

A Guide to

Surgical Audit & Peer Review

Determining Scope Selecting Standards Collecting data Presenting Results Opportunities to improve Making changes Monitoring progress Determining Scope Selecting Standards Collecting data Presenting Results Opportunities to improve Making changes Monitoring progress Determining Scope Selecting Standards Collecting data Presenting

Reviewing the outcomes of surgical care

Results Opportunities to improve Making changes Monitoring progress Determining Scope Selecting Standards Collecting data Presenting Results Opportunities to improve Making changes Monitoring progress Determining Scope Selecting Standards Collecting data Presenting Results Opportunities to improve

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1. INTRODUCTION

Surgical audit and peer review are important strategies in maintaining standards in surgical care at the clinical level. In February 2001, the Royal Australasian College of Surgeons (RACS) Professional Development and Standards Board (PDSB) elected to establish a Surgical Audit Task Force, to develop models of best practice for surgical audit.

In 2006 the task force became a committee reporting to Professional Standards, reflecting the need for continued monitoring and review of standards for surgical audit and peer review. The committee provided resources and tools to improve and support audit activities conducted by individual Fellows, specialty groups, hospitals and the wider Fellowship. It also approved various audits submitted for assessment by surgeons, special interest groups and specialty societies.

This Surgical Audit and Peer Review Guide was another step forward in the process of upholding the College's vision to set and maintain the highest standards of surgical care. It is for the guidance of individual surgeons and hospital surgical units. This standard should encourage administrations to provide adequate resources for these important activities.

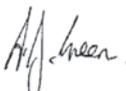
In recent years the number of audits submitted for approval has declined and so in 2013, the Surgical Audit Committee functions were assumed by the Professional Standards Committee. Former members of the Surgical Audit Committee have undertaken this review of the 4th edition of the Surgical Audit and Peer Review Guide.



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2. SURGICAL AUDIT – WHAT IS IT AND WHY DO IT?

Surgical audit is a systematic, critical analysis of the quality of surgical care that is reviewed by peers against explicit criteria or recognised standards, and then used to further inform and improve surgical practice with the ultimate goal of improving the quality of care for patients. The purpose of audit is to examine whether what you think is happening really is, and whether current performance meets existing standards.

A surgical audit involves:

- collection and measurement of clinical activities and outcomes
- analysis and comparison using standards, performance indicators and outcome parameters and
- a peer review process with a feedback mechanism to redress problems.

The key feature of audit is that it involves reviewing actual surgical performance, including outcomes. This clinical experience and that of your team is compared with accepted standards of what that performance should be. As such, it should be a stimulus and source of material for learning and quality improvement.

The aims of audit are:

- to identify ways of improving and maintaining the quality of care for patients;
- to assist in the continuing education of surgeons;
- to help make the most of resources available for the provision of surgical services.

2.1. Surgical Audit Definitions

Surgical audit may take the form of a personal surgical audit (total/ practice/ selected) or a group/hospital/specialty audit (focused or generic).

Total Practice or Workload Audit: This is an audit that covers all the surgical operations performed. Self-audit with comparisons to published outcomes can be useful.

While total practice audit is a goal, it is recognised that in some circumstances it is unrealistic. A total practice audit enables you to identify patterns and trends in your practice by observing changes in throughput (caseload), procedures performed and outcomes. One period needs to be compared with another and needs to be long



enough to accrue sufficient cases. A useful general tip is to start small, then gradually increase the scope of your audit.

Selected Audit from Surgical Practice: This is an audit that covers all patients who undergo a selected procedure, or an audit that covers all procedures conducted within a selected time-frame.

A Clinical Unit Audit: This is an audit conducted by a clinical unit in which a small number of individual surgeons may participate.

Group or Specialty Audit: This is an audit conducted by or under the auspices of a group or Specialty Society e.g. ANZSVS Bi-National Audit, BreastSurgANZ, Australasian Vascular Audit (AVA), Bi-National Colorectal Audit, Breast Implant Registry, Australian and New Zealand Gastric and Oesophageal Surgical Association (ANZGOSA) Audit, Carpal Tunnel Audit for Hand Surgeons, New Zealand Joint Registry.

A Focused Audit: A focused audit collects data on the process or outcome indicators such as those recommended by departments of health which may influence it: e.g. what is the wound infection rate after large bowel surgery – emergency/elective procedure, type of surgery, antibiotic prophylaxis blood loss, etc.

2.2. Surgical Audit and Continuing Professional Development

As surgical audit is a critical review of a personal, team or hospital's clinical work, it may be regarded as a cornerstone of professional development. Only by looking objectively at our own practice of surgery will we be able to compare our current performance and derive information which may help us consider how to improve what we do for the benefit of our patients. Audit can help identify the difference between what surgeons think they are doing and what they actually do. It facilitates self-referencing and reflective learning.

Surgical audit is an educational exercise that is thoroughly grounded in everyday practice. Research shows that audit and feedback is an effective educational strategy and helps participants analyse their performance and plan effective responses to improve their performance¹. All surgical trainees collect data for their logbooks and are involved in unit audits.

¹ Thomson M, Oxman A, Davis D, Haynes R, Freemantle N, & Harvey E (2000) Audit and feedback to improve health professional practice and health care outcomes (Cochrane Review). In: The Cochrane Library, issue 3, part 2. Oxford: Update Software, 1997.



A small expansion of the logbook data to include outcomes becomes the basis of a lifelong practice of audit. The RACS morbidity and logbook tool (MALT) which is recommended or mandated by some training boards, complies with these principles and contains the data sets and reports outlined later in this guide.

Group surgical audit also has been shown to improve the quality of surgery and reduce complications from surgery.

Participation in Surgical Audit – an annual requirement

As part of the College's Continuing Professional Development program (CPD), all surgeons who conduct operative procedures in hospitals, day surgery units or private rooms are required to participate in a surgical audit each year, and to submit such an audit for peer review².

The audit activity chosen can be a personal surgical, a unit/group audit, total practice or workload or an audit approved by the Professional Standards Committee of the Professional Development and Standards Board (PDSB). The audit must be submitted for peer review.

Mortality Audits

Lothian Surgical Audit

Aitken, Nixon & Ruckley³ demonstrated that audit and its associated peer review do lead to changes and improvements in surgical practice. In order to achieve the outcomes the audit cycle should concentrate on areas of clinical importance, continue over time and involve a cycle of analysis, reflection, dissemination and education. Changes in practice will be gradual but over time will occur.^{4 5}

The Lothian model was then introduced to Western Australia and has since been expanded to include other States and Territories and negotiations with New Zealand health authorities are in progress.

² RACS (2013) Continuing Professional Development Information Manual

³ Aitken R, Nixon S & Ruckley C 1997 Lothian Surgical Audit: a 15-year experience of improvement in surgical practice through regional computerised audit *The Lancet* 350 (9080):pp.800-804

⁴ The Western Australian Audit of Surgical Mortality – a 30% reduction in deaths over ten years: Aitken R, Azzam D, Itotoh F, Neo A: *Medical Journal of Australia* 2013; 199 (8): 539-542

⁵ The causes and effects of delay to diagnosis: outcomes from surgical mortality data: North J, Blackford F, Wall D, Ware, R, Rey-Conde, T, Allen J: *British Journal of Surgery* 2013; Volume 100, Issue 3



This program is called the Australian and New Zealand Audit of Surgical Mortality (ANZASM)

Australian and New Zealand Audit of Surgical Mortality

ANZASM is a bi-national initiative of the College to establish a network of regional audits of surgical mortality throughout Australia and New Zealand. These audits provide a peer review assessment for each death occurring during a surgical admission.

Participation in ANZASM is a requirement of the College's CPD program. Surgeons who have had a death of a patient under their care are required to participate in an ANZASM (where there is an audit available) by returning a completed case record form for review to ANZASM.

Some surgeons do not have the opportunity to participate in ANZASM, either because their hospital does not participate or because they live and work overseas. In such cases, we advise that surgeons should follow the principle of reviewing all mortalities of cases under their care, submitting such reviews to peer opinion. However, evidence that the surgeon has done this is not currently required if requested to verify one's CPD.

2.3. Audit or Clinical Review?

Surgical audit is a comparison against recognised standards of current surgical practice in order to improve the quality of care to patients. Data is collected with defined criteria. Comparisons are undertaken and recommendations for change made and followed up.

A clinical review involves a detailed presentation of one or more cases often with certain objectives and around a specific theme. The objectives may be educational and may focus on how we could have managed this case better (e.g. the clinicopathological case presentation). Some such cases may be reviewed during an audit meeting because they are unusual or because of what can be learned from the decision making or complications. However, reviewing one or two cases should be seen as one aspect of audit but not audit in itself.

2.4. Audit or Research?

Audit has similarities with research, but there are also many differences. Unlike research, audit does not necessarily extend the knowledge base of surgery but by critically analysing surgical practice, audit aims to improve the quality of care.

Because the primary purpose of an audit of surgical practice is not to promote scientific enquiry, the requirements and constraints of research



do not necessarily apply. However, it can on occasion provide impetus for a related research project. Audit is about review of surgical performance with a view to improving quality of care within a team or practice.

Audit databases may be used to prove or disprove research hypotheses. This is called an ad hoc audit in the Clinician's Toolkit.⁶ The more data in the data base the more feasible it is to do this. It is therefore worth retaining audit data but care must be taken in preserving privacy in building larger databases particularly if more than one hospital is involved. Local and other Ethics Committees may need to be consulted (e.g. RACS Ethics Committee).

2.5. Assessing Performance

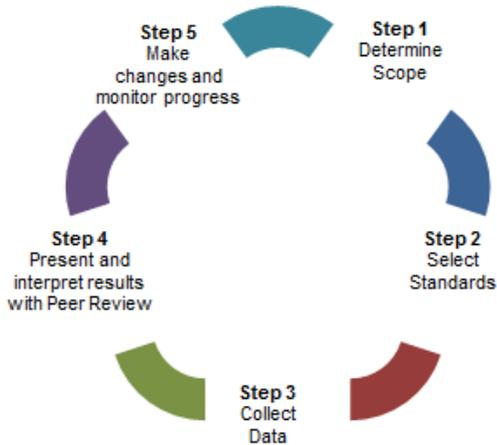
Although surgical audit data can be used to assess performance it is important to realise that the audit is only one aspect of assessment. It should be recognised that most surgeons perform well and that surgical audit helps to provide evidence of surgical achievements. Specific aspects of performance can be examined by defining outcomes and agreeing a target, though the process of defining and the agreeing may be a challenge for any group of surgeons.

Performance may not just relate to surgical outcomes (audit of outcome). It may also describe access to surgery, throughput or efficiency (audit of structure), or when assessing the process of care the use of investigations, or rates of referring cases for expert opinion (audit of process) e.g. the number/ percentage of patients with breast cancer being referred to an oncologist or discussed at a multidisciplinary meeting.

Most hospitals expect to be notified of what surgical audit data is being contributed to specialist or multi-centre databases. Normally data for surgical audit is regarded as low risk in terms of any ethical considerations that is providing it is de-identified so that patient, hospital and surgeon confidentiality are maintained.

⁶ Clinicians Toolkit <http://www0.health.nsw.gov.au/pubs/2001/pdf/clintoolkit.pdf>





2.6. The Surgical Audit Cycle

Surgical audit activities are based on a five-step cycle:

Step 1: Determine scope:

A thoughtful decision about which area(s) of surgical practice to review.

Step 2: Select standards:

A clear description of what is good practice in this area against which the results of the audit will be compared.

Step 3: Collect data:

The collection of relevant data.

Step 4: Present and interpret results including peer review:

Comparison of results to standards and/or those of peers, discussion with peers, decision about what changes may lead to improvement e.g. learning new skills, changes in practice, systems etc.

Step 5: Make changes and monitor progress:

Alteration or confirmation of practice in accord with the results of analysis and consultation with peers, then checking that improvement has occurred.



2.7. Determine Scope

The scope (or topic) chosen for audit should be clearly defined. Failure to clearly define this may result in insufficient or inappropriate data being collected. You can only report indicators if there is a sufficient volume of cases to give a meaningful numerator or denominator.

Common areas in the scope of an audit include:

- 30 day mortality;
- length of hospital stay;
- unplanned readmission or re-operation rates;
- positive and negative outcomes;
- operation-specific complications;
- process of care, such as pre-operative care;
- time on waiting list;
- numbers waiting for outpatient appointment;
- use of investigations;
- justification of management; and
- patient satisfaction.

In general, outcomes should be simple, well defined, easily measurable, relevant and have a valid relationship to performance.⁷

It has been traditional for audits to focus on adverse events, e.g. death and complications, reflecting an underlying assumption that adverse events are a consequence of poor quality of clinical care. A review of adverse events should aim to identify system errors to enable improvements in patient care.

Audit of the outcome of a disease process for surgical intervention may require a measure of the quality of life, activities of daily living or objective assessment of the symptoms the operation was intended to reduce.

Audit should recognise what is done well and the achievements of a surgeon/unit/service. Comparing 6-12 month time periods may allow improvement to be demonstrated as a result of changes in practice

⁷ Van Rij, A. (1996) Continuing Education & Surgical Performance, The Bulletin 16 (3):pp. 5-8



2.8. Select Standards

Decide what the standards of good practice are for the selected topic/practice area. Decide what information you need and what is irrelevant. You may want to use one or more methods to do this:

- use evidence-based research and guidelines;
- adapt existing local guidelines for local relevance;
- use an accessible library for evidence about effective practice and develop new guidelines; and/or
- look to your specialty group to define standards.

Clearly describe any existing standards or the process you will use to develop your standards. When reviewing existing standards or developing your own, remember to consider whether the standards are measurable, specific and realistic:

Will you be able to collect information that can be compared with the standards? Are you as clear as possible about what constitutes good practice in your chosen area? Can you foresee any reason that you cannot achieve these standards?

You may decide to use ideal standards, e.g. 100% compliance with national or RACS guidelines or from a literature review. Alternatively, you may use minimum standards - the very least you think acceptable, based on current practice and consensus or personal standards; or somewhere in between which seems the best you can imagine given the constraints of practice.

For the purposes of self-education and change, the most useful standards are those relevant to the particular circumstances in which you are working.

Key Performance Indicators

A clinical indicator is a measure of the clinical management and / or outcome of care. It must be relevant to the type of practice, supported by evidence and easily measurable if they are to be effective tools in the pursuit of quality improvement.⁸

A well-designed indicator should 'screen', 'flag' or 'draw attention' to a specific clinical issue. Usually rate based, indicators identify the rate of occurrence of an event. Indicators do not provide definitive answers; rather they are designed to indicate potential problems that might need

⁸ Australian Medical Association Position Statement Clinical Indicators 2012
<https://ama.com.au/ition-statement/clinical-indicators-2012>



addressing, usually demonstrated by statistical outliers or variations within data results. They are used to assess, compare and determine the potential to improve care. Indicators are therefore, tools to assist in assessing whether or not a standard in patient care is being met.

The best indicators are those that rely on independent, unbiased collection, but represent true, reliable data that clinicians have confidence in, and are willing to reflect on. The indicators may not just be the process or outcome ones listed above but also be targeted at times, hospital initiated postponements are all structural measures of access or efficiency.

Some examples of Clinical Indicators are:

BreastSurgANZ Quality Audit

(formerly known as the National Breast Cancer Audit)

Scope: early and locally advanced breast cancer.

www.surgeons.org/nbca

	Key Performance Indicator (KPI)	Quality Threshold
1	Percentage of invasive cases undergoing breast conserving surgery referred for radiotherapy	85% or more
2	Percentage of oestrogen positive invasive cases referred for hormonal therapy treatment	85% or more
3	Percentage of invasive cases undergoing axillary surgery	90% or more
4	Percentage of <i>in situ</i> cases undergoing breast conserving surgery without axillary surgery*	90% or more
5	Percentage of high risk invasive cases undergoing mastectomy referred for radiotherapy	85% or more

* KPI 4 is currently being reassessed for appropriateness and may be modified by the Steering Committee



ANZGOSA Audit

Scope: oesophago-gastric cancer or gastrointestinal stromal tumour (GIST)

www.surgeons.org/anzgosa

Outcome Indicators

Number and percentage

Individual Fellow rate compared to audit aggregate

OUTCOME
Intraoperative complications
Postoperative complications
Blood transfusion
Return to theatre
In-hospital death
Readmission within 30 days
30-day mortality

Length of Stay:

Mean and Range expressed as 'days'.

Individual Fellow result compared to audit aggregate.

LENGTH OF STAY	
Intubation	Mean
	Range
Initial post-operative ICU Stay	Mean
	Range
Post-operative hospital stay	Mean
	Range



Rural Procedural Audit

Scope:

- Laparoscopic cholecystectomy
- Colorectal surgery
- Inguinal herniorrhaphy (Adult)
- Breast cancer surgery
- Thyroidectomy

RPA Indicators:

- Number and percentage
- Individual Fellow rate
- Fellow comparison to audit aggregate

www.surgeons.org/rpa

Indicators
<u>Biliary tract indicators</u>
Bile leak requiring intervention
Bile duct injury
Unplanned ERCP post-operative
<u>Colorectal Cancer Indicators</u>
Unplanned reoperation
Mortality
Anastomotic leak
<u>Hernia Indicators</u>
Postoperative Haematoma
Referral to pain clinic
Hernia recurrence
<u>Thyroid indicators</u>
Recurrent Laryngeal Nerve Palsy
Postoperative hypocalcaemia Ca <2.0mmol/l



Adverse Events

An adverse event is defined as unintentional harm arising from an episode of healthcare and not due to the disease process itself. Major adverse events, such as bile duct injury, anastomotic leakage, and unplanned re-operations should also be included and presented for peer review. However there will be many minor adverse events such as pneumonia or UTI that should be presented but would not normally require discussion at an audit meeting.

An adverse event is not the same as a complication and although some complications are adverse events, not all are. It is the concept of “unintentional harm” that differentiates a complication from an adverse event. Some complications are merely unavoidable aspects of treatment, at least at a certain rate of occurrence. Complications are graded according to the Clavien-Dindo system.⁹

Adverse outcomes may be to some extent predictable but at a certain accepted rate which should be within agreed standards. They may arise as a result of technical error, patient comorbidity, progression of pathology, or reflect an accepted complication rate for a particular condition or operation. The various adverse outcomes that might be reported would include some of those listed below.

An alternative is to use some form of Limited Adverse Occurrence Screening based on identifying and reviewing cases that suffer from one or more of the Adverse Events listed below.

Some of the adverse events listed are already reportable or monitored in a number of hospitals.

- Adverse events worth considering are:
- Death in a surgical patient
- Unplanned readmission within 28 days
- Unplanned readmission to ICU from ward
- Unplanned reoperation
- Unplanned blood transfusion
- Transfer for more complex care
- Complication (Grade 3 or 4)

⁹ Dindo D, Demartines N, Clavien P. Classification of surgical complications. A new proposal with evaluation in a cohort of 6336 patients and results of a survey. *Ann Surg.* 2004, 240: pp.205-213.



- Complication prolonging anticipated hospital stay by more than 7 days
- Inadvertent perforation of a viscus
- Serious drug reaction or interaction
- Medication error
- Cardiac or respiratory arrest
- Medical Emergency Team (MET) call
- Fall
- Pressure Sore
- Reportable infection
- Booked for theatre and cancelled on day of surgery

In many hospitals some of the above listed adverse events are already reported and there should be no need to recollect the data. The challenge for those responsible for preparing an audit is to ensure that reportable adverse events such as nosocomial infections, falls, pressure sores and medication errors are known to the surgical team and where appropriate discussed.

Complications

Complications should be graded according to the Clavien-Dindo classification.¹⁰ The first three editions of this surgical audit guide combined Grades 3 & 4 below so had only a four level classification system. In recent years the Clavien-Dindo classification has become widely accepted and has replaced the previous level system.

Grade 1: Any deviation from the normal postoperative course without the need for pharmacological treatment, surgical, radiological or endoscopic interventions. For example, problems that did not prolong admission and had little impact on the patient's well-being, such as a mild wound infection, urinary tract infection, atelectasis, unexplained pyrexia

Grade 2: Requiring pharmacological treatment, including blood transfusion or TPN.

Grade 3: Complication which necessitates intervention, surgical, endoscopic or radiological

¹⁰ Dindo D, Demartines N, Clavien P. Classification of surgical complications. A new proposal with evaluation in a cohort of 6336 patients and results of a survey, p. 18



3a not requiring general anaesthesia

3b requiring general anaesthesia

Grade 4: Life threatening complications involving ICU management

4a Single organ dysfunction, including dialysis.

4b Multiorgan dysfunction

Grade 5: Death

The suffix 'd' can be added to the grade of complication, representing disability, if the data you require and that it is complete. Will you collect/ input the data yourself or review it before entry? It is wise to consider the accuracy of data – who has the final say in, for example, an accurate diagnosis or grade of complication?

Can the data required be collected at least in part by downloading from a hospital information system? Can you rely on the accuracy of downloaded data? - this will depend on who was responsible for entering it.

Before going on, pause to think how the data will look, how you will compare it to any standards and how you will analyse the results of this comparison.

- Is the data to be collected relevant to the objective(s) of the surgical audit?
- Do you need to modify, expand or limit the objective(s)?
- Will the data you collect adequately assess how well the standards have been met?
- Do you need to modify the standards?
- Do you need to modify the data collection methods?

2.9. The Minimum Data Set, Expanded Data Set and Trainee Logbook Data Set

To give guidance in collecting the data that are essential for effective surgical audit, the Surgical Audit Committee developed recommended data sets which allow some consistency of data and easier comparison of outcomes. The Minimum Data Set, which is the bare minimum of information, is particularly suited for large volume low risk procedures.



The Minimum Data Set is described in Appendix 1

For more effective audit, additional data is important. A further list of fields has been recommended as the Expanded Data Set. Additional recommended data requirements for specialty groups will be developed in conjunction with the specialty groups and their specific audits. There are also fields within this recommended data set which will be particularly relevant for trainees.

The Expanded Data Set is described in Appendix 2

The Extra Trainee Dataset fields are described in Appendix 3

There is often a need for extra fields for individual specialties. The fields added usually add to the grading of severity of disease (eg staging), or operative findings. Specialty data sets include those developed for Vascular, Cardiothoracic, Colorectal, Breast and Gastro and Oesophageal but there are many approved specialty audits (see Appendix 5). It is ideal if specialty data sets are kept to 12 extra fields or less.

2.10. Present and Interpret Results with Peer Review

Audit is about continuously improving by learning from experience and making changes, not just collecting data. It is the changes you can produce rather than the data collection itself, which are ultimately the most rewarding.

The results of your audit should be presented at a clinical meeting that is designed to discuss clinical outcomes. This constitutes the peer review of the audit and is an integral part of performing a surgical audit.

Peer Review

Peer review is a learning exercise. Whilst rights, responsibilities, apportionment of blame, punishment, compensation and access to justice can be valid processes, they should not be confused or interfere with the processes of education, risk management and quality assurance. Peer review is not an opportunity to blame or brag.

Peer review involves an evaluation of one's work by one's peers. Peers are other surgeons with comparable training and experience. It can often also be helpful to include other non-surgical members of the team in the review group e.g. surgical trainee or senior nursing staff. The review should be conducted in an atmosphere of confidentiality, of trust and teamwork, and be seen as an evolving process.



One form of peer review takes place through morbidity and mortality meetings, providing the participants include the presenter's peers. However, this type of peer review can be unstructured and informal. If morbidity and mortality meetings are used for audit peer review, they should be formally constituted and documented as described below.

Grand rounds as the name suggests are hardly confidential peer review - but cases should be presented as an educational exercise. They are good opportunities to learn from one or more cases but do not replace formal surgical audit meetings.

A peer review meeting should allow a frank, non-confrontational discussion between colleagues. This discussion should focus on perceived problems and successes, resulting in a practical plan for positive change if needed.

Confidentiality of the information used for and resulting from the audit is essential, both from the point of view of the rights of patients and of the individual surgeon. It should reassure those surgeons present that the discussion is confidential professional peer review.

An outcome of peer review may be a well-planned educational workshop (or a grand round to educate a wider audience), that takes account of the results of the audit. This can be highly effective in this step of the audit cycle. In fact, there is evidence to suggest that feedback of audit data without subsequent relevant education does not change performance.¹¹

As a general guide, there are three types of surgical practice for the purposes of peer review:

Surgeons working together with other specialists in a unit, a hospital or other group. A unit should review the work of all its surgeons at least once every six months. Some units may choose to do this on a more regular basis but this would be determined by individual circumstances.

Surgeons working as an individual, or head a single specialist team in a hospital with other specialists also providing surgery in the same institution but where there is no grouping of specialists into a unit. Peer review involves other surgeons from the same or similar craft group and should take place for each surgeon or surgical team at least once every six months.

¹¹ Aberg, T Svenmarker, S Hohner, P Hentschel, J (1997) Routine registration of deviations from the norm in cardiac surgery: a potent clinical research tool and quality assurance measure. [Journal Article] European Journal of Cardio-Thoracic Surgery. 11(1):10-2, 13-6



Surgeons solely responsible for a hospital or region who have no surgical peers of the same grade in their institution. Such surgeons may need to organise peer review by an occasional visit to or from regionally based colleagues or by teleconference if meeting together is not practicable. A registrar is not a peer of a consultant; however registrars should contribute to audit meetings.

Rural and isolated surgeons, and those working in small hospitals should establish geographic or specialty based links with other surgeons to facilitate peer review. Other options that can be considered are teleconferences, and on-line chat groups or discussion forums.

It is also possible to organise an anonymous comparison of performance outcomes of surgeons in a region, country or specialty. However, there are issues associated with the approach, which need to be considered — namely differences of case-mix, co-morbidity and type and size of practice. The College's Department of Professional Standards can facilitate peer review for an individual or group whom otherwise would find it difficult.

It can often be valuable to combine all surgical specialties or incorporate other clinical colleagues to add interest. The issue of whether a surgical audit is presented to other hospital doctors or senior nursing staff is a local matter. Also the requirement for individual units or surgeons in a hospital to report on surgical audit activities to their hospital management or quality units is also regarded as a local matter. It is expected however, that most hospitals would want to receive a regular summary of surgical audit from each unit and surgeon.

Peer Review Meetings

The following are suggestions for the conduct of peer review meetings:

- All surgeons should be a member of an active peer review group of no fewer than three surgeons.
- Choose a conducive setting e.g. privacy, coffee, minimal interruptions and with data projection facilities.
- Rotate the role of Chair - it is most important to create equity and avoid bias, real or apparent. An alternative is to appoint an
- independent chair such as a medical director or a recently retired surgeon.
- Schedule meetings with sufficient notice to give relevant staff the opportunity to attend.



- A record of attendance at peer review meetings should be kept to demonstrate satisfactory attendance.
- Peer review of an individual surgeon's work should occur not less than six- monthly, and unit/department peer review should occur monthly.
- Peer review should include both individual cases and examination of trends in practice over extended time periods. Outcome reviews can also include comparative assessments, focused reviews of specific problems or procedures, and follow up of recent changes.
- The Chair of the session should ensure all serious events are considered for appropriate review.
- Efforts should be made to identify quality issues (particularly system deficiencies) and appropriate actions to be taken. These issues should be brought to the attention of the hospital medical and administrative hierarchy and/ or the specialty group executive. An example is available under 'Chair's Report Format' (page 20).
- At the conclusion of the session, plans/ recommendations should be made, recorded and passed on to relevant service directors/ managers. It is important to follow up all results. The final outcomes column is to be completed at the next audit meeting. It cannot be filled in when the issues are raised and actions are recommended.
- It is ideal if hospitals assist surgeons with the process of conducting an audit.
- Surgical audit is a mandatory requirement for hospitals to maintain accreditation with organisation such as the ACHS or International Organisation for Standardization (ISO). At the very least, it is recommended that the hospital provides the list of procedures to assist with the audit and peer review process.

Suggested documentation for action on quality issues raised through peer reviewed audit:



Chair's Report Format

Chair: SURGEON'S NAME,

Date of meeting:

Meeting group name: (e.g. General Surgeons Audit Hospital XYZ)

Members present: A, B, C, D, E, F, G

The issues could be presented in tabular format as follows:

Issue	Effect on patient & Hospital	Recommendation	Action by whom and when	Final outcome of report

Morbidity and Mortality Meetings

It is a local matter as to whether audit review meetings are combined with mortality and morbidity meetings, or whether they are conducted separately.

At morbidity and mortality meetings, all de-identified morbidities and mortalities should be listed. Only significant morbidities and selected deaths where there are learning or quality issues at stake need to be discussed. The Chair of the morbidity and mortality meeting or those to whom he/she delegates the task would normally make the selection of cases.

2.11. Make Changes and Monitor Progress

The next step is to implement any changes that are recommended. Implementation involves not just making changes but ensuring that everyone affected is educated/ informed as to what changes are being made and why. The impact/ effects of the changes made then needs follow up action. For example, did they achieve the desired outcome, and have expectations been met? If you are not carrying out a continuous total practice audit, you will need to make some decisions about how this is monitored.

When is the best time to do this follow-up?

Remember that many changes may take some time to have a significant effect, although some may be almost immediate. Make sure you allow enough time to avoid disappointing negative results.



How will you do the follow-up?

Do you need to repeat the full audit, or only those parts relevant to changes you made? Is there some other information source that might help you monitor your achievements?

Having thought through all these matters you are well on the way to planning your surgical audit activity. Remember that you may still need to do some fine-tuning as you go.

3. WHAT MAKES FOR EFFECTIVE AUDIT?

Promotion of a culture of audit

Some of your colleagues may regard surgical audit as unnecessary or threatening, so it is essential that audit is undertaken in an atmosphere that highlights educational aspects, is regarded as non-threatening or 'safe', and is carried out in a culture of 'no-blame'. This atmosphere enables open discussion of findings, and participants will be able to discuss their feelings concerning audit reviews. Creating such an environment depends on physical and social aspects and the culture of the practice or hospital in which you work. The importance of assuring quality outcomes through improved risk management is now accepted as a necessary element of clinical practice.

Allocate time and resources

Audit should not be allowed to become a burden, as this will make participation difficult. It should be considered as part of normal clinical practice. Getting help with data collection is important. Resources should be made available by your hospital, as clinical audit and peer review are requirements for maintaining CPD and credentialing. Critical incident monitoring is also a component of VMO contracts in some jurisdictions – this may be a potential source of funds.

Oversee and verify data collection

It is important to collect the essential data only, and keep it simple. You should allocate responsibility for who collects which data. The data should be accurate and complete, with clinical details provided by clinicians. Review the data regularly and frequently, and troubleshoot immediately. Don't forget to look for:

- the complication that didn't occur;
- the death that was missed;
- the house surgeon's diagnosis that was misconceived;



- the misinterpreted pathology report; and
- the reason for the misdiagnosis.

Productive peer review

Audit is only effective if we 'close the feedback loop' by following through on findings and outcomes. Good follow up and implementation of change requires the surgeons to work closely with management and putting in place systems for quality improvement and risk management. Hospital administrators may need reminding of the safety and risk management aspects of recommendations arising from audit activities and morbidity and mortality meetings.

4. AUDIT IN PUBLIC AND PRIVATE HOSPITALS

Surgeons working in public hospitals — particularly teaching units — will usually have help in data collection by clerical staff and registrars. Many will have a comprehensive audit system which facilitates audit meetings. It is then a matter of making time to attend those meetings and participate in the process!

In private hospitals, especially smaller ones and day surgeries the ability and resources to collect relevant data and to analyse the audit data may at times be a bit more difficult. Surgeons have a role to play in encouraging managers and administrators in this.

Most hospitals already collect Clinical Indicators data for ACHS purposes and this should be available from medical records/administration as a basis for limited surgical audit.

Most if not all hospitals have electronic information systems which lend themselves to the process of data collection. Working with the IT support staff to meet the needs for surgical audit can be very useful. They may assist in networking, data capture and interfacing with locally designed or proprietary audit software packages.

There is a need for improved data exchange between surgeons and hospitals. Improving the collection and use of hospital data is important to enable surgeons to carry out effective audit. The work of gathering data is greatly reduced if the surgeon's audit database is linked to one generated by the hospital information system. At the very least, patient identification information dates and procedures can be input from the hospital system, and in the case of private practice, by secretarial staff who are responsible for billing. Surgeons need to be responsible for accurate recording of diagnosis, procedures, complications and outcomes. This information is also invaluable for the accuracy of the hospital record.



It is worthwhile exploring the options within individual hospitals and Area Health Services to see what is available or what can be developed to facilitate audit and peer review. Clinical Risk, Quality Improvement and Hospital Information (Medical Records) staff can be a source of help and advice with data collection.

In the private practice sector, electronic data collection can be relatively challenging. However, it is worth exploring the IT options. In private rooms, simple databases can be set up (e.g. Microsoft Access, FileMaker Pro or HanDBase) and secretarial assistance could be utilised to enter the data. Surgeons may need help to set up these systems and learn how to run queries and reports (see Appendix 4.).

It is also essential that those responsible for safety and quality are aware of the audit and its findings. Without this, supporting audit documentation may not be used in the event of a complaint or an inquiry.

Accreditation Standards for Surgical Audit and Peer Review in Hospitals

In accrediting the practice of surgical audit and peer review in hospitals, the accrediting body needs to look at the entire audit cycle, not just one part of it (Fig 1 p 11). The accreditors need to assess

1. What aspects of care are being audited
2. What types of audit are being done – structure, process, outcome
3. How are they being presented for peer review, including conduct and format of peer review meetings and their recording.
4. How are issues arising being managed at the surgeon and surgical unit level, but also at the system level?
5. How are changes made to practice being assessed for their impact on future practice?

In the future, it may be more important that accreditation supports local reporting, reviewing and responding, rather than driving the submission of reports based on a selection of clinical indicators to an external body, often without any form of local surgical input as to their accuracy. However, the advantage of external reporting is that benchmarks can be created which enable comparison between institutions and services. Although these can generally be determined by specialty consensus, the surgical literature is subject to publication bias and therefore true and reasonable benchmarks need to be determined from large sample sizes derived from involuntary and independent audit without case-mix selection bias. The College has



developed a guide for accreditors 'Surgical Audit- a Guide for Accreditors', Appendix 7.

5. WHAT OPPORTUNITIES ARISE FROM SURGICAL AUDIT?

Educational opportunities

Educational opportunities that can arise from audit include:

- encouraging collaboration, modifying attitudes and approaches to clinical problems;
- enhancing critical approaches and giving a rational basis to local changes in clinical practice;
- encouraging learning about new technologies and procedures and auditing their introduction to provide justification;
- indicating deficiencies in knowledge and skills, which leads to development of educational activities to address these; and
- by developing required standards of care, giving guidance as to what is expected.

Systemic improvement opportunities

Clear problems and deficiencies identified in 'systems' should lead hospital authorities to redress the issues. Similarly individuals and teams can always improve.

Medical indemnity insurance

It is now a clear requirement by medical indemnity organisations for surgeons to understand and practice risk management so they should also partake effectively in continuing professional development programs and be certified as such. Surgical audit and peer review are essential components of CPD.

Verification

The following information should be retained about your surgical audit and peer review activities in order to provide verification of audit activities if required:

- type and topic of audit;
- dates of audit;
- names of peer review groups or meeting to which audit results were presented;



- names of surgeons and others present;
- outcome/ recommendations of the review;
- plans for follow up; and
- list the details of any RACS approved audits you were part of.

6. WHAT RESOURCES ARE REQUIRED FOR SURGICAL AUDIT?

Manual systems

Audit can be conducted using manual, paper-based systems. Many surgeons have succeeded with notebooks or card indexes, often with the help of sticky labels. However, the flexibility, speed and power of electronic data base management systems suggest that most future efforts will take advantage of suitable electronic systems. Electronic systems ultimately reduce duplication and facilitate data collection, verification and analysis.

Computer systems

A database management system is required. It may be written using commercially available general-purpose programs or it may be custom built. It is recommended that, where practicable, particularly for individuals in private practice, data be used for multiple purposes such as billing, reporting or clinical records, so that the system provides multiple benefits in addition to surgical audit.

As manual data recording and entry can be tedious and prone to error, it is recommended that advantage be taken where possible, of automated or semi- automated entry, such as bar codes, scanners, down-loading from other systems or use of look-up tables, etc.

Smartphones, iPads and tablets enable audit data capture on the move. They offer the opportunity for data entry using touchpad, handwriting or voice in addition to a computer keyboard, and will be able to share information wirelessly through clouds, mobile phones and other wireless networks. Whatever system is used, contemporaneous data backup is important for when devices and drives fail.

Logbooks

Logbooks used by surgical trainees provide an opportunity to start a data collection system as part of an ongoing process towards surgical audit. There are a number of programs available, including Morbidity Audit and Logbook Tool (MALT), that have been developed by the College. It will enable all surgeons (as well as specific groups) to easily undertake a



process of total practice audit. The specific trainee fields recommended are included in Appendix 3. Other fields may be recommended or required by the Specialty Societies training boards. The reporting functions for Fellows are being developed.

7. PRIVACY, QUALIFIED PRIVILEGE AND AUDIT COMPLIANCE

Privacy

Confidentiality of the information used for and resulting from the audit process is essential, both from the point of view of the rights of the individual patient and of the surgeon. It is also important to reassure participating surgeons and other team members that peer review discussions constitute confidential professional peer review rather than a 'witch hunt'.

Australia's Privacy Act (1988) impacts on audit data. You should ensure that the following principles are adhered to:

- that only necessary and accurate health information is kept;
- that you use patient information only with consent or that the information is used only for the purposes for which it was intended (or which a patient might reasonably expect); and
- that the information is securely stored at all times.

New Zealand Privacy Amendment Act (2013) and Health Information Privacy Code (1994) and commentary (2008 edition)¹² also define a number of similar principles governing the collection, use, accuracy, storage and disclosure of health information relating to individuals. Additionally, health agencies are not permitted to assign a unique identifier to an individual unless this is necessary for the efficient functioning of the agency.

Qualified Privilege

RACS considers that confidentiality is essential for effective surgical audit. All audit information collected and discussions must remain strictly confidential.

One means of assuring confidentiality for audit is to obtain legal protection under 'qualified privilege' schemes. The surgeon in charge of an audit and peer review activity should ensure that the activity is registered under appropriate Federal or State or Territory schemes and that there is

¹² New Zealand Privacy Amendment Act
<http://privacy.org.nz/assets/Files/Codes-of-Practice-materials/HIPC-1994-incl.-amendments-revised-commentary.pdf>



appropriate protection as a quality assurance activity. In some jurisdictions, it is the 'activity' rather than the 'meeting' that requires qualified privilege

Once registered as a 'qualified privilege' scheme, information obtained through the audit or peer review must be kept confidential and made available only to those participating in the activity, as identified. Criminal sanctions can apply for unauthorised breach. Records and documents cannot be subject to subpoena or order by the courts or police.

Legal provision for qualified privilege exists at both State and Commonwealth levels in Australia. Surgeons should make inquiries at the health service, hospital or day surgery unit to which they are credentialed. If your organisation does not have qualified privilege then you should encourage them to apply for it (providing your group of surgeons is willing to live within the restrictions on membership it can impose).

In New Zealand, an application can be made for recognition as a Quality Assurance Activity under the New Zealand Health Practitioners Competence Assurance Act 2003 under section 5.4 (PART 3 - Compliance, Fitness to Practice and Quality Assurance)¹³. This is often done through an application by the local district health board.

Audit Compliance and Management of Outliers

Surgical audit and peer review is primarily an opportunity for self-education and quality improvement. However, circumstances may arise in which problems are identified which do not appear to be addressed adequately by individual surgeons.

The RACS position paper Credentialing and Scope of Practice provides advice and guidelines for dealing with these situations.

Fellows in New Zealand should be aware that under the Health Practitioners Competence Assurance Act 2003 it is mandatory for any doctor who has reason to believe a registered doctor is unfit to practice medicine because of a mental or physical condition, to notify the Medical Council of New Zealand (MCNZ). Such conditions include alcohol or drug dependence, other psychiatric disorders, a temporary stress reaction, an infection with a transmissible disease, declining competence due to age related loss of motor skills or to the early stages of dementia, and certain illnesses and injuries.

From 1 July 2010 the Australian Health Practitioners Regulation Agency (AHPRA) released new mandatory reporting guidelines, noting that Section

¹³ Health Practitioners Competence Assurance Act 2003, Public Act 2003 No 48 Date of assent, 18 September 2003



140 of the National Law¹⁴ requires that a registered health practitioner must notify the Board if, in the course of practising their profession, they form a reasonable belief that another registered health practitioner has behaved in a way that constitutes 'notifiable conduct'.

Notifiable conduct is defined as when a practitioner has:

1. practised the profession while intoxicated by alcohol or drugs, or
2. engaged in sexual misconduct in connection with their profession, or
3. placed the public at risk of substantial harm in their practice because they have an impairment, or
4. placed the public at risk of harm during their practice because of a significant departure from professional standards.

Pathways to the Identification of the Underperformer

There are a number of ways in which underperformance comes to our attention.

Single events may be reported through hospital complaints processes or in morbidity and mortality meetings. Similarly trends may be observed informally in a hospital or community, or they may be identified in structured reviews. Such reviews are carried out as part of surgical audit by groups of surgeons in units, departments or hospital-wide, or by specialty surgical groups regionally or nationally. The impact of these observations and the level of concern generated are influenced by the severity, frequency, type and the context in which the events occur.

Under performance also comes to light through complaints to external bodies including Review Boards, State and Territory Medical Boards, Health Commissioner, Medical Council Disciplinary Committees, and through legal actions. It is not intended to deal with these types of assessments of performance although the principles given below should be relevant to them.

Confirmation of Possible Underperformance

It is important to ensure that the observation is justified. First appearances can be deceiving. For any review of the event(s) it should be clear whose responsibility this is:

¹⁴ Australian Health Practitioners Regulation Agency (AHPRA) National Law <http://www.ahpra.gov.au/Legislation-and-Publications/Legislation.aspx>

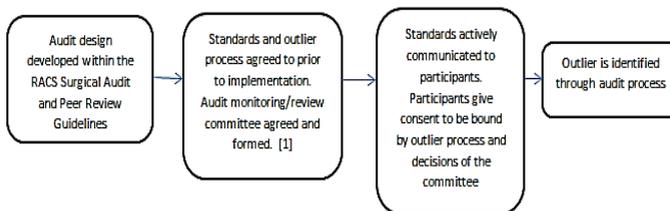


- Prior rules for this eventuality should be in place for the peer review group should be known whether there is protected status of the evaluation as a peer review activity.
- Legal obligation to report under performance as well as the processes required within an institution needs to be clear.
- Anonymity of the individual should be maintained wherever and as long as possible. Rules for when and by whom coded information may be broken should be in place.
- Use of validated statistical analysis should be used to include case mix consideration, or appropriate bench marking for example.
- Definition of outlier status should be predetermined where ever possible.
- The person leading the evaluation should be an acknowledged respected member of the peer group who should preferably have been given this responsibility prior to this eventuality.
- The number of persons involved in an initial appraisal should be limited.
- Where there is conflict of interest other peers should be used.
- Use of an independent assessor or advisor may be very helpful.

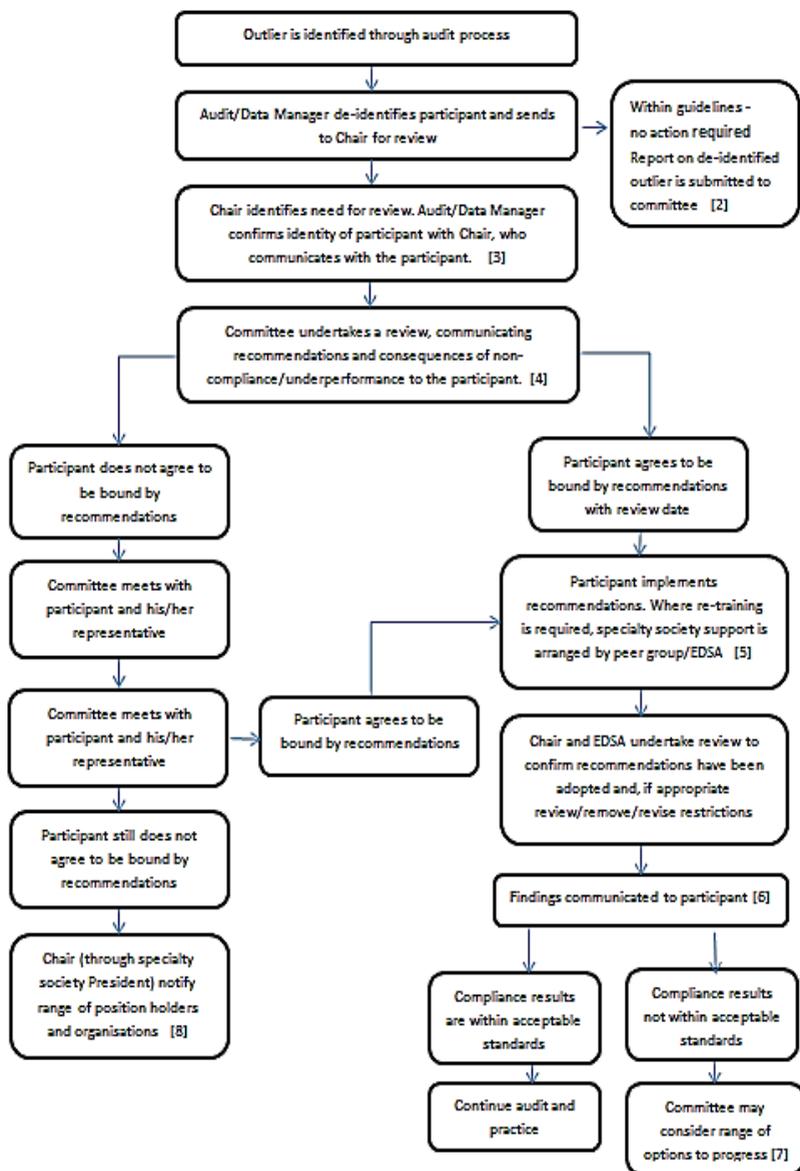
Guidelines for Managing an Outlier through Structured Audit Processes

The College has developed guidelines for managing an outlier through structured audit processes which provide a generic pathway for surgeons in all specialties to use as a guide for managing outliers identified through the use of a structured surgical audit. The guidelines were developed to ensure that existing and future surgical audit programs have appropriate audit design and processes.

Identifying an Outlier



Managing an Outlier



1. Standards and outlier processes agreed to prior to implementation. Audit Monitoring/ Review Committee formed and agreed.
 - Standards for the audit are to be developed at this stage.
 - Application for qualified privilege and jurisdictional requirements may need to be considered.
 - The Audit Monitoring/ Review Committee will have a defined term of office and may include:
 - Specialty Society Training Chair
 - Specialty Society CPD Chair
 - 2 – 4 other peer members by agreement depending on the size of the society/ group.
 - Flexibility will be required for the membership of the Audit Monitoring/ Review Committee, giving the differences in the specialties.
 - The Chair signs a confidentiality agreement prior to commencement of role.
2. Report on de-identified outlier is submitted to Audit Monitoring/ Review Committee
 - The report is to address reasons for no further review action/ investigation
 - The report will feature de-identified information only
3. Audit/ Data Manager confirms identify of participant with Chair, Audit Monitoring/Review Committee. Chair communicates with participant.
 - Conflict of interest is considered.
 - Chair advises participant of outlier status and the activation of the assessment group.
 - Participant is provided with information that determined outlier status
 - Participant is given the opportunity to prepare response to address outlier status.



4. The Assessment Group is activated and undertakes a Conflict of interest is considered.

The assessment group (separate to Audit Monitoring/ Review Committee) may consist of:

- Chair, Audit Monitoring/ Review Committee
- Chair/ representative from Regional Committee
- Chair/ representative from Specialty Society
- Nominated member(s) from Audit Monitoring/ Review Committee.
- The assessment group's deliberations must be maintained in confidence at all times. A de-identified response from participant is considered as part of the review. Only the Chair is aware of audit participant's identity.

The assessment group may:

- proceed with a meeting involving the participant and his/ her nominated representative after identification of and confirmation of outlier. Confidentiality agreements are signed and identity revealed prior to meeting.
 - recommend changes to participant's practice or retraining
 - Recommendations and consequences of non-compliance/ underperformance communicated to participant following the meeting.
 - Communication is issued by Chair of Audit Monitoring/ Review Committee
 - Recommendations need to be specific and to be achieved within a defined time frame.
 - Recommendations must state the need for a follow up review by the assessment group and the date the review will take place.
5. Participant implements recommendations(s). Where retraining is involved, Specialty Society/ College support will be arranged by Chair and Executive Director Surgical Affairs (EDSA) advised of arrangement and identity.
 - The College's Re-skilling and Re-entry Program policy should be considered where retraining is involved.



6. Review findings communicated to participant and second review date set.
 - Communication is issued by Chair of Audit Monitoring/ Review Committee
 - Ongoing or further recommendations may be considered.
7. Assessment group may consider a range of options to progress.

Possible options include:

- meeting again with participant and his/ her nominated representative
 - more retraining with a further review date
 - a request to cease all practice while retraining is carried out
 - a request to cease specific work area
8. Chair (through Specialty Society President where appropriate) notifies a range of position holders and organisations.

These position holders and organisation are:

- RACS President
- Credentialling Committee of relevant hospitals
- Medical Board of Australia/ Medical Council of New Zealand

In addition, the President through Council may wish to consider further sanctions/ actions.

8. AUDIT REPORTING

Peer review meetings are limited in time. Discussion needs to focus on the most important issues. This makes a formal audit report of a service, unit or surgeon's work a valuable document to refer to the routine and mundane. A pre-agreed structure and format of reports assists in their generation regardless as to whether this is done by hand or automated from the database.

A minimum standard of reporting is expected for any surgical audit. It should identify all the cases that were done for the area of interest. It should be able to sub-classify the cases according to preagreed criteria within the minimum, expanded, trainee or specialty datasets. For example, surgeon D wishes to audit all cholecystectomies sub-classified by whether they were emergency or elective admissions. The audit report should identify particular adverse



outcomes. A minimum for general surgery would be mortality, unplanned reoperation and unplanned readmissions.

An audit report should include some basic mathematics (again by hand or automated).

Aggregates: A count of different procedures, emergencies, electives, unplanned reoperations etc

Calculations: Present complication rates for operations, sometimes sub-classified by some method of risk stratification (staging, urgency or ASA/ comorbidity/age)

Whenever a craft group can agree on the definition of an outcome and classify the case into a Yes/No or successful/unsuccessful then such a binary definition can be used to generate a Cumulative failure or CUSUM chart. Providing there are agreed benchmarks/performance markers the plot can be compared with what a group of surgeons think is acceptable or unacceptable performance.

When considering a surgical audit program certain types of report should be mandatory for approval and others may be advisable though difficult to generate.

Binary Outcome: An outcome from a procedure or intervention that can be Yes or No (it happened or it didn't) or a success or failure. An example is anastomotic leak after colorectal surgery – from the point of view of anastomotic leak the outcome can be classed as success (no leak) or failure (leak). Another example might be stroke after carotid endarterectomy – if stroke classed as failure, otherwise success. A number of different binary outcomes may be chosen to assess the outcome from one procedure i.e. mortality, unplanned reoperation, unplanned readmission, wound infection etc.

CUSUM

CUSUM¹⁵ stands for cumulative sum and involves a time plot of attempts against an agreed binary target. It measures variation in small samples. It allows for early detection of small aberrations, natural variations and procedural performance trends.

Cumulative failure means that each failure is recorded as an upstroke on a cumulative failure chart where the horizontal axis is number of attempts

¹⁵ Yap C, Colson M, Watters D (2007) Cumulative sum techniques for surgeons: a brief review, ANZ J Surg. 2007 Jul;77(7):583-6.



(procedures) and the vertical axis records failures; a success is recorded as a horizontal line.

CUSUM and cumulative failure charts are visual and useful for feedback to surgeons, units and services on performance.

Mandatory Reports

Search/ find/ sort by any of the minimum data fields (total, pre, post op, LOS)

Aggregate reports

Number of admissions

Number of operations, Sub classified by procedure, urgency, magnitude

Ability to list cases with/ without complications

Sub classified by grade 1 – 5

Advisable Reports

Binary recording of key performance indicators

At minimum, identify:

- Unplanned reoperations;
- Unplanned readmissions;
- Unplanned ICU admissions/ readmissions;
- Prolonged LOS (varies according to procedure);
- Unanticipated blood transfusion.

Other procedure specific Indicators

Calculation of key performance indicators from numerator/ denominator

Ability to generate CUSUM

Risk Adjustment Reports

Audit reports should be interpreted with appropriate risk adjustment. Where possible, risk adjustment tools should be sought from the related craft group.

Risk adjustment factors to consider include:

- Operation urgency (emergency / elective);
- Age of patient;



- ASA;
- Patient co-morbidities;
- Stage of disease

Specialty specific risk adjustment tools are available, for example Fellows performing cardiac surgery can use AUSScore¹⁶ and POSSUM¹⁷ can be used within General Surgery. Ideally, risk adjustment tools should be based on a small number of variables.

There are two major comorbidity scoring systems, based on papers from Elixhauser and Charlson. Elixhauser¹⁸ is simpler in that it apportions a score of 1 to every comorbidity from a list of 35, whereas Charlson's¹⁹ group created an index where some comorbidities were deemed more important than others and so were allocated a score of 2 rather than 1. Generally, an Elixhauser comorbidity count of 4 or more represents a significantly comorbid patient in terms of risk.

¹⁶ Reid C, Bilah B, Diem D, Smith JA, Shardey GC. The AusScore – a validated model for predicting outcome from isolated coronary bypass graft procedures in Australia. *Heart, Lung and Circulation* 2007;16:S179.

¹⁷ POSSUM is a scoring system that correlates with outcome. It has been used in General Surgery, particularly colorectal surgery. Portsmouth (P-POSSUM), Colorectal (CR-POSSUM), vascular (V-POSSUM) and Eldery (E-POSSUM) versions are also available. POSSUM was developed for surgical audit and has two components: an acute physiology score and operative severity score. POSSUM scores can only be completed after discharge and therefore it is an audit tool for risk adjustment but cannot be used for individual patients during their care. (please see Further References).

¹⁸ Elixhauser A, Steiner C, Harris DR, Coffey RM. Comorbidity measures for use with administrative data. *Med Care* 1998;36:8-27

¹⁹ Charlson ME, Pompei P, Ales KL, MacKenzie CR A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. *J Chronic Dis.* 1987;40(5): pp.373-83.



9. NEED MORE HELP?

- Many surgeons have considerable experience in surgical audit. These colleagues are a valuable resource as their experience can save others from having to re-invent the wheel.
- The College's Research, Audit and Academic Surgery Division has staff experienced in setting up and running audits, and are always happy to assist Fellows who are setting up their own audits.
- The RACS Library can assist with literature searches and searches on audit topics and obtain copies of relevant journal articles. There are many accessible on-line resources. Please contact college.library@surgeons.org
- A number of software companies have developed audit programs for surgical use. These companies exhibit at College meetings and advertise in the medical press.
- There is often existing expertise within hospitals that can be called upon to assist in surgical audit.
- The New Zealand Ministry of Health has published a booklet 'Toward Clinical Excellence', which gives a good overview of clinical audit and peer review.
- The New South Wales Department of Health's 'Clinicians Toolkit' is also a useful resource.
- A PowerPoint and poster template for the 'Fair Dinkum Audit', providing advice on audit presentation and reporting is available at <http://www.surgeons.org/my-page/my-audit/audit-templates/> or by contacting the Department of Professional Standards.
- Specialty Societies and the Department of Professional Standards may also be able to offer advice on surgical audit and peer review.
- Approved Audits - refer to Appendix 5.
- Templates for surgical audit presentations are available from surgicalaudit.college@surgeons.org or contact the Department of Professional Standards.



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Appendix 1: Minimum Data Set

1	Name	or initials
2	ID	or case record number (unique identifier information is necessary only for linking patients' admissions)
3	Age	or Date of Birth for calculation of age
4	Sex	male, female
5	Diagnosis	the final diagnosis (e.g. duodenal ulcer, bladder cancer plus stage)
6	Admission date	for calculation of total length of stay, and pre-operative and post-operative stays (there is a special category for day case in 'admission type')
7	Discharge date	if same as admission – day case could be assumed
8	Operation date	if performed
9	Operation/procedure	may be multiple or none
10	Operation category	elective, urgent, emergency, unplanned return to theatre
11	Complications/ Discharge outcomes	<p>These should be comprehensive and include specific surgery related, e.g. haemorrhage; medical, e.g. myocardial infarction; and system related; specific performance indicators may also be included. There should preferably be a sub-field that grades the severity of the complication, eg:</p> <p>Grade 1: Any deviation from the normal postoperative course without the need for pharmacological treatment, surgical, radiological or endoscopic interventions. For example, problems that did not prolong admission and had little impact on the patient's well-being, such as a mild wound infection, urinary tract infection, atelectasis, unexplained pyrexia</p> <p>Grade 2: Requiring pharmacological treatment, including blood transfusion or TPN.</p> <p>Grade 3: Complication which necessitates intervention, either surgical, endoscopic or radiological. 3a not requiring general anaesthesia 3b requiring general anaesthesia</p> <p>Grade 4: Life threatening complications involving ICU management. 4a single organ dysfunction, including dialysis. 4b Multiorgan dysfunction</p> <p>Grade 5: Death – reason should be indicated, including all other complications. (See also suggestions at the end of Appendix 2</p>
12	Surgeon(s) identifier	that allows the individual surgeon, his/her assistant(s) and the place (hospital) of practice to be identified. These may be coded. This should include trainee status for logbook purposes



Appendix 2: Expanded Data Set – for more effective audit

In addition to all data fields listed in the minimum dataset –

5	Admission type	elective, emergency, day case, unplanned, public/private, unplanned readmission within 28 days
10	Co-morbidities	list relevant major co-morbidities (these determine outcomes e.g. diabetes, smoking status, cardiac status, significant medications e.g. warfarin)
11	Presenting problem	the presenting problem(s) or reason for surgery/procedure, e.g. bowel obstruction, P.H TCC bladder
12	Final diagnosis	e.g. bleeding D.U, colon cancer
15	Operation magnitude	complex, major, intermediate, minor
16	Surgeon/assistant	identifier (may be coded for hospital data set) level of (trainees) Assistance
17	Wound infection risk	clean, clean/contaminated, contaminated, dirty, N/A
18	ASA grading	a useful simple grading of patient health status which reflects patient status
19	Type of anaesthetic	sedation, local, regional, spinal, epidural, general
20	Prophylaxis	e.g. antibiotics, DVT prevention
21	Pathological diagnosis	where applicable the stage of disease should be a sub-field
23	Admission outcome	died, discharged home; transferred to another service (rehabilitation, aged care, higher level of care (e.g. refer to neurosurgical centre), or another hospital (and ultimate outcome)
24	Follow up outcome	one week/month follow up late complications, positive outcomes. It is desirable to collect longer-term follow up data, to include both good and bad results. However, the challenges inherent in this are acknowledged



Additional Data

It can also be useful to include a free content field to record qualitative information. Free content fields may also assist imports from other databases.

These may be related to specific procedure or outcome in a specialty

- Agreed clinical indicators (e.g. bile duct injury in laparoscopic cholecystectomy)
- Late outcomes (e.g. 1, 2, and 5 year cancer outcomes)
- Patient satisfaction.

These fields should be considered very carefully as data overload is a danger to successful audit.

Modified Visick Grading²⁰ for reporting outcomes of a procedure:

1. Greatly improved in wellbeing as a result of procedure with no persisting complications
2. Some improvement in well-being with some persisting morbidity as a result of disease or complications/loss of function
3. Similar state of wellbeing as a result of improvement as a result of procedure being matched by complications and/or loss of function incurred
4. Worse than before procedure, as a result of procedure not achieving improvement and/or complications/loss of function.

²⁰ Goligher JC, Pulvertaft CN, Irvin TT, Johnston D, Walder B, Hall RA, Willson-Pepper J, Matheson TS. [Five- to eight-year results of truncal vagotomy and pyloroplasty for duodenal ulcer](#). Br Med J. 1972 Jan 1;1(5791):7-13.



Appendix 3: Extra Trainee Dataset Fields

The College's Morbidity Audit and Logbook Tool (MALT) has been designed with the primary aim of enriching the education and training experiences for a trainee by:

- Promoting communication between the trainee, supervisor and training board through the ability to generate summary and individual reports
- Enabling the system to be portable, web-based which includes mobile and handheld devices that are web enabled
- Ensuring validity/consistency in data collection
- Increasing data collection opportunities for specialty areas
- Progression towards the establishment of an effective audit process for Fellows.

Operation group (Defined by Training Board)	Defined by Training Board
Procedure	May be defined differently from operation performed
Supervisor (Surgeon ID)	Unique identification number
Supervision Level	S1: Surgeon Mentor Scrubbed S2: Surgeon Mentor in Theatre S3: Surgeon Mentor Available A1: Assisting Surgeon Mentor A2: Assisting Surgeon Registrar
Co morbidities	Pre op/ Post op management diagnosis. Recognised diagnosis list
Complications	Recognised complication list



Appendix 4: Available Audit Systems

The following are examples of established systems available to individual surgeons and groups to facilitate effective surgical audit.

Otago Clinical Audit

Otago Clinical Audit is a web platform software. The audit is designed for a wide range of organisations -from single surgeon practices through to multi-site government health organisations. It covers a wide range of surgical specialties and as well as facilitating the peer review process, Otago clinical audit can answer enquiries from clinical management, determining surgical workloads, monitoring the training of registrars and evaluating the overall performance of a surgical service.

Contact:

Phone: +64 3 474 7646

Email: clinical.audit@otago.ac.nz

Web: www.otago.ac.nz/ouaudit

Rural Procedural Audit

The Rural Procedural Audit (RPA) provides support for rural centres and individual rural-based clinicians from the participating colleges to collect and analyse audit data on designated procedures using an electronic data collection tool.

Individualised data reports will provide a basis for comparison of acceptable procedural outcomes in rural/remote locations. This audit has been incorporated into the Morbidity Audit and Logbook Tool (MALT).

Contact: Rural Procedural Audit

Phone: +61 8 8219 0938

Email: rpa@surgeons.org

Filemaker Pro Surgical Audit

CORDis is a clinical information system written in Filemaker Pro which supports trainee logbooks and surgical audit, and which can be linked to the 'whole hospital' information system. It produces discharge summaries, operation notes, clinical letters and audit reports which include the minimum and expanded data sets. It was used at the Geelong Hospital from 2001-2012. There is a stand-alone trainee logbook which can be downloaded. An upgraded Filemaker Pro program on which CORDis was originally based is available for free download. Note: David Watters facilitated the rewriting of his Filemaker Pro system using the same template which is made available through the Rural Procedural Audit (see above).

Contact: Professor David Watters:

Email: davidw@barwonhealth.org.au

Telephone: +61 3 4215 0000

Web: <http://www.surgeons.org/my-page/my-audit/david-watters-tool/>



Morbidity Audit Logbook Tool (MALT)

The Morbidity Audit and Logbook Tool (MALT) allows for the capture of surgical training and assessment experience as well as the ability for surgical audit.

MALT is currently available to SET trainees and Fellows subspecialising in the following specialties:

- Cardiothoracic Surgery (mandatory for all SET levels)
- Gastric and Oesophageal Surgery (mandatory for ANZGOSA Fellows sub-specialising)
- General Surgery (mandatory for Australian SET1)
- Hepatic, Pancreatic and Biliary Surgery (mandatory for ANZHPBA Fellows sub-specialising)
- Neurosurgery (optional for all SET levels)
- Orthopaedic Surgery (New Zealand) (mandatory for SET 1, optional SET 2-6)
- Paediatric Surgery (mandatory for SET 1-5)
- Urology (optional for SET 1-2)

Contact the MALT Team

Telephone: +61 8 8219 0900

Email: malt@surgeons.org

Further information on audit systems is available at:

<http://www.surgeons.org/my-page/my-audit/>



Appendix 5: Approved Audits

The following are examples of audit activities that have been approved by the College's PDSB and are available for Fellows to participate in, where relevant and appropriate. Please check the College website for up to date contact details

ANZGOSA Audit

Australian and New Zealand Gastric and Oesophageal Surgery Association (ANZGOSA) Audit

Oesophago-gastric cancer or gastrointestinal stromal tumour (GIST)

Chair: Sarah Thompson FRACS

Contact: Katherine Economides

Telephone: +61 8 8219 0900

Email: anzgosa.audit@surgeons.org

Web: www.surgeons.org/anzgosa

ANZSVS Bi-National Audit

Australasian Vascular Audit

Chairman: Mr G Fell FRACS

Telephone: is 03 9459 6144

Email: Gary.Fell@austin.org.au

Web: www.anzsvs.org.au/national-audit/

BreastSurgANZ Quality Audit

(formerly the National Breast Cancer Audit)

Clinical Director: David Walters FRACS

Contact: Katherine Economides

Telephone: +61 8 8219 0900

Email: breast.audit@surgeons.org

Web: www.surgeons.org/nbca

BiNational Colorectal Cancer Audit

Managed by the Colorectal Cancer Audit Committee

Colorectal Surgical Society of Australia and New Zealand

Phone: +61 8 8353 8013

Email: bcca@cssanz.org

The New Zealand Joint Registry

Contacts: Prof A G Rothwell FRACS (Supervisor), Toni Hobbs (Co-ordinator)

Telephone: +64 3 3641 581

Email: toni.hobbs@cdhb.govt.nz

or alastair.rothwell@chmeds.ac.nz

Web: www.cdhb.govt.nz/NJR/



New Zealand Vascular Audit

Managed by the Audit Committee of the Vascular Society of New Zealand

Contact: Mr Ian Thomson, FRACS

Telephone: +64 3 4740 999

Email: ian.thomson@otago.ac.nz

Rural Procedural Audit

Chair: Professor David Watters FRACS

Contact: RACS Project Officer

Telephone: +61 8 8219 0900

Email: rpa@surgeons.org

or davidw@barwonhealth.org.au

The Australian and New Zealand Society of Cardiac and Thoracic Surgeons' Database Program.

(formerly The Victoria Cardiac Surgery Database Audit)

Contact: Mr Gil Shardey, FRACS

Email: gshardey@cabrini.com.au

Web: <http://www.ascts.org>

To review the latest audits approved in the CPD Program, visit

<http://www.surgeons.org/my-page/my-audit/>



Appendix 6: Approval of Audit Activities and Programs

Fellows, specialty groups and area health services may wish to apply for audit activities (focused or generic) to be approved and recognised in the College's Continuing Professional Development Program. In addition, commercial organisations may seek approval from the College to ensure that their software program(s) contains the College's Minimum Data Set for surgical audit.

The following approval application forms are available at www.surgeons.org

Generic Audit Activities (i.e. hospital morbidity and mortality audits, clinical unit audits)

Focused Audits (i.e. specialty group audits, regionally based mortality audits, audits which look at one particular issue and the factors which influence it)

Audit Programs (i.e. audit software programs)

The Department of Professional Standards requires a completed application form and a copy of your audit (or a password to access an online audit) to enable a review of an audit activity/ program.

The surgical applications are reviewed against the following standards:

Minimum Data Set – mandatory (including search/ find/ sort of these data fields)

Expanded Data Set – advisable

Trainee Data Set – advisable (where appropriate)

Advice on the ease of use is given, however approval relates to the audit activity or program meeting the minimum standards.

The Professional Standards Committee reviews audits/ programs and recommendation are endorsed by the PDSB in February, June and October each year. Approved audit activities are added to the College website:

<http://www.surgeons.org/my-page/my-audit/approved-audits/>

For further information regarding the audit approval application process, please contact the Department of Professional Standards:

Phone: +61 3 9429 1200

Fax: +61 3 9276 7432

Email: surgicalaudit.college@surgeons.org



Appendix 7: Surgical Audit - A Guide for Accreditors

All surgeons should be involved in the audit process. This includes VMO surgeons, even if they operate as an outreach service.

The data collection must be robust, and needs to be facilitated by the hospital. Usually this requires dedicated software. It is especially important to collect data on surgical complications. Data entry needs to be overseen or facilitated by an appropriate staff member.

The data collected needs to be clinically relevant. For all patients it is appropriate to record deaths, serious complications, unplanned readmissions, unplanned ICU admissions and unplanned returns to theatre. Additional information should be collected relating to specific specialties or procedures. (e.g. visual outcomes after cataract surgery, bile leaks after cholecystectomy) Assistance with selection of appropriate audit topics is available from RACS and the Surgical Specialist Societies. The exact topics audited may vary from time to time, and from hospital to hospital.

Where possible, audit should focus on outcomes. However measures of process are sometimes all that is feasible.

Data should be risk adjusted. This could involve collection of ASA score, elective/emergency status, pathological stage, or more complex systems. Assistance should be available for statistical interpretation if required.

There are a range of external audits to which individual surgeons or hospitals can contribute. These usually incorporate appropriate benchmarking, which can be highly beneficial. Otherwise hospital data can be benchmarked by comparison with published data, or by collaboration with similar institutions.

All hospitals should contribute to Australian & New Zealand Audit of Surgical Mortality (ANZASM) if available in their jurisdiction.

Audit information must be presented at an appropriate Surgical Audit meeting. All surgeons should attend the meeting. Minutes should be kept. There must be the opportunity for a full, open discussion of any issues. Recommendations for improvement should be made. The chair of the meeting should summarise any conclusions and pass them to the hospital's appropriate quality committee. The decisions of the quality committee should be fed back to the surgical audit meeting to complete the feedback cycle. There should be ongoing monitoring of the effects of any improvements introduced.

