



Priorities for research in trauma care: creating a bucket list

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Trauma represents a major global health burden [1,2], yet receives disproportionately less funding compared to other medical conditions [3]. One report found that injury research constituted only 6% of all research grants provided by major funders [4]. Alas, if only there was an endless funding resource for trauma and critical care research. Indeed, only those who have tried to get past the high doors of the federal and institutional research funding programmes (where these even exist) can tell of the intricacies involved, the frustration and pain of rejections, the hard work and relentless hours of tedious reporting to reach an even remotely slim chance for a well-funded research programme on a perceived valuable theme and a well-designed project [5]. Clearly, there is a need to prioritize. The critical questions are what to investigate, what to fund and, what are the clinical implications and for whom? And, hence, how to strengthen the trauma chain of survival [6] (Fig. 1)?

Defining a research agenda or even a priority among the topics viewed as ‘research worthy’ may prove hard. Clearly, priority is based on perspective, which again is all about location and situation of the beholder. So, for a US trauma researcher, among all of the important research themes that may come up on any given agenda, the prevention of deaths and injuries caused by gun violence cannot escape attention, as it is a major trauma-related research challenge from so many perspectives [7,8]. However, other regions of the world have a much lower burden of penetrating trauma and hence view other aspects in need of research attention. In less ‘developed’ countries (for the lack of a better definition) the research agenda may be viewed quite differently, as the interest may lie in gathering an overview of the data and numbers involved (e.g. through development of a registry) or, even identifying barriers to care may be the top priority on the research agenda [9]. Further, the specific specialisms involved in trauma management may view priorities specifically from their standpoint of care, as has been reported for physician-manned pre-hospital care [10], for surgical critical care [11] (including trauma) and for specific age-groups and associated skeletal injuries [12]. Also, public and patients perspectives can be incorporated into the broad range of

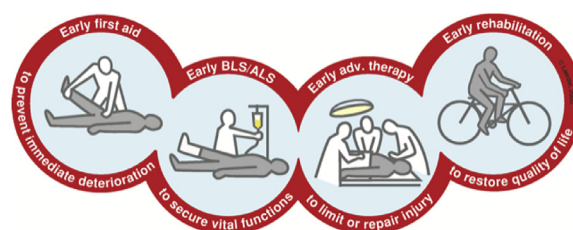


Fig. 1. The Trauma Chain of survival.

Legend:

The trauma chain of survival infographic as first displayed at the 2002 TraumaCare conference held in Stavanger, Norway. Reproduced with permission from Laerdal Medical, Stavanger, Norway.

BLS denotes ‘basic life support’; ALS denotes ‘advanced life support’.

trauma research [13,14]. Moreover, cultural and societal differences in priorities are important but less well investigated [15].

In this issue of *INJURY*, Curtis and colleagues have identified clinical research priorities for Australia and New Zealand trauma researchers [16]. The work builds on parallel efforts to define the challenges for trauma care delivery [17] and the priorities for quality improvement and registry use [18]. The researchers should be congratulated for their systematic approach to identifying the current state of trauma management and directing the way forward. The presented data are of interest and have wider application outside Australia and New Zealand. However, the results may be viewed in the context of the specific population demographics in both urban and rural regions, geographical challenges related to distances and coverage for transport, injury patterns and the maturity of the current trauma system. In their report based on a modified Delphi technique, Curtis *et al.* identified 5 priority areas [16]. Briefly put, the top priorities concern the injured patient at the extremes of age (the elderly and children); the role of performance indicators; the management of traumatic brain injury, and; prehospital triage criteria [16]. All 5 areas can easily be agreed as challenging topics and areas worthy of further investigation. However, it might be of interest to look at some of the topics that just did not make the cut in the Delphi process— specifically those that had a high initial score during the first Delphi round but fell out

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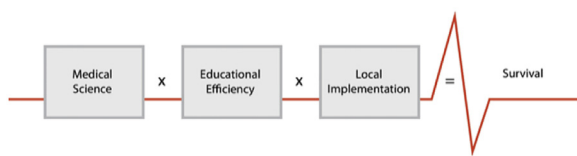


Fig. 2. The Utstein formula for survival.

Legend:

The formula for survival concept as proposed by the Utstein consensus and proposed to constitute a valid concept worth pursuing. The theoretical formula for survival equation suggesting three components related to the 'outcome', here represented by the end-product 'survival'.

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in favour of other topics in subsequent rounds. Among these are 'classical' trauma research topics including "managing the bleeding trauma patient" with subtopics including blood product ratios for transfusion and handling of pelvic injuries. Further, imaging-based decision-making had a high initial score (same initial score as management of traumatic brain injury) but for some reason dropped below the 70% criteria set for consensus. The same occurred for "methods to enhance exposure to trauma in low volume centres" and topics related to trauma team training and team dynamics to enhance clinical practice. The latter had a high consensus (77%) but below the 80% score to make the top 5 priority list. Notably, had the group decided to expand the priority list to a 'top 10' rather than the arbitrarily set threshold of 'top 5', several of the topics that just missed the cut would have been included. Also, while the Delphi group was made up of persons from a multidisciplinary setting, a diverse background and various locations, there was a notable change between rounds (e.g. number of surgeons increased to almost double in round two; prehospital personnel were absent in round one, but appeared in round two) and slightly skewed towards metropolitan practice (threequarters) and some geographical regions (New South Wales) compared to others. Hence, the composition of the Delphi group may provide an inherent bias towards certain viewpoints, which is a recognized limitation to this type of consensus work, sometimes having the risk of becoming an echo chamber. For example, had a higher number of rural practitioners been involved, the focus on team training and exposure in low volume settings may have received a higher priority score, reflecting a need possibly viewed differently from a rural perspective than an urban. The researchers have recognized some of these limitations to the study design [16], which the reader and interpreter of the report must take into consideration as well. Notably, other stakeholders, such as government officials and patients may have other views of the set priorities. Nonetheless, the report provides a valuable "bucket list" of areas in need of new data and better evidence to inform improved decision-making for the clinician.

The objectives for clinical research in trauma care should be to strengthen the trauma chain of survival [6] (Fig. 1). Good quality trauma care does not happen by accident, nor does it occur in isolation. The multidisciplinary care of the injured patients involves a considerable number of care takers with varying views and perspective to delivery and decisions in care [19]. While 'survival' may be a valid and hard endpoint in trauma and critical care [20], the end-product relies on several components that lead to the outcome (Fig. 2). The role of survival as an endpoint is arguably a valid outcome metric, yet Curtis *et al* [16] have identified a need for other outcome metrics and key performance indicators in trauma care. Where these are eventually identified, one may use the formula

(Fig. 2) to generate an 'equation' for achieving best performance of the chosen outcome metric. Generating new data ('medical science') is only helpful where knowledge is understood by clinicians ('educational efficacy') and brought into clinical care under the given local conditions ('local implementation') to enhance patient outcome. The Delphi process has identified a set of top priorities, generating a "bucket list" of themes to investigate. Subsequent areas may follow suit to adjust the list to the *chain of survival* and the *formula of survival*. Notably, identification of *what* to research may be the low hanging fruit. Addressing *how* and by *which methods* these themes may be best investigated will be the next quest for the trauma researchers. Lastly, funders will still need to be convinced that the topics and methods proposed are good 'value for money' and competitive against other conditions and ailments in society. Only then can the evidence-based and optimal quality of care be brought to the injured patient.

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