Discussion paper

Clinical audits to improve critical care: Part 2: Analyse, benchmark and feedback

Gillian Ray-Barruel RN, BSN, GC ICU, BA (Hons), PhD [a,b,c,*],
Amanda J. Ullman RN, GC Paediatric ICU, MAppSci, PhD [a,b,d,e],
Claire M. Rickard RN, PhD [a,f,g,h],
Marie Cooke RN, PhD [a]

[a] National Centre of Research Excellence in Nursing, Alliance for Vascular Access Teaching and Research (AVATAR) Group, Menzies Health Institute Queensland, Griffith University, Nathan, QLD, Australia
[b] Centre for Clinical Nursing, Royal Brisbane and Women's Hospital, Australia
[c] Nursing Practice Development Unit, Princess Alexandra Hospital, Australia
[d] School of Nursing and Midwifery, Alliance for Vascular Access Teaching and Research (AVATAR) Group, Menzies Health Institute Queensland, Griffith University, Australia
[e] Paediatric Critical Care Research Group, Lady Cilento Children's Hospital, Brisbane, Australia
[f] Royal Brisbane and Women's Hospital, Australia
[g] Princess Alexandra Hospital, Woolloongabba, Australia
[h] The Prince Charles Hospital, Australia

ARTICLE INFORMATION

ABSTRACT

Clinical audits are an essential part of the cycle designed to ensure that patients receive the best quality of care. By measuring the care delivered against established best practice standards, it becomes possible to identify shortcomings and to plan targeted strategies and processes for continuous improvement. The success of a clinical audit depends upon defined goals, motivation of stakeholders, appropriate tools and resources, and clear communication.

In part 1 of this series, an overview of the structures and processes needed to prepare and collect data for clinical audits in the critical care setting was provided [A.J. Ullman, G. Ray-Barruel, C.M. Rickard, M. Cooke, Clinical audits to improve critical care: Part 1 Prepare and collect data, Aust Crit Care, 2017, in press]. In part 2, we discuss how to analyse the collected audit data, benchmark findings with internal and external data sets, and feedback audit results to critical care clinicians to promote evidence-based practice and improve patient outcomes.

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1. Introduction

The importance of clinical audits in measuring performance and tracking progress is well recognised by critical care leaders. Clinical audits are a quality improvement process, systematically undertaken to improve clinical practice and subsequent patient outcomes. By providing objective and quantifiable data, clinical audits enable clinicians to compare current performance with explicit, defined criteria, and identify areas for improvement.[1] Clinical audits can be used to monitor and track both clinical practice and service delivery changes, and they provide a useful and objec-tive tool to motivate healthcare staff to engage in the process of continuous quality improvement.

Undertaking a clinical audit in the critical care unit need not be a daunting task. With careful preparation and an informed approach, clinical audits can provide a useful and valuable tool for critical care clinicians. Preparing and committing to a clear audit strategy creates transparency in the process, ensures validity and reliability of the data, and builds confidence in the findings. The success of an audit will depend upon clearly defined goals, motivation of key opinion leaders and stakeholders, appropriate tools and resources (time, staff, equipment), and clear communication.

This is Part Two of a two-paper series regarding clinical audits in critical care. In the previous article, the structures and processes needed to prepare and collect data for clinical audits in the critical care setting were addressed. This article features an overview of the skills and resources needed to analyse, benchmark and feedback

* Corresponding author at: National Centre of Research Excellence in Nursing, Alliance for Vascular Access Teaching and Research (AVATAR) Group, Menzies Health Institute Queensland, Griffith University, Nathan, QLD, Australia.
E-mail address: g.ray-barruel@griffith.edu.au (G. Ray-Barruel).

audit data. Together, these articles provide a step-by-step guide, and the remaining five steps are outlined here. These are:

7 Identify appropriate techniques for analysing audit data
8 Identify internal and external audit data for benchmarking
9 Feedback to clinical area and management
10 Plan targeted strategies and processes for continuous improvement
11 Repeat the audit cycle: re-identify areas for improvement

2. Step seven: identify appropriate techniques for analysing audit data

Once the data collection is complete, the data must be collated and analysed. The primary goal of data analysis is to understand the key audit findings, so these can be presented to the clinical staff and other stakeholders, and action plans can be developed, if needed. Before any data analysis can begin, it is important to check the data are "clean", that is, no typographic errors have been made during data entry. This does not mean that all the audit data entry needs to be double-checked (although this is ideal), but attention is at least needed to confirm/correct any missing data, and check any extreme results (high and low), as well as any impossible results (e.g., age = 187 years old). Ideally, the person checking the data should have a thorough understanding of the data collection tool and an excellent eye for detail, as well as knowledge of the clinical practice or service being audited.

An in-depth knowledge of statistics is not necessary when analysing audit data. For the purposes of clinical audit, it is perfectly acceptable in many cases to present the data using simple percentages and absolute numbers, incorporating appropriate numerators and denominators whenever possible.[2] Percentages represent a calculation of the number of times an event occurred based on the total number of people, whereas rates represent the probability of a certain event. For instance, to determine the percentage of pressure injuries in the critical care unit, a simple snapshot audit could identify the number of pressure injuries detected (numerator) in the total sample of patients (denominator) and multiply by 100. To calculate the rate of pressure injuries for your unit, it would be more accurate to keep track of the total number of pressure injuries per 1000 patient days. While the simple percentage provides a neat starting point to identify if the unit has a problem with pressure injuries, the rate provides a better picture of the extent of the problem over time.

The primary purpose of the clinical audit is to improve practice, and an essential component of this is building staff engagement in the continuous quality improvement process, therefore, simple calculations and descriptive statistics[3] that can be easily presented and understood by busy clinicians are preferred. Software programs such as Microsoft Excel® are satisfactory for this level of analysis. If more detailed enquiry is desired, statistical software packages can be used, but this is certainly not essential. If capacity exists, inferential statistics, such as Chi-square, T-tests, and Mann–Whitney, can be used to determine meaningful differences between samples. More information regarding the appropriate use of descriptive and inferential statistics can be found in the series of statistics articles published by Australian Critical Care.[3–9]

3. Step eight: identify internal and external audit data for benchmarking

The presentation of results using internal and external benchmarking is effective in provoking discussion surrounding the results and strategies for improvement.[10,11] Benchmark criteria indicate a desired level of care in the critical care area.[12] There-

fore, clinical practice guidelines should be used to inform the audit criteria, as discussed in Step Three. These criteria may be in the form of rates or percentages (e.g., percentage of patients receiving enteral nutrition within 48 h of ICU admission), but need to provide a realistic and attainable goal for the local unit.

Benchmarking can be either internal or external, and decisions about benchmarking criteria should be made with the key stakeholders to ensure the benchmarks chosen are clinically relevant and appropriate. Internal benchmarking can be accomplished via repeated audits over time in the same institution, using the same audit tools. For the majority of data types, results may be presented using graphical illustrations such as Statistical Process Control (SPC) Charts. Fig. 1 illustrates how tools such as SPC Charts can be used to present data over time for repeated measures, with built-in thresholds (upper and lower control lines) to highlight significant variations in practice. These significant variations emphasise results outside of the normal fluctuations in the statistical 'norm' of care and reflect three standard deviations above (upper control line) or below (lower control line) the mean (central line).[13] These statistical norms are most valuable when external benchmarks do not exist. Resources are readily available to support the development of these charts which use programmes including Microsoft Excel® (Refer to Part 1 of this series. Table 1: Organisations providing resources on-line to support the undertaking of clinical audits of critical care practice". Ullman AJ, Ray-Barruel G, Rickard CM, et al. Clinical audits to improve critical care: Part 1 Prepare and collect data. Australian Critical Care. 10.1016/j.aucc.2017.04.003).

External benchmarking provides another form of goal setting for improvement, but should be chosen in consultation with stakeholders to ensure their relevance to the institution. External benchmarks can be identified within a range of resources including international institutions (e.g., World Health Organization), national institutions (e.g., Australian Commission on Safety and Quality in Healthcare), discipline-specific clinical registries (e.g., Australian and New Zealand Intensive Care Society registry), or published audits using similar methods of assessment. Some examples of common indicators to benchmark ICU performance include: the rate of central-line associated bloodstream infection (CLABSI) (expressed as number of CLABSI occurrences per 1000 line days); the Standard Mortality Ratio (actual deaths divided by the predicted number of deaths at each ICU); the rate of ICU readmissions, declined admissions, or after-hours discharge.[14] An example of external international benchmarking is the International Nutrition Survey, in which 150 ICUs participate annually.[15]

4. Step nine: feedback to clinical area and management

Providing feedback about the audit results is one of the most important but frequently undervalued aspects of the audit cycle.[16,17] The goal of feedback is to raise awareness and challenge beliefs about current practice and clinical outcomes, with the assumption that people will be motivated to change when presented with suboptimal results and a clear action plan.[16] Developing appropriate feedback strategies should be the result of in-depth, collaborative discussion between the original project stakeholders. Audit feedback is most effective when delivered by a well-respected supervisor or colleague, rather than an external party.[16,18] This person should ideally be passionate about improving practice and have a good rapport with the critical care staff. Importantly, feedback needs to be timely, individualised and non-punitive in order to be effective in improving performance.[19,20] A lag time of months between collecting the data and providing feedback to staff can lead to disinterest in the findings.[21]

Current audit results can be displayed beside previous audit results or the results of another area in the same hospital. Alter-
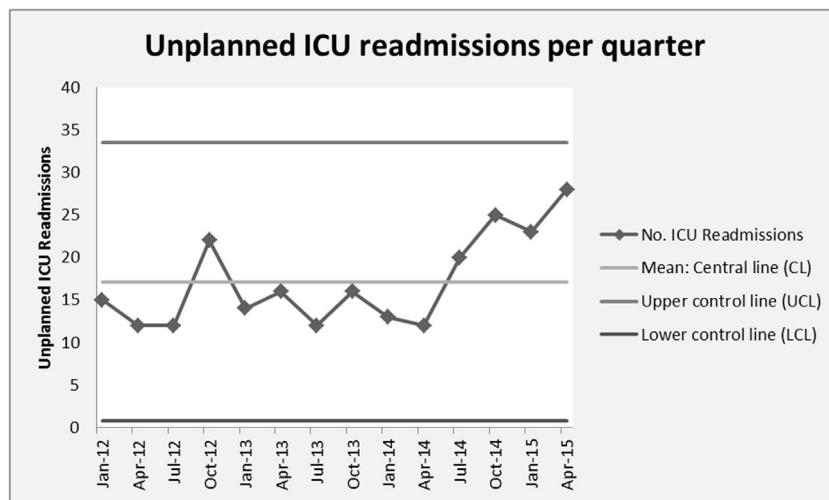
Fig. 1. Example of a Statistical Process Chart demonstrating unplanned ICU readmissions per quarter.

natively, results can be displayed alongside benchmarking criteria, such as clinical practice guidelines or external audit data, to enable comparison of the current audit findings with the expected level of performance. How to best deliver and display audit feedback depends on the intended audience, but a range of strategies is likely to be more effective.[16] Possible strategies could include interactive workshops, in-service sessions, laminated posters, display boards, email bulletins, newsletters, and screensavers, among others. For maximal impact, visual and verbal presentations should be delivered in a clear, comprehensive format, using tables, charts and graphs (for example, presentation software, such as Microsoft PowerPoint®, is useful). The prominent display of audit results in a populated area of the unit, such as the office, hallway or tearoom can encourage staff to read and engage with the audit findings. During in-service sessions and workshops, staff can be prompted to discuss the findings and their relevance to their own unit practice, as well as their adherence or deviance from best practice guidelines, and they should be encouraged to be creative in coming up with possible strategies for improvement. Encouraging patients and visitors to take an interest in the unit's quest for improvement by displaying the audit results in the waiting room can also be a proactive strategy for consumer engagement and participation.[22]

Targeted feedback strategies should incorporate relevance to the local unit, individual hospital and wider audience. As identified in Step Two ('Engaging of stakeholders'), discussed in part 1 of this article series, key stakeholders play an essential role in preparing the audit, developing the audit tools, data collection, and disseminating the findings of the audit. Staff will be more motivated to embrace the audit process and adopt change if they can see the relevance of the audit findings to the local situation.[18,20] Not all staff will experience the same degree of motivation, so it can be helpful to engage key stakeholders to identify and work with those staff members who are more driven to improve practice and encourage them to champion the desired change.[18] Remember that if there have been many recent changes in practices or processes within the unit, implementing further changes could be difficult, therefore it is also important to consider the best timing for undertaking audits and implementing new practices.

5. Step ten: plan targeted strategies and processes for continuous improvement

The successful implementation of improvements requires investment by all stakeholders involved in the audit process.[19] If gaps between audited practice and clinical practice guidelines or high-quality evidence exist, this provides a good starting point to develop the practice improvement strategies. Consider the development of an action plan with timeframes to record these recommendations. This plan should include clear targets and the name of each person who agreed to take responsibility for each element.[12] It is preferable to focus on one or two areas needing improvement, rather than attempt to change too many things at once. Be warned, however, systematic reviews have demonstrated that practice change via rapid dissemination of educational materials[23] or clinical practice guidelines alone is rarely effective at improving patient outcomes.[12]

Improvements should be implemented using a combination of initiatives, tailored to the local critical care audience and resources.[24,25] The stakeholder group, including interdisciplinary clinicians, patient and family representatives, safety and quality experts, and institutional management, needs to plan appropriate improvement interventions and prospectively identify factors that will encourage or discourage their application (i.e., the determinants of practice).[26] Understanding these determinants (e.g., a lack of knowledge, lack of staff and time) and using this information to devise appropriate strategies will improve their effectiveness.[26] Tailored practice improvement strategies can include targeted educational bedside visits, reminders (manual or computerised), checklists, interactive educational meetings, and multiple educational resources.[24,25,27] Areas highlighted by the audit findings that require improvement may also be the focus for developing research and on-going, targeted quality improvement activities so as to build and maintain a focus on care improvements in the unit.[16,17] It may also be possible to connect with critical care special interest groups, patient safety groups or consumer advisory panels, to determine what activities and improvements other clinical areas have instituted.

Audit results that demonstrate notable improvements should be acknowledged and staff commended for their efforts. Audit drivers and change champions can be encouraged to present the findings at unit meetings, hospital quality and safety meetings, journal clubs, the intranet and local conferences. Sharing experiences with audit processes and subsequent practice improvements in critical care newsletters and journals is strongly recommended. Not only is this an excellent way to develop research skills, but it also can open up exciting avenues for further networking and benchmarking with colleagues from other critical care units.

6. Step eleven: repeat the audit cycle: re-identify areas for improvement

After a period of implementing improvements, it is important to evaluate them at least once, and preferably at regular intervals, to see if they were successful. Re-auditing also monitors whether any improvements were maintained after the initial post-audit enthusiasm. If the goals were not reached, a continued program of strategies to achieve change must continue, and the auditing process repeated until it can be demonstrated that the desired practice has been successfully implemented and sustained over time. Once it has been decided that a practice has improved and is being sustained, a new focus for improvement can be addressed.

Performance indicators can be used to drive the continuous quality improvement cycle. Progress reports should be communicated and copies made readily available to staff and managers. A regular auditing time period should be mutually agreed upon by the stakeholder group, providing enough time to implement improvements while also being sustainable for the critical care area. The goal is always to improve clinical practice and patient outcomes, so the planned frequency of audits will depend on the practice being audited. While there is no one size fits all solution for deciding how often to audit, as a general guide, the frequency of auditing should be based upon your unit's needs and capacity, compliance regulations, and risk assessment. For example, ongoing auditing and reporting of hospital patient falls data is required by the Australian Council on Healthcare Standards, whereas monitoring insulin infusion management following the introduction of a new guideline[28] would likely be a time-limited unit audit.

7. Conclusion

Clinical audits can be effective tools to promote best practice, reducing errors in the critical care setting,[29] but their success relies on several characteristics. Most importantly, it is essential to focus and define the clinical audit goals from the beginning. Next, identify and engage with key opinion leaders and local stakeholders throughout the audit process. Spend time developing the appropriate method and tool for undertaking the clinical audit. Remember, benchmarking and providing goals for improvement will strengthen the audit, but make sure it is the right benchmark for the clinical area. Finally, communicate the results of the audit, including a plan for improvement. Keep going! Auditing is a cyclical process and should be repeated regularly to ensure improvements are effective.

Authors' contributions

Conception and design of the study: all authors.
Acquisition of data, or analysis and interpretation of data: all authors.
Drafting the article and revising it critically for important intellectual content: all authors.
Final approval of the version to be submitted: all authors.

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