Figure 5: Distribution of anaesthesia-related deaths by location within the hospital, 2015 (n=60)	20
Figure 6: Distribution of age and ASA physical status in inevitable deaths, 2015 (n=183)	23



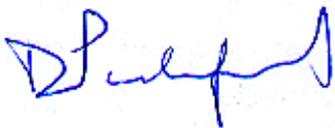
## Foreword

Much has changed since the committee began in 1960. At this time the estimated anaesthetic related mortality at a Sydney teaching hospital was estimated to be 1 in 3,900<sup>1</sup>. In the first ten years, the committee reported a high number of anaesthetic related deaths among obstetric and paediatric patients, whereas these are now almost non-existent.

We consider that safety has improved with specialist training, sophisticated monitoring and enforced better standards of care, but we are now faced with surgical procedures being offered at the extremes of age and with increasingly sick patients presenting for anaesthesia.

Anaesthesia is very safe in Australia. In NSW, more than one million individual episodes of anaesthesia care are recorded annually in all public and private hospitals. Modern anaesthetic techniques have made much of today's surgery possible and brought great benefits to patient safety. The reporting of anaesthesia-related deaths has helped ensure the high quality and safety of anaesthetic administration.

In this report, the committee shares its findings on anaesthesia- and sedation-related deaths that occurred in NSW in 2015. It provides the evidence for demonstrating the safety and risk of anaesthesia. I thank the committee for their good work and commend this report to you.



**David Pickford**  
Chair, SCIDUA

---

<sup>1</sup> B.S Clifton and W.I.T. Hotten; Brit J. Anaesth (1963), 35, 25

## **SCIDUA membership, 2015**

- Dr David Pickford, chair
- Dr Michele O'Brien, deputy chair & medical secretary
- Dr Damien Boyd
- Dr Matthew Crawford
- Dr Carl D'Souza
- Prof Clifford Hughes – retired in April 2015
- Dr Elizabeth O'Hare
- Dr Benjamin Olesnicky
- Dr Frances Smith

## Executive Summary

The Special Committee Investigating Deaths Under Anaesthesia (SCIDUA) has been reviewing anaesthesia-related deaths since 1960. It is the longest-serving committee of its type in the world. Because sedation and anaesthesia exist on a continuum of a decreased level of consciousness and use the same or similar drugs, the committee has more recently decided it was important to also review sedation related deaths.

In NSW the mandatory requirement to notify a death arising after anaesthesia or sedation for an operation or a procedure, is stipulated in section 84 of the *Public Health Act 2010*. We currently do not have available a method to verify whether all anaesthesia and/or sedation deaths are reported under that provision. The committee is confident that the data contains a representative sample of deaths in NSW. Other reporting sources within the Clinical Excellence Commission have helped ensure that major cases are not missed. Our data also indicates a good response rate from anaesthetists in providing further details of their notified cases, with 75 per cent of questionnaires requested in 2015 completed and returned to the committee.

In 2015 the committee reviewed 401 cases where death had occurred during, due to, or within 24 hours of an anaesthetic or administration of sedative drugs for medical procedures. Of these 287 fell within the terms of reference of the committee and were then classified.

In 60 cases the death was wholly or partly related to anaesthetic factors. A summary follows.

- The anaesthetic either directly caused, or substantially contributed to, the patient's death in 14 cases (Category 1 and 2<sup>2</sup>).
- Anaesthetic and surgical factors contributed to the patient's death in the remaining 46 cases.
- The majority of the patients were elderly, with 90 per cent (n=54) older than 65 and 57 per cent (n=34) older than 80.
- Almost two thirds (62%, n=37) were ASA<sup>3</sup> grade 4 or 5, i.e., critically unwell or not expected to survive for 24 hours. Nearly all cases (93%, n=56) were ASA grade 3, 4 or 5, i.e., had significant or life-threatening intercurrent illness<sup>4</sup>.
- Notably in 63 per cent (n=38) of cases, no correctable anaesthetic factor could be identified. Undergoing surgery still poses a risk to patients despite advances in anaesthetic drugs, monitoring and techniques.

---

<sup>2</sup> Classification of Anaesthetic Mortality (see Appendix B).

<sup>3</sup> The American Society of Anesthesiologists (ASA) physical status rating grades patients according to their health (see Appendix C).

<sup>4</sup> Intercurrent disease occurs at same time and may impact on other disease processes.

Correctable anaesthetic factors were seen in 37 per cent (n=22) of cases. The most common factors were:

- inadequate airway maintenance (36%)
- inadequate pre-operative assessment (32%)
- inadequate monitoring (23%)
- poor planning (23%)

These findings should be viewed in light of the retrospective nature of the committee's deliberations.

In June 2015, the average estimated resident population in NSW, as reported by the Australian Bureau of Statistics, was about 7.62 million<sup>5</sup>. Using this figure, the estimated anaesthesia-related mortality rate was approximately eight deaths per million population per annum. The estimated mortality directly caused by the anaesthetic was less than two deaths per million population per annum.

There were approximately 1.19 million individual episodes of anaesthesia care recorded at all public and private hospitals in NSW during 2015<sup>6</sup>. Using this figure, the estimated anaesthesia-related mortality was 1:19,858 procedures and the estimated mortality directly caused by anaesthesia was 1:85,106 procedures.

The committee reviews anaesthetic deaths to look for management choices that it considers could be improved. These are called correctable anaesthetic factors. The estimated mortality of anaesthetic deaths with correctable factors for 2015 was 1:54,158 procedures.

It is increasingly rare to review a case where a previously healthy patient dies from anaesthesia administration. The vast majority of patients who die with anaesthetic related factors are elderly and frail, and/or have a significant life threatening illness. Never-the-less the committee feels it is necessary to continue reviewing these deaths to increase our understanding of the interaction of anaesthesia with illness and to assess what improvements can be made in the delivery of health care in NSW.

---

<sup>5</sup> Australian Bureau of Statistics, 2015, *Australian Demographic Statistics*, 'Table 4. Estimated Resident Population, States and Territories (Number)', time series spreadsheet, cat. no. 3101.0, viewed 03 February 2016, <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Jun%202015?OpenDocument>

<sup>6</sup> This figure was obtained from the Health System Improvement and Reporting Branch, NSW Ministry of Health. It included cerebral anaesthesia, conduction anaesthesia and analgesia and anaesthesia during labour and delivery procedure. A coding hierarchy was used to ensure that only one anaesthesia item number was counted per episode of anaesthesia care.

## 1. SCIDUA

The Special Committee Investigating Deaths Under Anaesthesia (SCIDUA) is an expert committee appointed by the Minister for Health and has been in operation since 1960. Its current terms of reference are:

*'to subject all deaths which occur while under, as a result of, or within 24 hours after the administration of anaesthesia or sedation for procedures of a medical, surgical, dental or investigative nature to peer review so as to identify any area of clinical management where alternative methods could have led to a more favourable result'*

The Minister appoints members to the committee for a fixed term of five years, after which the committee advises the Minister whether re-appointment is appropriate. In the event of a loss of a member by resignation or other reason, the committee may recommend a suitable replacement to the Minister. The Minister may also appoint a member who is a representative of the Ministry of Health or the Clinical Excellence Commission (CEC). The committee elects its own chairperson, who must be a currently practising anaesthetist.

The committee has anaesthetists from a broad range of clinical specialties and professional organisations. Nominations for membership come from the Australian and New Zealand College of Anaesthetists (ANZCA), the Australian Society of Anaesthetists and academic departments of anaesthetics.

## 2. Reporting deaths to SCIDUA

The notification of deaths arising after anaesthesia or sedation for operations or procedures is a mandatory requirement in NSW, regardless of whether it is a coroner's case or not. This has caused some confusion because until 2009 reporting was stipulated within the *Coroner's Act 1980*.

Reporting to SCIDUA is required under section 84 of the *Public Health Act 2010* and applies:

*'if a patient or former patient dies while under, or as a result of, or within 24 hours after, the administration of an anaesthetic or a sedative drug administered in the course of a medical, surgical or dental operation or procedure or other health operation or procedure (other than a local anaesthetic or sedative drug administered solely for the purpose of facilitating a procedure for resuscitation from apparent or impending death).'*

Health practitioners are required to notify the death by completing the State form (SMR010.511): *Report of death associated with anaesthesia/sedation* (Appendix A). This can be ordered online from Stream Solutions ([www.tollstreamdirect.com](http://www.tollstreamdirect.com)). It can also be downloaded at:

[www.cec.health.nsw.gov.au/data/assets/pdf\\_file/0011/259355/nsw-health-report-of-death-assoc-with-anaesthesia-sedation.pdf](http://www.cec.health.nsw.gov.au/data/assets/pdf_file/0011/259355/nsw-health-report-of-death-assoc-with-anaesthesia-sedation.pdf)

Cases may also be referred to SCIDUA by the Patient Safety Team at the CEC if there is concern that anaesthesia may have been a factor in a patient's death.

### **3. Legislative protection and confidentiality**

SCIDUA has special privilege under section 23 of the Health Administration Act 1982 (NSW). This legislation makes it an offence for a person who obtains information in connection with the work of the committee to:

- disclose the information
- answer any questions or produce any documents relating to the information in any proceedings

Confidentiality of all communications between the reporting anaesthetist and the committee is paramount. Information can only be released with the consent of the person who provided the information, or the approval of the NSW Minister for Health.

### **4. Reporting**

SCIDUA communicates with its key stakeholders as follows.

- Each individual anaesthetist who provides information to the committee receives a letter from the chairperson explaining the reasons behind the committee's views on his or her case.
- A special report for the preceding calendar year is provided to the Minister.
- The committee provides data to the ANZCA Mortality Sub-committee, which produces the triennial report of 'Safety of Anaesthesia: A review of anaesthesia-related mortality reporting in Australia and New Zealand'.
- Periodically, the committee submits reports to peer-reviewed journals, in which trends in anaesthesia-related mortality are described. These reach a wide range of anaesthetists in Australia, New Zealand and internationally.

### **5. Why this is important**

Anaesthesia is not a medical therapy in itself, but is performed so that a medical or surgical procedure can be performed. Ideally there would be no adverse outcomes from the anaesthetic. Unfortunately this is an unrealistic expectation, since we know that all current anaesthetic and sedative drugs are either cardiovascular and/or respiratory depressants and their administration is subject to human error. Additionally, the specialised equipment and monitors that are used may be subject to faults and/or incorrect use.

Anaesthetists have to monitor, interpret and react to changes in the patient's condition. These changes could be due to the underlying disease process, the patient's intercurrent diseases, interactions or reactions to drugs, or due to the surgical/medical procedure and its complications.

It is important to look for emerging trends, because anaesthetic, surgical and medical interventions change with time. It is also important to monitor anaesthetic outcomes and look for ways to reduce any adverse events.

### **6. Process**

All reported deaths are reviewed by the triage sub-committee, which can either classify the death as due to factors not falling under the control of the health practitioner, or request further information from the reporting health practitioner using

an additional SCIDUA questionnaire. The questionnaire is always sent if there is any suspicion the anaesthetic or sedation was involved, or if the patient died during the procedure or in the recovery period. A questionnaire is also sent when there is a paucity of information on the initial notification form by the anaesthetist.

When questionnaires are returned, all information is de-identified and distributed to members of the committee prior to its meetings for review. Cases are discussed at each meeting and classified. A confidential reply by the chair is sent to the health practitioner explaining the committee's decision.

The committee manages its data in a secure Microsoft Access 2010/SQL server relational database. It stores data on patients and anaesthetists, as well as that collected from the form of notification, questionnaire and triage sub-committee and committee meetings. SCIDUA's data analyst is responsible for data management, ensuring accurate reporting, interpretation and verification of anaesthesia-related death data.

## **7. System of classification**

Cases are classified using a system agreed upon by the ANZCA Anaesthesia Mortality Sub-committee in 2006. The full system of classification may be seen in Appendix B at the end of this report.

Group A contains deaths where anaesthetic factors are thought to have played a role. There are three categories:

- deaths primarily due to anaesthetic factors are classified Category 1
- deaths where anaesthetic factors may have played some role are Category 2
- deaths where both surgery and anaesthetic factors were thought to have contributed are Category 3.

Group B contains deaths where anaesthesia is thought to have played no part. There are three categories:

- Category 4 for surgical deaths
- Category 5 for inevitable deaths (with or without surgery)
- Category 6 for incidental deaths, where the cause was unrelated to the surgery or anaesthetic.

Group C contains deaths where the factors involved in the patient's death are not fully assessable. There are two categories:

- Category 7 is used when the committee has considerable data, but is unable to find out the actual cause of death
- Category 8 is used for cases in which the available data is inadequate.

## 8. Results

### 8.1 Committee activities

**Table 1: Cases reviewed and classified by SCIDUA in 2015**

Meeting no.	Reviewed	Classified	More information
503	11	8	3
504	13*	12	-
505	12	12	-
506	11	11	-
507	13	13	-
508	11	11	-
509	12*	11	-
510	13	13	-
511	12	12	-

\* The number of cases reviewed by the committee includes some that were excluded because they did not fall within the terms of reference.

**Table 2: Cases reviewed and classified by triage sub-committee in 2015**

Triage no.	Reviewed	Classified	More information
107	21**	9	10
108	20**	7	9
109	26**	11	13
110	40	29	11
111	40**	25	14
112	39**	28	8
113	35**	28	6
114	44**	26	14
115	28**	21	5

\*\* The number of cases reviewed by the triage sub-committee includes some that were excluded because they did not fall within the terms of reference and those referred to the committee directly from triage.

**Table 3: Summary of committee activities in 2015**

	<b>No. of cases</b>
Reviewed by triage	293
Reviewed by the committee	108
<b>Total cases reviewed</b>	<b>401</b>
Classified by triage	184
Classified by the committee	103
<b>Total cases classified</b>	<b>287</b>

The committee met nine times in 2015 and, together with the triage sub-committee, reviewed 401 cases. Some cases do not fall within the terms of reference – usually because the patient died more than 24 hours after the operation and anaesthetic or the anaesthesia was not thought to be implicated in any way. These are excluded from further study. In total, 287 cases were classified using the system described above.

## 8.2 Committee findings

**Table 4: Classification of cases reviewed in 2015**

<b>Death Type</b>	<b>Category</b>	<b>No. of Cases</b>
Deaths attributable to anaesthesia	1 & 2*	14
	3	46
Deaths in which anaesthesia played no part	4	15
	5	183
	6	14
Un-assessable deaths	7 & 8*	15
	<b>Total</b>	<b>287</b>

\* Aggregated data is reported, due to small numbers in at least one of the categories (n≤5)

## 8.3 Anaesthesia-related deaths

The cases of greatest interest to the committee are those where anaesthetic factors are thought to be the main contribution to the death (Categories 1 and 2) and those where both anaesthetic and surgical factors are involved (Category 3). There were 60 anaesthesia-related deaths classified in 2015.

Table 5 shows the list of factors identified in anaesthesia-related deaths in 2015.

It is important to realise that there are two sub-sets of anaesthesia-related death - those in which the anaesthetic management could have been improved with possibly

a better outcome, and those in which the committee could not suggest any way in which alternative management could have averted the fatal outcome.

**Table 5: Factors identified in anaesthesia-related deaths, 2015 (n=60)**

<b>Causal or contributory factors</b>	<b>Frequency count</b>
<b>A Pre-operative</b>	
Ai Assessment	7
Aii Management	2
<b>B Anaesthetic technique</b>	
Bi Choice or application	3
Bii Airway maintenance	8
Biii Ventilation	1
Biv Circulatory support	1
<b>C Anaesthesia drugs</b>	
Ci Selection	3
Cii Dosage	3
Ciii Adverse event	3
Civ Incomplete recovery	-
Cv Inadequate recovery	-
<b>D Anaesthetic management</b>	
Di Crisis management	1
Dii Inadequate monitoring	5
Diii Equipment failure	-
Div Inadequate resuscitation	1
Dv Hypothermia	-
<b>E Post-operative</b>	
Ei Management	3
Eii Supervision	3
Eiii Inadequate resuscitation	2
<b>F Organisational</b>	
Fi Inadequate supervision or assistance	1
Fii Poor organisation	1
Fiii Poor planning	5
<b>G No correctable factor</b>	38
<b>H Medical condition of patient a significant factor</b>	55

The frequency counts add up to more than 60, because some anaesthesia-related deaths have more than one factor identified.

### **8.3.1 No correctable factor identified**

For thirty-eight (63%) deaths attributable to anaesthesia the committee felt that anaesthetic, surgical and/or the patient's own serious medical condition were factors that contributed to the death. For these cases the committee was satisfied with the anaesthetic management, but it is a reminder that surgery and anaesthesia are not without risk.

### **8.3.2 Anaesthesia-related with correctable factors**

The committee classified 22 cases (37%) as having correctable factors in the anaesthetic management. The most frequently identified were:

- inadequate airway maintenance (n=8)
- inadequate pre-operative assessment (n=7)
- inadequate monitoring (n=5)
- poor planning (n=5)
- inappropriate choice or application of anaesthetic technique (n=3)
- inappropriate selection of anaesthetic drugs (n=3)
- adverse event (n=3)
- inappropriate drug dosage (n=3)
- inadequate post-operative management (n=3)
- inadequate post-operative supervision (n=3)

#### **8.3.2.1 Inadequate airway maintenance**

The committee identified eight cases where adequacy of airway maintenance was considered a factor in the patient's death.

Peri-operative aspiration events were seen as a result of:

- Using a supraglottic airway despite patient risk factors indicating a need for intubation
- Not using a rapid sequence induction when it was appropriate
- Using a muscle relaxant inappropriate for a rapid sequence induction

Severe hypoventilation was not recognised in one case despite end-tidal CO<sub>2</sub> monitoring being utilised.

#### **8.3.2.2 Inadequate pre-operative assessment**

The committee identified seven cases where inadequate pre-operative assessment was considered a factor in the patient's death.

Better assessment may have led to changes in the timing of surgery, the type of surgery performed or avoidance of surgery in some patients. Also different decisions regarding appropriate levels of post-operative care and the adequacy of appropriately experienced staff in handling the case could have been made.

### **8.3.2.3 Inadequate monitoring**

The committee identified five cases where inadequate monitoring was considered a factor in the patient's death.

Critically unwell patients, those with cardiac conditions or patients having complex procedures with anticipated blood loss were sometimes noted to have no invasive arterial monitoring. This usually delayed the detection and appropriate management of haemodynamic instability.

### **8.3.2.4 Poor planning**

The committee identified five cases where poor planning was considered a factor in the patient's death.

Failure to anticipate the need to have a higher level of post-operative care led to patients having surgery in institutions where appropriate back-up facilities were not present. This delayed both the early signs of deterioration being noted and the delay of definitive treatment being instituted due to the delays involved in retrieval to an appropriate centre.

### **8.3.2.5 Anaesthetic technique**

The committee identified three cases where the choice or application of anaesthetic technique was considered a factor in the patient's death.

Alternative management might have avoided poor outcomes related to airway maintenance, the dosage of drugs given during a procedure and avoiding a recognised complication of a regional technique.

### **8.3.2.6 Anaesthetic drugs selection**

The committee identified three cases where the selection of anaesthetic drugs was considered a factor in the patient's death.

The choice or dosage of a muscle relaxant was questioned for patients requiring a rapid sequence induction in two patients and in another the choice and dose of an opioid drug produced an unwanted side effect.

### **8.3.2.7 Adverse event**

The committee identified three cases where an adverse event was considered a factor in the patient's death.

Cases of anaphylaxis continue to be seen by the committee. In the three cases seen, drugs either suspected or proven to be causative agents were muscle relaxants and antibiotics. Even with immediate and appropriate resuscitation efforts the outcomes were still fatal.

### **8.3.2.8 Anaesthetic drug dosage**

The committee identified three cases where the dosage of anaesthetic drugs was considered a factor in the patient's death.

The committee continues to see cases where intravenous induction agents are not being titrated to the patient's specific characteristics.

A case was also seen where an overdose of a drug infusion and its resulting side-effects contributed to a poor patient outcome, and another where using less than the recommended dose of a drug led to an airway event.

### **8.3.2.9 Post-operative management**

The committee identified three cases where post-operative management was considered a factor in the patient's death.

Adequately trained staff should be available early in the patient's recovery to manage known complications, and ongoing high level care needs to be anticipated and arranged in some patients.

### **8.3.2.10 Post-operative supervision**

The committee identified three cases where post-operative supervision was considered a factor in the patient's death.

### **8.3.2.11 Inadequate pre-operative management**

The committee identified two cases where inadequate pre-operative management was considered a factor in the patient's death.

Cases concerning either the failure of placement of nasogastric tube pre-operatively for bowel obstruction or the confirmation of the position of the nasogastric tube peri-operatively have contributed to aspiration events occurring.

### **8.3.2.12 Inadequate post-operative resuscitation**

The committee identified two cases where inadequate post-operative resuscitation was considered a factor in the patient's death.

Observation of haemodynamic parameters and respiratory function are critical in the recovering patient. Cases have been seen where the alteration of alarm volume has led to resuscitation efforts being delayed.

### **8.3.2.13 Inadequate circulatory support and ventilation**

The committee identified one case where the inadequacy of circulatory support and ventilation were considered to be factors in the patient's death.

The absence of an end-tidal CO<sub>2</sub> trace should be viewed as a critical situation which requires immediate resolution.

### **8.3.2.14 Crisis Management**

The committee identified one case where crisis management was considered a factor in the patient's death.

Sudden haemodynamic instability needs to be recognised, investigated and aggressively managed.

### **8.3.2.15 Inadequate anaesthetic management of resuscitation**

The committee identified one case where inadequate resuscitation was considered a factor in the patient's death.

A delay in recognising surgical complications can lead to delays in adequate management.

### **8.3.2.16 Inadequate supervision or assistance**

The committee identified one case where inadequate supervision or assistance was considered a factor in the patient's death.

The anaesthetic risk profile of the patient was under appreciated at initial assessment leading to less experienced staff members performing the intubation resulting in an anaesthetic complication occurring.

### **8.3.2.17 Poor organisation**

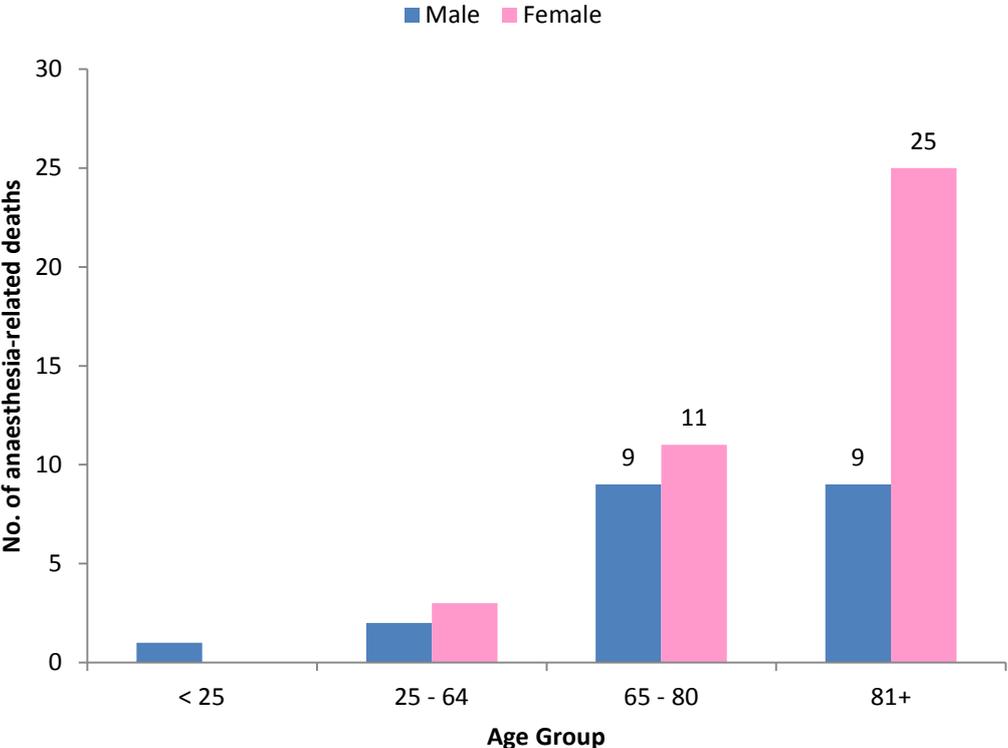
The committee identified one case where poor organisation of the anaesthetic service was considered a factor in the patient's death.

The high risk nature of the patient was not matched with the level of post-operative care available in the facility where the surgery was performed, leading to delays in detection of patient deterioration and the initiation of appropriate management.

## 8.4 Description of anaesthesia-related deaths

### 8.4.1 Age and sex

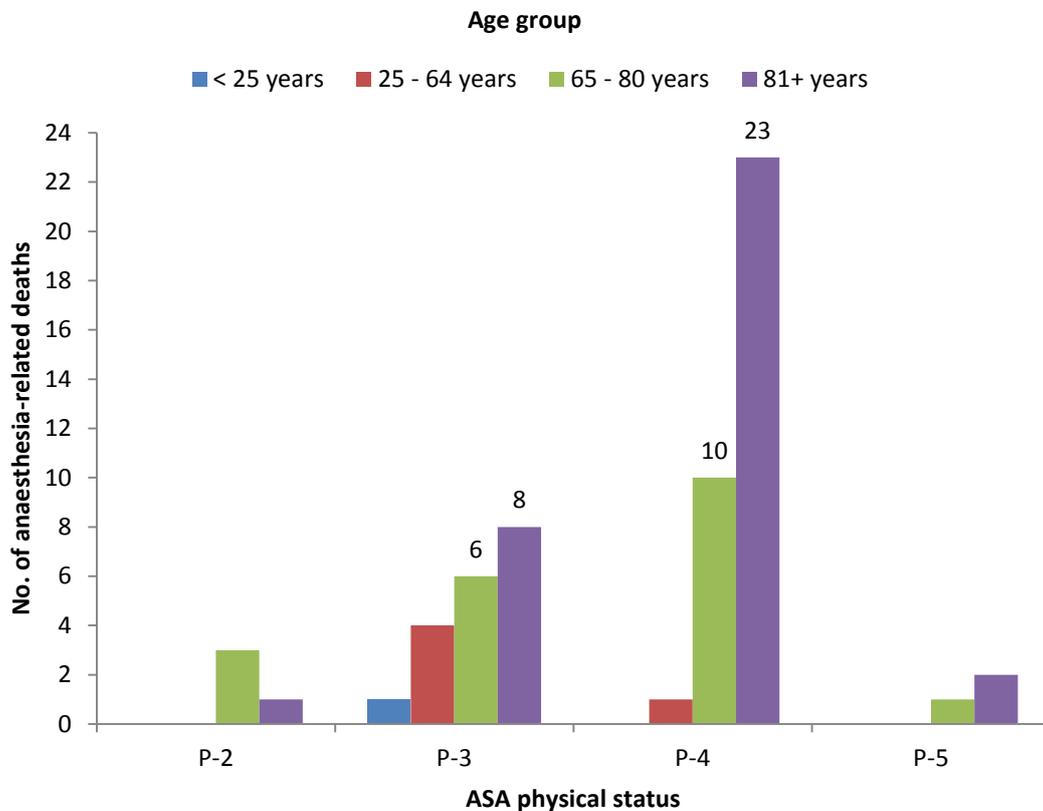
Figure 1: Age and sex distribution in anaesthesia-related deaths, 2015 (n=60)



- There were more females (65%) than males (35%) in anaesthesia-related deaths
- Most patients (90%, n=54) were aged 65 and over, with more than half aged over 80 (57%, n=34)
- The median age of patients was 84 years (range: 14 years – 99 years)

### 8.4.2 ASA physical status<sup>7</sup>

Figure 2: Age and ASA distribution in anaesthesia-related deaths, 2015 (n=60)



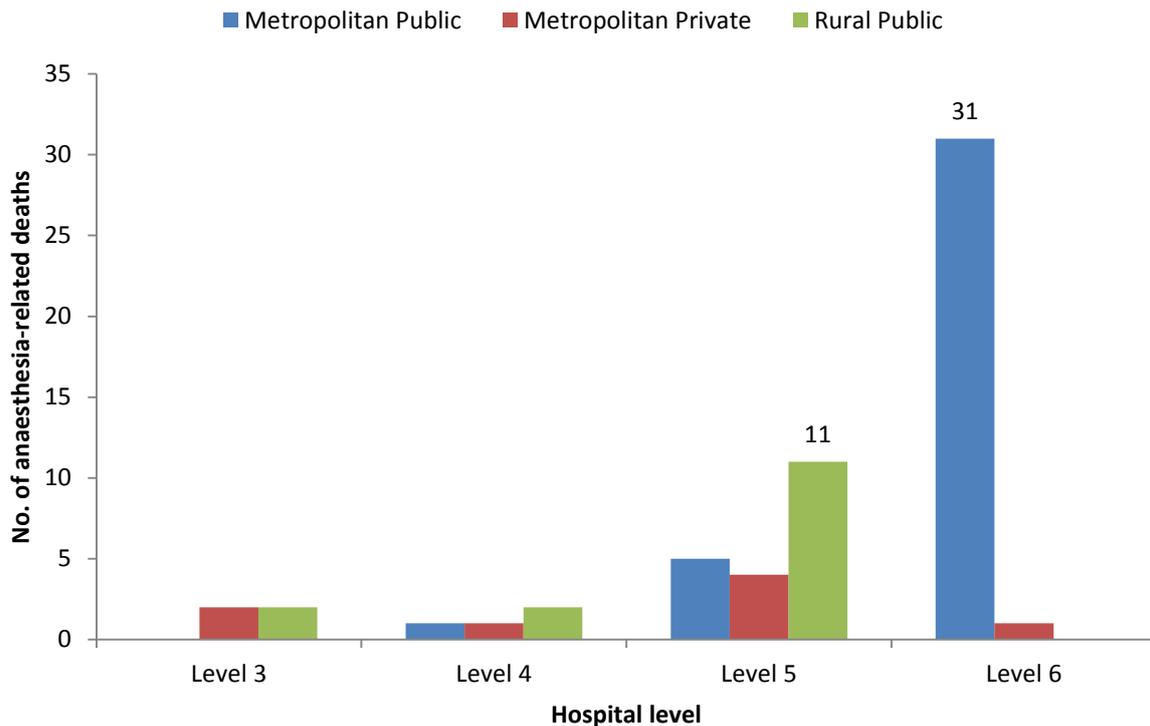
- Most anaesthesia-related deaths (89%, n=53) were ASA grade 3 or 4 and occurred in patients aged 65 and over. Thirty four patients were aged over 81 years and 33 of these patients were ASA grade 3, 4 or 5. Anaesthetists are frequently giving anaesthetics to very old and sick patients and anaesthesia poses a significant risk to this group.

<sup>7</sup> The American Society of Anesthesiologists (ASA) Physical Status rating grades patients according to their health (see Appendix C).

### 8.4.3 Hospitals

SCIDUA classifies hospitals into six levels, using a numerical system (Appendix D) based on, but not identical to the NSW Guide to Role Delineation of Health Services<sup>8</sup>. Figure 3 shows the distribution of anaesthesia-related deaths in NSW hospitals.

**Figure 3: Distribution of anaesthesia-related deaths by hospital type, 2015 (n=60)**

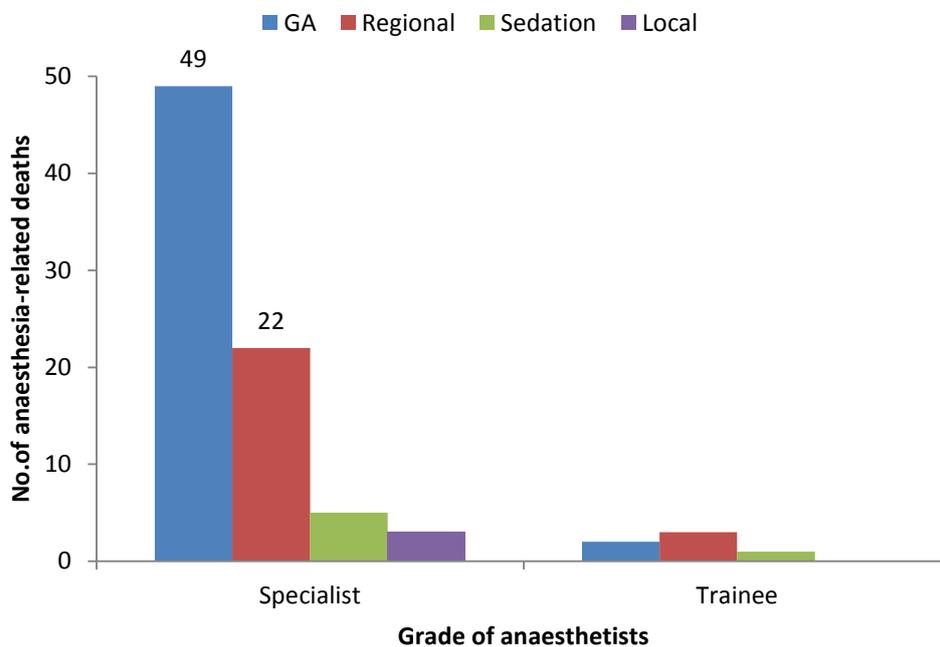


- The majority of anaesthesia-related deaths (60%, n=36) occurred in Level 5 or 6 metropolitan public teaching hospitals where higher volumes of complicated surgery are performed.
- Fifteen (25%) occurred in rural public hospitals
- Eight (13%) occurred in metropolitan private hospitals
- Three (5%) occurred in metropolitan public non-teaching hospitals

<sup>8</sup> NSW Health Department, 2002, *Guide to the Role Delineation of Health Services*, viewed 1 February 2016 <http://www.health.nsw.gov.au/services/Publications/guide-role-delineation-health-services.pdf>

#### 8.4.4 Anaesthetists and anaesthesia

**Figure 4: Distribution of anaesthesia-related deaths by grade of anaesthetists and type of anaesthetics administered, 2015 (n=60)**



- Most anaesthesia-related deaths (82%, n=49) had a general anaesthetic administered by a specialist anaesthetist or with the close supervision of a specialist anaesthetist.
- Twenty-two (37%) had a regional type of anaesthesia administered by a specialist anaesthetist
- Sedation was reported in six (10%) deaths. Nearly all (83%, n=5) were administered by specialist anaesthetists
- Specialist anaesthetists administered the anaesthesia/sedation in 57 (95%) anaesthesia-related deaths
- Trainee anaesthetists administered the anaesthesia/sedation in only three (5%) anaesthesia-related deaths

#### **8.4.5 Surgery and urgency**

SCIDUA classifies the timing of surgery as emergency, urgent, urgent non-emergency and scheduled (refer to Appendix E for definitions). The Australian and New Zealand College of Anaesthetists (ANZCA) Mortality Sub-committee report into the "Safety of Anaesthesia in Australia" will in future classify urgency based on whether the patient was admitted for scheduled (elective) surgery or as an emergency admission.

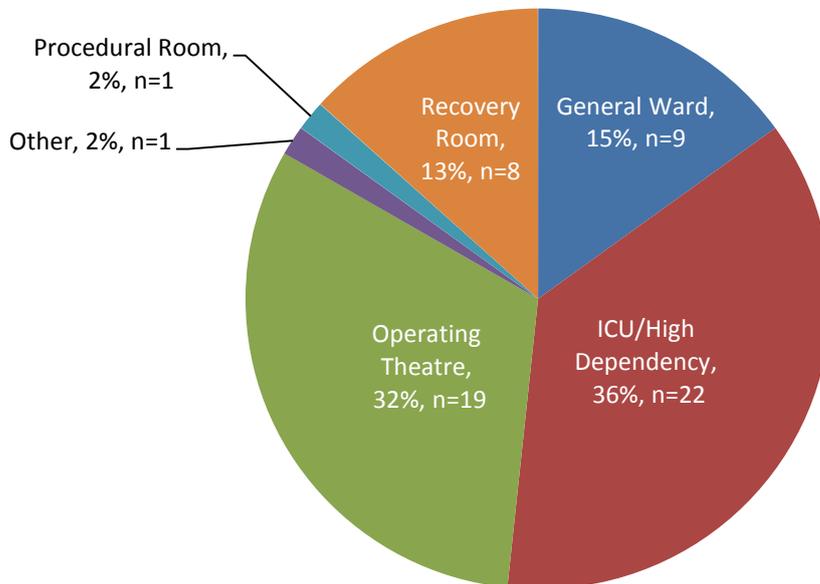
The committee found that by far the largest type represented was urgent non-emergency surgery. It accounted for most of the surgery performed in anaesthesia-related deaths (60%, n=36). Most of these cases were orthopaedic in nature (81%, n=29).

Scheduled surgery accounted for fourteen (23%) of the cases performed in anaesthesia-related deaths. Some of these scheduled cases could have been emergency admissions to hospital, but the committee was led to believe that the procedure was not critically time dependent and the patient had time for appropriate assessment and management before surgery. Ten (17%) of the operations classified as anaesthesia-related deaths were performed as an emergency.

Orthopaedic surgery was performed in more than half of all anaesthesia-related deaths (58%, n=35). Other types of surgery performed had small numbers and included abdominal, cardiothoracic, neurosurgical, non-invasive procedural investigations, urological and vascular operations.

#### 8.4.6 Location of death

**Figure 5: Distribution of anaesthesia-related deaths by location within the hospital, 2015 (n=60)**



- Most anaesthesia-related deaths (36%, n=22) occurred in intensive care units (ICU) or high dependency units
- There were 19 (32%) anaesthesia-related deaths in the operating theatre, followed by deaths in the general ward (15%, n=9) and the recovery room (13%, n=8)
- One anaesthesia-related death occurred in the procedural room and one other was a death in the community

## 8.5 Deaths in the operating theatre

The most confronting death is the one that happens on the operating table, or shortly after in the recovery room, directly under the anaesthetist's care.

In 2015, the committee reviewed 57 deaths that occurred in the operating theatre or procedural room. Of these, 20 (36%) were classified as being anaesthesia-related (Table 6).

The committee also considered that death was inevitable and outside the control of the surgeon and anaesthetist in 29 (51%) of deaths in the operating theatre or procedural room.

**Table 6: Classification of deaths in the operating theatre or procedural room by SCIDUA, 2015**

<b>Death Type</b>	<b>Category</b>	<b>No. of cases</b>
Deaths attributable to anaesthesia	1, 2 & 3	20
Deaths in which anaesthesia played no part	4, 5 & 6	33
Un-assessable deaths	7 & 8	4
	<b>Total</b>	<b>57</b>

### 8.5.1 Anaesthesia-related deaths in the operating theatre

The median age of "on table" anaesthesia-related deaths was 83 years (range: 14 – 95 years).

Fifty per cent (n=10) were ASA 4 or 5, i.e., critically unwell. The rest were ASA 3, i.e., with moderate systemic disease.

Orthopaedic surgery was performed in more than half these cases (60%, n=12). The remainder underwent abdominal, cardiothoracic, neurosurgical or vascular surgery.

More than half the cases were urgent non-emergency (65%, n=13), the remainder were scheduled (30%, n=6) or emergency (5%, n=1) operations.

There was one case of an adverse drug event/anaphylaxis, and 7 cases (35%) in which bone cement implantation syndrome was implicated.

## **8.6 Deaths associated with cemented hip arthroplasty**

There were 17 cases where the committee considered the cause of death was related to bone cement. There were other cases where bone cement might have been used, but the committee agreed that those deaths were not related to the typical bone cement implantation syndrome.

## **8.7 Deaths associated with haemorrhage**

There were eight cases where death was thought to be due to uncontrolled haemorrhage as a complication of the patient's disease process and the surgery.

## **8.8 Inevitable deaths**

The majority of cases reported to the committee in 2015 were classified as having no anaesthetic or surgical factors involved and are considered inevitable deaths (Category 5) (64%, n=183). These were cases where the patient's disease or injury made recovery impossible, despite competent anaesthesia and surgery. The age and ASA grade<sup>9</sup> distribution among these inevitable deaths are presented in Figure 6.

Trauma was reported in 27(15%) of these cases. Most inevitable deaths occurred after an operation or medical procedure listed as follows:

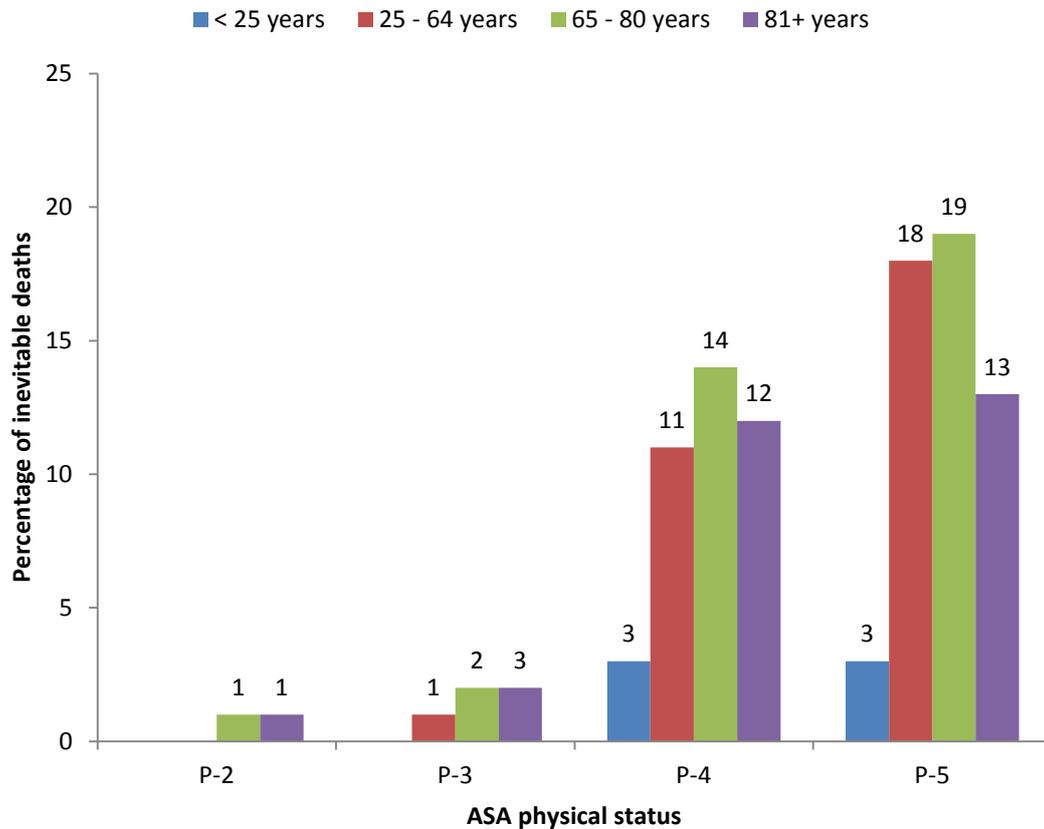
- Abdominal (34%, n=63)
- Cardiothoracic (10%, n=19)
- Neurosurgery (10%, n=19)
- General (non-abdominal) (10%, n=18)
- Vascular (8%, n=15)
- Endoscopic procedures (7%, n=13)
- Multi-trauma (7%, n=13)
- Other<sup>10</sup> (13%, n=23).

---

<sup>9</sup> The American Society of Anesthesiologists (ASA) Physical Status rating grades patients according to their health (see Appendix C).

<sup>10</sup> Includes cardiac procedures, orthopaedic surgery, radiological procedures, resuscitation and urological surgery.

**Figure 6: Distribution of age and ASA physical status in inevitable deaths, 2015 (n=183)**



- Nearly all inevitable deaths (93%, n=170) were ASA grade 4 or 5, i.e., critically unwell, or not expected to survive for 24 hours
- Most were patients aged 65 or over (64%, n=117)
- All deaths under 25 years (7%, n=12) were ASA grade 4 or 5

### 8.9 Futile cases

These are cases where surgery is performed, when it is clear before starting, that no favourable outcome could be expected from the surgical intervention. The committee classified 14 such cases in 2015.

While it is understandably difficult to be put in a situation where medical practitioners are seen as withholding treatment, the concepts of what is of benefit to the patient and what is and is not a medically appropriate procedure should be considered in cases where time allows.

### 8.10 Deaths not able to be assessed

There were 15 cases classified Categories 7 and 8. It is important to note that both these categories could have anaesthetic factors involved in the patient's death, but the committee has been unable to assess them, usually due to a lack of information.

# Appendix A - SCIDUA Notification Form

 SMR010511			FAMILY NAME		MRN	
	Facility:		GIVEN NAME		<input type="checkbox"/> MALE <input type="checkbox"/> FEMALE	
			D.O.B. ____/____/____		M.O.	
	<b>REPORT OF DEATH ASSOCIATED WITH ANAESTHESIA/SEDATION (PREVIOUSLY FORM B)</b>		ADDRESS			
			LOCATION			
			COMPLETE ALL DETAILS OR AFFIX PATIENT LABEL HERE			
	LOCATION OF DEATH (eg, OR, ICU, HDU etc)		DATE OF DEATH	TIME OF DEATH	WEIGHT	
	Pre-operative diagnosis / condition					
	ASA classification (please tick) <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> E					
	Operation(s) / procedure(s)					
Findings at operation/procedure						
Induction		DATE OF INDUCTION	TIME OF INDUCTION	TIME ANAESTHETIC CEASED		
Anaesthetic / Sedation (tick all relevant boxes) <input type="checkbox"/> GA <input type="checkbox"/> Regional <input type="checkbox"/> Local <input type="checkbox"/> Sedation						
List of all drugs given & doses (including premedication if any)						
Brief description of events						
Likely cause(s) of death						
Anaesthetist / Sedationist (Please print name, title and qualifications)		1. _____				
		2. _____				
Contact details of Medical Officer completing this report (for feedback)		PRIVATE MAILING ADDRESS		HOSPITAL ADDRESS		
Name of Medical Officer completing this report:		SIGNATURE		DATE		
Please send completed form to: Secretary NSW Health, c/o Special Committee Investigating Deaths Under Anaesthesia Clinical Excellence Commission, Locked Bag 8 HAYMARKET NSW 1240						

Holes Punched as per AS2628.1: 2012  
 BINDING MARGIN - NO WRITING

NHH01685 30/01/14

REPORT OF DEATH ASSOCIATED WITH ANAESTHESIA/SEDATION (PREVIOUSLY FORM B)

SMR010.511

SPECIAL COMMITTEE INVESTIGATING DEATHS UNDER ANAESTHESIA

## Appendix B - Anaesthesia Mortality

### GLOSSARY OF TERMS – CASE CLASSIFICATION

#### A Deaths attributable to anaesthesia

<b>Category 1</b>	Where it is reasonably certain that death was caused by the anaesthesia or other factors under the control of the anaesthetist.
<b>Category 2</b>	Where there is some doubt whether death was entirely attributable to the anaesthesia, or other factors under the control of the anaesthetist.
<b>Category 3</b>	Where death was caused by both surgical and anaesthesia factors.
<b>Explanatory notes:</b>	
<ul style="list-style-type: none"> <li>• The intention of the classification is not to apportion blame in individual cases, but to establish the contribution of the anaesthesia factors to the death.</li> <li>• The above classification is applied regardless of the patient's condition before the procedure. However, if it is considered that the medical condition makes a substantial contribution to the anaesthesia-related death, <u>subcategory H</u> should also be applied.</li> <li>• If no factor under the control of the anaesthetist is identified which could or should have been done better, <u>subcategory G</u> should also be applied.</li> </ul>	

#### B Deaths in which anaesthesia played no part

<b>Category 4</b>	Surgical death where the administration of the anaesthesia is not contributory and surgical or other factors are implicated.
<b>Category 5</b>	Inevitable death, which would have occurred irrespective of anaesthesia or surgical procedure.
<b>Category 6</b>	Incidental death, which could not reasonably be expected to have been foreseen by those looking after the patient, was not related to the indication for surgery and was not due to factors under the control of anaesthetist or surgeon.

#### C Un-assessable deaths

<b>Category 7</b>	Those that cannot be assessed, despite considerable data, but where the information is conflicting or key data is missing.
<b>Category 8</b>	Cases which cannot be assessed because of inadequate data.

### CAUSAL OR CONTRIBUTORY FACTORS IN CATEGORY A DEATHS

Note that it is common for more than one factor to be identified in the case of anaesthesia-attributable death.

#### SUB-CATEGORIES

##### A Pre-operative

<b>(i)</b> Assessment	This may involve failure to take an adequate history, or perform an adequate examination, or to undertake appropriate investigation or consultation, or make adequate assessment of the volume status of the patient in an emergency. Where this is also a surgical responsibility, the case may be classified in Category 3 above.
<b>(ii)</b> Management	This may involve failure to administer appropriate therapy or resuscitation. Urgency and the responsibility of the surgeon may also modify this classification.

## B Anaesthesia technique

<b>(i)</b> Choice or Application	There is inappropriate choice of technique in circumstances where it is contra-indicated, or by the incorrect application of a technique, which was correctly chosen.
<b>(ii)</b> Airway Maintenance Including Pulmonary Aspiration	There is inappropriate choice of artificial airway, or failure to maintain or provide adequate protection of the airway, or to recognise misplacement or occlusion of an artificial airway.
<b>(iii)</b> Ventilation	Death is caused by failure of ventilation of the lungs for any reason. This would include inadequate ventilator settings and failure to re-institute proper respiratory support after deliberate hypoventilation (e.g., bypass).
<b>(iv)</b> Circulatory Support	Failure to provide adequate support where there is haemodynamic instability, in particular in relation to techniques involving sympathetic blockade.

## C Anaesthesia drugs

<b>(i)</b> Selection	Administration of a wrong drug or one which is contra-indicated or inappropriate. This would include 'syringe swap' errors.
<b>(ii)</b> Dosage	This may be due to incorrect dosage, absolute or relative to the patient's size, age and condition and in practice is usually an overdose.
<b>(iii)</b> Adverse Drug Reaction	This includes all fatal drug reactions, both acute, such as anaphylaxis and the delayed effects of anaesthesia agents, such as the volatile agents.
<b>(iv)</b> Inadequate Reversal	This would include relaxant, narcotic and tranquilising agents where reversal is indicated.
<b>(v)</b> Incomplete Recovery	For example, prolonged coma.

## D Anaesthesia management

<b>(i)</b> Crisis Management	Inadequate management of unexpected occurrences during anaesthesia or in other situations which, if uncorrected, could lead to death.
<b>(ii)</b> Inadequate Monitoring	Failure to observe minimum standards as enunciated in the ANZCA professional documents, or to undertake additional monitoring when indicated, e.g., use of a pulmonary artery catheter in left ventricular failure.
<b>(iii)</b> Equipment Failure	Death as a result of failure to check equipment, or due to failure of an item of anaesthesia equipment.
<b>(iv)</b> Inadequate Resuscitation	Failure to provide adequate resuscitation in an emergency situation.
<b>(v)</b> Hypothermia	Failure to maintain adequate body temperature within recognised limits.

## **E Post-operative**

<b>(i)</b> Management	Death as a result of inappropriate intervention or omission of active intervention by the anaesthetist or a person under direction (e.g., recovery or pain management nurse) in some matter related to the patient's anaesthesia, pain management or resuscitation.
<b>(ii)</b> Supervision	Death due to inadequate supervision or monitoring. The anaesthetist has ongoing responsibility, but the surgical role must also be assessed.
<b>(iii)</b> Inadequate Resuscitation	Death due to inadequate management of hypovolaemia or hypoxaemia, or where there has been a failure to perform proper cardiopulmonary resuscitation.

## **F Organisational**

<b>(i)</b> Inadequate Supervision, Inexperience or Assistance	These factors apply whether the anaesthetist is a trainee, a non-specialist, or a specialist undertaking an unfamiliar procedure. The criterion of inadequacy of supervision of a trainee is based on the ANZCA professional document on supervision of trainees.
<b>(ii)</b> Poor Organisation of the Service	Inappropriate delegation, poor rostering and fatigue contributing to a fatality.
<b>(iii)</b> Failure of Interdisciplinary Planning	Poor communication in peri-operative management and failure to anticipate need for high-dependency care.

## **G No correctable factor identified**

Where death was due to anaesthesia factors, but no better technique could be suggested.

## **H Medical condition of the patient**

Where it is considered that the medical condition was a significant factor in the anaesthesia-related death.

## **Appendix C - American Society of Anesthesiologists Physical Status Classification**

### **P-1**

A normal healthy patient

### **P-2**

A patient with mild systemic disease

### **P-3**

A patient with severe systemic disease

### **P-4**

A patient with severe systemic disease that is a constant threat to life

### **P-5**

A moribund patient who is not expected to survive without the operation

### **E**

Patient requires emergency procedure

## Appendix D - Hospital Level

The nomenclature is a numerical system based on, but not identical with, the NSW Guide to Role Delineation of Hospitals. It classifies hospitals as follows:

- Level 6:** A multi-disciplinary hospital, which provides facilities for most or all surgical sub-specialties and the intensive care environment to support them. Specialist and sub-specialist anaesthetic staff are on site during the day and anaesthetic registrar cover is on site 24 hours a day. This classification also applies to where a hospital is designated as a trauma centre.
- Level 5:** A hospital which is multi-disciplinary, but only provides some sub-specialty surgery and anaesthesia, with an appropriate post-operative environment. Specialist and sub-specialist anaesthetic staff are on site during the day and anaesthetic registrar cover is on site 24 hours a day, or available within 10 minutes.
- Level 4:** A multi-disciplinary hospital, which does not cater for all surgical specialities, but accepts some trauma and provides a lower level of intensive care, referring any patients in need of specialised life support to a higher-level facility. Specialist anaesthetic staff are on site during the day and provide an on-call service after hours.
- Level 3:** A hospital or day centre which undertakes a limited range of procedures, but does not have the capability to care for high-risk patients or surgery which necessitates high-level post-operative care. Specialist anaesthetic staff are on site during the day.
- Level 2:** A facility at which anaesthesia or sedation is provided to enable a single procedure to be undertaken on good-risk patients (such as stand-alone ECT or dentistry).
- Level 1:** Any other location at which anaesthesia or sedation is administered, such as a dental office.

If an institution or facility is in regional NSW, the suffix **R** is added and for private hospitals, the suffix **P**.

## **Appendix E - Urgency of cases**

### **Emergency**

Immediate surgery for life-threatening condition (less than 30 minutes), e.g., ruptured abdominal aortic aneurysm, extra-dural haematoma, prolapsed umbilical cord.

### **Urgent**

At the earliest available time to prevent physiological deterioration (30 minutes - 4 hours), e.g., ruptured viscus, appendicitis, open wound, blocked ventriculo-peritoneal shunt.

### **Urgent non-emergency**

The patient has a condition that requires emergency surgery, but there is time to allow medical optimisation and appropriate organisation of operating time and surgeons or surgical teams (4 hours to days), e.g., fractured neck of femur, pacemaker insertion, laparotomy for bowel obstruction.

### **Scheduled**

Where the patient presents for elective surgery.

## **Acknowledgement**

### **Executive and project staff at the CEC**

Prof Clifford Hughes AO (retired in April 2015)

Dr Jonny Taitz, Director, Patient Safety

Paula Cheng, Manager, Special Committees

Bruce Czerniec, Data Analyst

Luana Oros, Project Officer

Kathy Tsoi, Project Officer

Nathaya Muadjienga, Project Officer

ShanShan Zhao, Project Assistant

### **Program support staff based at local health districts**

Deanne Ellis, Central Coast

Briana Bartley, Far West

Ann Barry, Hunter New England (retired in June 2015)

Diana Whittaker, Hunter New England

Daniel Purvis, Illawarra Shoalhaven

Ashley Thomas, Mid-North Coast

Nicole Smith, Murrumbidgee

Evelyn Esguerra, Nepean Blue Mountains

Craig McNally, Northern NSW

Angie Pang, Northern Sydney

Cyndee King and Michael Piza, South Eastern Sydney

Colette Duff, South Western Sydney

Jennifer Shevchuk, Southern NSW

Jasmin Douglas, St Vincent's Hospital

Cassandra Chan, Sydney

Maree Carolan, Western NSW

Kannan Srinivasan, Western Sydney





## Office

Level 17, McKell Building  
2-24 Rawson Place  
Sydney NSW 2000

Tel 61 2 9269 5530

Fax 61 2 9269 5699

[www.cec.health.nsw.gov.au](http://www.cec.health.nsw.gov.au)

## Correspondence

SCIDUA  
Clinical Excellence Commission  
Locked Bag 8  
Haymarket NSW 1240



Health



CLINICAL  
EXCELLENCE  
COMMISSION