Priorities for trauma quality improvement and registry use in Australia and New Zealand

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A B S T R A C T

Introduction: The Australia New Zealand Trauma Registry enables the collection and analysis of standardised data about trauma patients and their care for quality improvement, injury prevention and benchmarking. Little is known, however, about the needs of providers and clinicians in relation to these data, or their views on trauma quality improvement priorities. As clinical experts, trauma clinicians should have input to these as ultimately their practice may be influenced by report findings. This paper presents the perspectives of multidisciplinary trauma care professionals in Australia and New Zealand about the use of the Australia New Zealand Trauma Registry data and trauma quality improvement priorities.

Methods: An exploratory survey of trauma professionals from relevant Australia and New Zealand professional organisations was conducted using the Snowballing Method between September 2018 and February 2019. Participants were recruited via a non-random sampling technique to complete an online survey. Descriptive statistical and content analyses were conducted.

Results: The data use priorities identified by 102 trauma professionals from a range of locations participated were clinical improvement and system/process improvement (86.3%). Participants reported that access to trauma data should primarily be for clinicians (93.1%) and researchers (87.3%). Having a standardised approach to review trauma cases across hospitals was a priority in trauma quality improvement.

Conclusion: Trauma registry data are under-utilised and their use to drive clinical improvement and system/process improvement is fundamental to trauma quality improvement in Australia and New Zealand.

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Introduction

The management of critically ill trauma patients within jurisdictions across Australia and New Zealand is organised via designated major trauma centres covering geographic areas. These major trauma centres vary in size and resources [1]. While all centres are designated in accordance with prevailing state or territory-based criteria, many centres have also undergone formal verification as part of the Trauma Verification Program of the Royal Australasian College of Surgeons (RACS). This program enables hospitals to analyse their systems and process performance of acute care services from pre-hospital to discharge and benchmark against international comparators [2]. Verification therein incorporates assessments of the service elements such as staffing, local registries/databases, audit capability, education and research activities,
and a quality improvement program. The data collected as part of these local processes is collated at a national level in both Australia and New Zealand. The Australian Trauma Registry (ATR) was established in 2012 [3] and the New Zealand Major Trauma Registry (NZ-MTR) in 2015 [4], with data currently provided by 27 Level 1 trauma centres and 22 acute hospitals, respectively. The individual registries are used for quality improvement work in each country. In 2019, the registries combined to enable bi-national comparisons and benchmarking using common datasets as part of the Australian Trauma Quality Improvement Program (AusTQIP) to form the Australia New Zealand Trauma Registry (ATR) [3].

Trauma registries enable the collection and analysis of standardised data regarding trauma patients, their injury events, diagnoses, intervention and outcomes, to support clinical quality improvement, system change and injury prevention [5]. The important role of trauma registries in providing high quality data for quality improvement is clear [6], and the AusTQIP [7] and the New Zealand Major Trauma National Clinical Network [8] provide annual reports as the basis for understanding the burden and patterns of serious injury. Development, maintenance and reporting on the data within a trauma registry is a resource intensive exercise, and little is known about the needs of data providers and users in relation to these data. This is important as those that collect, implement or are impacted by the findings of the data should also contribute to how the data are administered. As clinical experts, trauma clinicians should have input to the quality improvement priorities and subsequent data variables, as ultimately, their practice and patients’ safety may be influenced by the data collected and subsequent findings [9,10].

The aim of this study was to establish the data use and trauma quality improvement priorities of trauma professionals in Australia and New Zealand, in particular, the perspectives of multidisciplinary trauma professionals, particularly clinicians and those in operational roles.

Materials and methods

Study design

An exploratory survey of trauma professionals from relevant professional organisations was conducted between September 2018 and February 2019. The survey objective was to identify priorities for quality of care and to investigate possible (and future) use of binational trauma registry data. Ethics was obtained from the Human Research Ethics Committee (HREC) at the University of Sydney (Reference No: 2018/752).

Study sample and recruitment

The following professional organisations and special interest groups were approached to distribute the survey throughout their networks to identify and recruit participants:

a. The Royal Australasian College of Surgeons is a not-for-profit organisation that fosters the training of surgeons (including the trauma surgeons) and maintaining surgical standards in Australia and New Zealand [11].

b. Australasian Trauma Society is a special interest group focusing on multidisciplinary trauma management. Membership includes doctors, nurses and paramedicine professionals from Australia and New Zealand [12].

c. The Australian Trauma Quality Improvement Program (AusTQIP) provides an integrated and coordinated approach to continuous quality improvement systems and patient safety nationally, based on meaningful trauma data. Forms the steering committee for the Australian New Zealand Trauma Registry (ATR).

d. New Zealand Major Trauma Clinical Network is a quality improvement initiative established to reduce preventable levels of mortality, complications and lifelong disability amongst people who sustain a major trauma. Membership is made up of management and senior clinical leaders from New Zealand’s four regional trauma networks which represent the 20 District Health Boards. The Network also includes representatives from ambulance services and other key stakeholders.

The Snowballing method [13] was used to recruit participants. Snowball sampling is based on referrals from initial subjects to generate additional subjects. When applying this sampling method members of the sample group are recruited via chain referral. This method was selected as it was not possible to identify all eligible participants, ie all Australian and New Zealand trauma professionals, or, all member of all sub-specialist societies who are involved in some aspect of trauma care provision. As a Snowballing method is a respondent-driven sampling [14], to ensure the respondent was of the target sample, the initial participant characteristics section ensured the respondent had the relevant qualifications and expertise to be included. Participants had to be either: (a) directly involved in the delivery of pre-hospital and hospital clinical care to people injured due to trauma; (b) responsible for service delivery at an organisational level; or (c) responsible for clinical, education, research, quality and management activities related to trauma. Completion of the survey was considered implied consent.

Data collection

Data were collected directly from the participants using an online survey. The Research Electronic Data Capture (REDCap), maintained by the University of Sydney, Australia, was used as a secure web-based database application [15]. The trauma quality improvement and data use component had two main components;

1. A list of statements on possible quality priorities. Participants were asked to rank their importance using a four-point Likert-like scale (1 = not important, 2 = slightly important, 3 = moderately important, 4 = very important). These quality priorities were selected by an expert group of trauma professionals who form the Trauma Quality Improvement Subcommittee of the Royal Australasian College of Surgeons Committee on Trauma in an iterative process amongst the group via email until the group was satisfied all possible priorities had been captured (Table 1) [16].

2. Four questions with check-box options with a free text option to collect participants’ opinions and suggestions for the use of trauma registry and “non-major” trauma data, who should have access to those data, and what level of data should be provided (e.g., aggregate). For example;

What do you think the data housed in the national major trauma registries should be used for?

- Clinical improvement (+free text option)
- System and process improvement (+free text option)
- Injury prevention policy, practice and advocacy (+free text option)
- Data provision for government/industry groups (+free text option)
- Social media releases to raise community awareness (+free text option)
- Epidemiological research (+free text option)
- Other, please specify (+free text option)
Table 1

<table>
<thead>
<tr>
<th>Trauma Quality Improvement Priorities as identified by the Trauma Quality Improvement Sub-committee of the Royal Australasian College of Surgeons [16]. Participants were asked to rate the importance of the following statements as not important at all [1] to very important [4].</th>
</tr>
</thead>
<tbody>
<tr>
<td>There should be a standardised approach to review trauma cases across hospitals and other trauma care providers.</td>
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<td>TQI programs should include non-major as well as major trauma patients.</td>
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<td>TQI programs should involve pre-hospital and post-hospital (rehabilitation) phases of care.</td>
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<tr>
<td>TQI programs should have capacity to record events and actions arising from M&amp;M activities.</td>
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<tr>
<td>A dedicated case review tool(s) should be used to structure M&amp;M meetings across Australia and New Zealand.</td>
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<td>M&amp;M meetings should be held monthly as a minimum.</td>
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<tr>
<td>There should be criteria to select a case for M&amp;M review.</td>
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<tr>
<td>Any tool used for case review should include causal factors thought to play a role in leading to the adverse event.</td>
</tr>
<tr>
<td>Any tool should include a grading system for any adverse outcome (e.g. non-preventable, possibly preventable, preventable (and related sub-categories)).</td>
</tr>
<tr>
<td>TQI tools and activities should align with principles of patient-centredness, equity and cultural safety.</td>
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<tr>
<td>TQI programs should employ patient experience and co-design principles in change activities.</td>
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<tr>
<td>A human factors approach should be used in trauma case review to understand why an adverse event occurred.</td>
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<tr>
<td>Adverse patient events require monitoring of event trends and remedial loop closure.</td>
</tr>
<tr>
<td>TQI should be a required activity of all facilities receiving trauma patients.</td>
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</tbody>
</table>

M&M = morbidity and mortality; TQI = total quality improvement.

In line with the aims of RACS Trauma Committee to support quality improvement for all trauma patients, this study has included questions that relate to the delivery of care to patients of all injury severities, including the high volume trauma patient group that has not reached the severity scoring threshold for major trauma and are therefore not included in the ATR.

Designated representatives in each of the professional organisations invited the potential participants via email. The email recruitment script encompassed the study information along with contact details of investigators and a public electronic link to the survey in REDCap™. Participants were asked to rate the importance of each quality priority to establish preliminary importance among items and identify areas of agreement or disagreement. Upon the completion of the survey, data were downloaded from REDCap™, and managed according to the Research Data Management Plan at the University of Sydney, Australia.

Data analysis

Data were analysed using Stata/IC™ v 14.2 [17]. Descriptive statistics were generated to summarise sample characteristics and outcomes. Free text responses were imported into NVivo™ 12. These qualitative data were analysed using content analysis [18]. The findings from this analysis provided further explanatory insight into the descriptive information.

Results

Participant characteristics

A total of 102 participants completed the survey, of which 75.5% (77/102) were female and 24.5% (25/102) were male. The mean age of participants was 48.4 years (SD = 10.8), with an average years of post-registration practice of 21.5 years (SD = 9.7). Table 2 summarises the key characteristics of the sample. Some participants did not answer all questions, and percentages were calculated using the number of responses for that question as a denominator.

Data use priorities

The leading data utility priority for the overwhelming majority of participants was equally clinical improvement and system and process improvement (86.3%, 88/102). This was followed by enhancing injury prevention policy, practice and advocacy and epidemiological research that were equally ranked as the next priority (75.5%, 77/102) (Fig. 1).

The analysis of the qualitative responses from the open questions indicated that the current major trauma data from the ATR could be used by clinical and research stakeholders to improve clinical education, development of clinical guidelines, and determining trauma research priorities, as these excerpts demonstrate:

“data should only be collected if we can use it to effect improvements in clinical practice, improvements in trauma sys-
tems. This could be performed through studies, which may be performed locally and regionally. There could also be scope for local research targeting local needs."

and

"identify 'issue of the year' such as time to CT, setting a benchmark and making it reportable to RACS trauma verification process."

Participants identified that using data to establish benchmarks (e.g., comparative benchmark reports and feedback to each site or cross-comparison between trauma centres) was a means of identifying ongoing areas of improvement within the system. However, consistency in data collection and engagement of clinical staff across all trauma sites was noted to be problematic:

"All trauma sites should be consistent in trauma data collation and level of clinicians collating data. Some tertiary sites aren't collecting at all!"

The highest suggested uses for non-major trauma patient data were injury prevention policy, practice and advocacy (68.6%, 70/102) and clinical improvement (65.7%, 67/102). The analysis of open question responses revealed that some participants appreciated that the continuum of trauma encompass the non-major trauma, as this quote demonstrates:

"We should be looking at trends of even minor injuries because these can be of serious consequence to the patient and with such large numbers they become very significant to society."

Assuming that the appropriate data governance measures are in place, the overwhelming majority pointed out that the access to trauma data should be made available mainly for clinicians (93.1%, 95/102) and researchers (87.3%, 89/102) (Table 3).

Two prevailing perspectives emerged from the open question responses regarding the access to trauma data. Firstly, that access to trauma data should be restricted to those who possess the ability to frame, analyse and interpret through a health perspective and clinical context as this respondent indicated:

"There needs to be some level of insight as to the limitations so as not to be used in a way which would be inaccurate."

The respondent's opinions that the priority for data use findings is that clinicians and researchers should have higher priority than other groups to access trauma data as they have greater capacity to drive change, were reflected in the free text responses:

"Government, systems and bureaucratic improvement should be driven by clinicians and researchers."

Respondents identified that there should be a reduced span and level of access for non-clinical stakeholders. Respondents also perceived that government and hospital executives have greater tendency to misinterpret raw data, and suggested provision of summary reports which could allow for reviewing the performance and activities at hospital level. The summary reports could also be made available to community groups and community organisations to boost advocacy and engagement.

Wider access to raw data with identifiable attributes were considered inappropriate, with the need to implement measures to control the span of access (e.g., access to aggregated and de-identified data) being necessitated. Granting equal access to all stakeholders was considered appropriate provided that a login trail is implemented to track who has accessed the data and why. This was specifically highlighted when considering that some industry,
community organisations and media may possess specific agendas that are not aimed at improving care and clinical processes and outcomes, such as those that may be politically or socially motivated. As one participant indicated:

“Access to the data by industry, community and media should be controlled to ensure that data is not misrepresented or misconstrued.”

Similarly, it was suggested that the trauma registries required a transparent and clearly articulated access policies where all the incoming queries should be subject to a review process against scientific and ethical codes of conduct.

“when done in proper governance - it’s counter intuitive to restrict data from specific parties - though commercial use needs to strictly governed and financially reimbursed” … “If that (proper governance) is in place then why shouldn’t everyone have opportunity to use the data? Even the media can help with messages regarding road safety.”

Trauma quality improvement priorities

Fig. 2 illustrates several key priorities were identified as being highly important for TQI.

The necessity of having a standardised approach (to review trauma cases across hospitals and other trauma care providers) was overwhelmingly endorsed as moderately or very important by all participants (95.9%, 95/98). They also indicated that any tool used for trauma case review should examine causal factors (86.7%, 85/98) and include a grading system for any adverse outcome, such as non-preventable, possibly preventable, preventable and related sub-categories (84/98). The lowest level of priority was given to the idea that the TQI programs should employ patient experience and co-design principles in change activities (32.7%, 32/98).

Discussion

This study has identified the extent to which trauma quality improvement is important to trauma clinicians and their work. The perspectives of pre-hospital and hospital multidisciplinary health-care professionals, particularly clinicians and operational people, about trauma registry data use and the suitability and importance of recommendations for quality improvement priorities for trauma.

Data use

Study participants felt strongly that the trauma registry should be used to improve patient safety and quality of care. The ATR is not yet able to achieve this to any great extent because reliable monitoring and subsequent valid measurement of processes and outcomes of care relies on near-complete inclusion of all eligible patients [19]. With increased and adequate site and ATR resources, the potential for the ATR to instigate change and positive outcomes for major trauma patients, similar to the AOA National Joint Replacement and Victorian State Trauma Registries [19] would be possible. Further, Australian clinical quality registries have delivered significant value for money when correctly implemented and sufficiently mature [20].

Governance

Registry governance was identified as important to trauma professionals in the qualitative analysis, and echoed the view that custodians must give accurate and timely feedback to clinicians and organisations; and have well-functioning governance structures [19]. Participants also felt there should be increased trauma professional engagement. Central to translation of data to real change, there be strong local clinical leaders who are accountable for ensuring that registry outcomes drive quality improvement [19].

Benchmarking

Participants also indicated that trauma registry data should be used as much as possible for benchmarking. To achieve this, as is in New Zealand, sites in Australia would need to be identified. However, the ATR does not currently release site identifying information in compliance with the existing ATR/site collaboration agreements. This limitation prevents learning between sites. For example, if one site is performing particularly well in an evidence based process indicator such as time to head CT for the patient with severe head injury, it would be useful to identify that site, and adapt their models of care and processes that have resulted in such positive results. Similarly, identifying sites that are not performing as well as others creates great opportunity for review, redesign and improvement to improve equitable access to quality trauma care across Australia and New Zealand. This has been achieved for example with the ANZ Hip Fracture [21] and Burns registries [20].

Trauma quality improvement priorities

Most participants assigned high importance to the concept that TQI should be a required activity in all facilities receiving trauma patients, as well as a standardised approach to review trauma cases that includes causal factors and outpatient follow-up. A standardised binational case review process with consistent criteria (definitions), performance indicators, monitoring and reporting would facilitate improvement in health service delivery to patients sustaining severe injury [22,23]. A substantial enhancement of human resources and registry capability for both Australia and New Zealand is required to ensure timely data are submitted to local and national registries [1]. This would enable targeted quality improvement activity.

The inclusion of outcome measures beyond mortality and process indicators were rated as important by the majority of respondents. Patient-reported outcome measures, including the EQ-

Fig. 2. The ranking of Trauma Quality Improvement Priorities in Australia and New Zealand.

SD-3L, 12-item World Health Organization Disability Assessment Schedule (WHODAS) and the Glasgow Outcome Scale - Extended are collected across Victoria [24], and soon to be collected in NSW, however this has required significant investment.

Non major trauma patients and centres

A large proportion of non-major and major trauma patients are not treated at the major trauma centres who contribute data to the ATR. This prevents monitoring of patients injured and managed in rural and regional sites. The ATR is currently expanding the number of contributing sites.

There are some limitations to this study. Despite repeated calls by disseminating organisations, and Snowballing, the sample size is small, although each of the professions essential to trauma care are represented. There is also likely to be an element of selection bias amongst respondents, for example, those that chose to respond are likely to have an interest in quality improvement and
data management. Also, the not all respondents answered all questions, hence denominator for some responses vary, further contributing to bias. Finally, these are reported statements and subjective in nature, and it is not possible to verify the veracity of each response.

Conclusion

The findings of this study suggest that trauma registry data are under-utilised, and that the way in which existing data is used and the utility of other kinds of data are critical for clinical improvement and system/process improvement of trauma care. Improving the utility and types of data can support and contribute to the strategic activities of the key organisations who strive to improve trauma care in Australia and New Zealand.

Declaration of Competing Interest

None declared.

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