**Article:**

Bretherton, C.P. orcid.org/0000-0001-9569-0734, Hirst, R., Gacaferi, H. et al. (21 more authors) (2024) Research priorities for the management of major trauma: an international priority setting partnership with the James Lind Alliance. BMJ Open, 14 (5). e083450. ISSN 2044-6055

https://doi.org/10.1136/bmjopen-2023-083450

BMJ Open

# Research priorities for the management of major trauma: an international priority setting partnership with the James Lind Alliance

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**To cite:** Bretherton CP, Hirst R, Gacaferi H, *et al*. Research priorities for the management of major trauma: an international priority setting partnership with the James Lind Alliance. *BMJ Open* 2024;**14**:e083450. doi:10.1136/bmjopen-2023-083450

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (https://doi.org/10.1136/bmjopen-2023-083450).

Received 19 December 2023
Accepted 25 April 2024

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## ABSTRACT

**Objective** The objective of this study is to determine research priorities for the management of major trauma, representing the shared priorities of patients, their families, carers and healthcare professionals.

**Design/setting** An international research priority-setting partnership.

**Participants** People who have experienced major trauma, their carers and relatives, and healthcare professionals involved in treating patients after major trauma. The scope included chest, abdominal and pelvic injuries as well as major bleeding, multiple injuries and those that threaten life or limb.

**Methods** A multiphase priority-setting exercise was conducted in partnership with the James Lind Alliance over 24 months (November 2021–October 2023). An international survey asked respondents to submit their research uncertainties which were then combined into several indicative questions. The existing evidence was searched to ensure that the questions had not already been sufficiently answered. A second international survey asked respondents to prioritise the research questions. A final shortlist of 19 questions was taken to a stakeholder workshop, where consensus was reached on the top 10 priorities.

**Results** A total of 1572 uncertainties, submitted by 417 respondents (including 132 patients and carers), were received during the initial survey. These were refined into 53 unique indicative questions, of which all 53 were judged to be true uncertainties after reviewing the existing evidence. 373 people (including 115 patients and carers) responded to the interim prioritisation survey and 19 questions were taken to a final consensus workshop between patients, carers and healthcare professionals. At the final workshop, a consensus was reached for the ranking of the top 10 questions.

**Conclusions** The top 10 research priorities for major trauma include patient-centred questions regarding pain relief and prehospital management, multidisciplinary working, novel technologies, rehabilitation and holistic support. These shared priorities will now be used to guide funders and teams wishing to research major trauma around the globe.

### STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ Use of the established, transparent and patient-orientated James Lind Alliance methodology.
- ⇒ Survey responses were received from an international audience and a range of patients and healthcare providers.
- ⇒ As patient involvement is culturally less common internationally, there were limited patient responses outside of the UK.

## BACKGROUND

Major trauma is an injury or combination of injuries that are life-threatening and potentially life-changing and carries with it a significant risk of long-term disability.[1 2] Injuries occur as a result of blunt and penetrating forces stemming from incidents such as falls, road traffic collisions and individual violence including gunshots or stabbings. Major trauma is the leading cause of death and disability in those under the age of 45.[1 2] In older frail people, severe injuries can also be caused by low-energy mechanisms such as falling from a standing position.[3 4] The treatment of major trauma is highly multidisciplinary, requiring the expertise of a range of healthcare professionals.[5 6] Despite the significant impact of major trauma, research into injuries represents only 6% of all research funding and has historically focused on outcomes of interest to clinicians.[7]

The establishment of the UK Major Trauma Networks together with the Trauma Audit Research Network (TARN) has facilitated the gathering of high-quality demographic and outcome data over the last decade, highlighting the burden of major trauma.[4 8] More recently, several international randomised controlled trials have been conducted and reported, evaluating interventions for the most severely injured patients in highly acute treatment settings.[9 10] These demonstrate that high-quality research in major trauma is feasible and effective, but qualitative research suggests contemporary studies may not encompass topics and outcomes valued by trauma patients.[11] There is now an urgent need to identify research priorities to ensure that funding and resources are directed towards areas deemed most important by trauma patients and their families.

The James Lind Alliance (JLA) operates as an independent, non-profit organisation under the auspices of the National Institute for Health and Care Research (NIHR).[12] Committed to principles of inclusivity, transparency and equal engagement of patients, carers and health professionals, the JLA is the gold standard for multistakeholder research prioritisation in healthcare.

The aim of this work was to establish the international research priorities for the treatment of patients sustaining major traumatic injuries, representing the shared interests and priorities of patients, their families, carers and healthcare professionals.

## METHODS

The Major Trauma Priority Setting Partnership (PSP) was conducted in accordance with the JLA process and was undertaken over 24 months (November 2021–October 2023) (see figure 1). The results were reported in accordance with the Reporting guideline for priority setting of health research.[13]

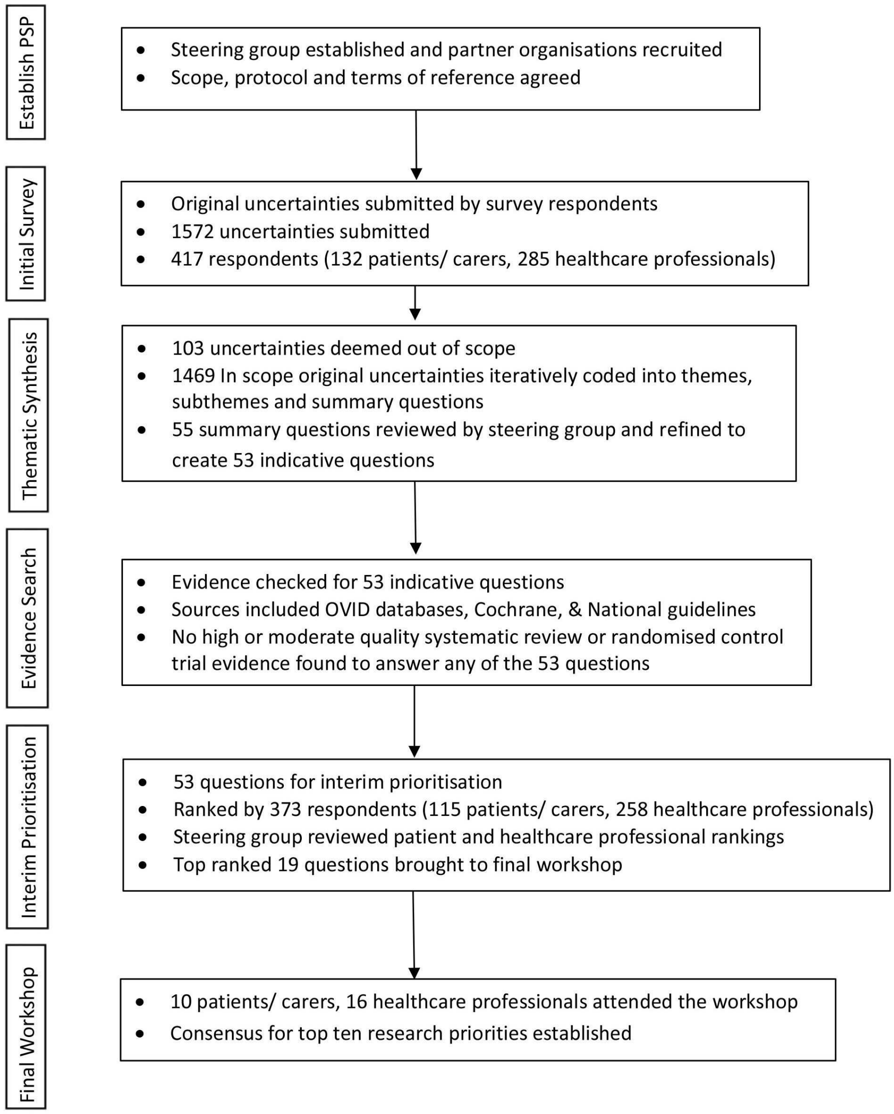

**Figure 1** Flow chart of priority setting partnership process. PSP, priority setting partnership.

### Steering group and partner organisations

Steering group members were recruited from professional and charitable organisations, including patients, doctors, nurses and allied healthcare professionals from the UK, Europe, North America, Australasia and Africa. Patient representatives were reimbursed for their time with shopping vouchers. A JLA advisor (JG) facilitated the process, serving as a neutral guide to encourage equal participation from both patients and healthcare professionals while ensuring adherence to JLA principles and methodology. The information specialists (RH/HG) were responsible for survey design, data management and analysis. Oversight for each step was provided by the steering group.

### Scope

The scope of the PSP mirrored the conditions included in the UK National Institute for Health and Care Excellent guidance for major trauma.[6 14] This included chest, abdominal, pelvic, life or limb-threatening injuries, as well as major bleeding and multiple injuries. Patients of all ages were included and the time frame for inclusion encompassed the moment of injury to the point of discharge from an acute hospital. Consequently, safeguarding, injury prevention, post-traumatic stress disorder and post-hospital care were excluded. Isolated spinal cord injuries, isolated head injuries, burns, hanging, asphyxia and drownings were also excluded from the scope as these fell within existing or planned PSPs. Additionally, treatments unique to military or low-resource settings were excluded. Decisions about whether submissions were in or out-of-scope were made by the information specialists and verified by the steering group.

### Initial survey and identification of themes

The steering group designed an initial survey, asking respondents to submit their free-text research uncertainties for major trauma. Demographic information was also collected, although ethnicity data were not collected as the international steering group felt this was culturally insensitive for some of the regions included. The survey was translated into English, Dutch and German and was available in paper and online formats (see online supplemental file 1 ‘Initial Survey’). The survey was launched at the multidisciplinary National Trauma Research and Innovation Collaborative Conference on 15 March 2022. The survey was disseminated through partner organisations, social media and to patients in hospital wards and clinics (see online supplemental file 2 ‘Partner organisations’).

The information specialists analysed all submissions, initially breaking down longer entries into distinct components according to topic transitions. Following a period of data immersion, responses were systematically coded into themes, subthemes and subsequently into summary questions. Each original submission and its associated theme and summary question underwent verification by at least two members of the steering group, including a patient representative. This verification process entailed reviewing each original submission and its related summary question to confirm alignment, with any disagreements addressed in steering group meetings to achieve consensus.

### Creation of indicative questions and evidence-checking

The steering group met to systematically assess all themes and summary questions. Similar questions were consolidated into indicative questions, ensuring the representation of each original submission. Each indicative question underwent review in the steering group meeting to enhance readability and verify that the language was comprehensible to both patients and stakeholder groups.

A literature review was conducted to confirm that each indicative question represented a ‘true’ uncertainty and had not been adequately addressed by existing research. The information specialists performed searches across multiple databases including PubMed, Cumulative Index Nursing Allied Health, British Nursing Index, Embase, Medline, PsycINFO, Google Scholar, the WHO International Clinical Trials Registry Platform Search Portal, the US National Institute of Health Trials Registry, ISRCTN Registry and Published UK national guidelines.[6 14] The search strategy is outlined in online supplemental file 3 ‘Question verification form’.

Indicative questions were deemed ‘unanswered’ if no systematic reviews of research evidence or recent (within the past 5 years) randomised controlled trials providing high or moderate-quality evidence for the question were identified.[15] The steering group reviewed each indicative question along with the available summarised evidence to confirm its status as a genuine uncertainty.

### Interim prioritisation

A second survey tasked respondents with selecting their top 10 priorities from the indicative questions. Participants were asked ‘What questions would you like to see answered by research?’, without the need to consider feasibility or other factors. This survey was disseminated both online and in paper format through the same channels as the initial survey, between 23 November 2022 and 31 July 2023 (see online supplemental file 4 ‘Interim Survey’). Separate rankings were generated for patients (along with their relatives and carers) and healthcare professionals to address the uneven distribution of responses and ensure equitable representation of stakeholder groups. The geometric means were computed and combined to form the interim rankings. The steering group reviewed these rankings and chose a manageable list of questions to be discussed at the final workshop.

### Final consensus workshop

On 17 October 2023, a 1-day virtual workshop convened patients, carers and healthcare professionals to establish the ‘top 10’ research priorities for major trauma. A sampling framework was employed to select and invite participants from earlier stages of the PSP. The sampling framework took into account factors such as age, gender, geography, and both professional and personal experiences.

Before the workshop, participants received introductory materials and videos and were asked to rank the questions in order of priority. At the workshop, participants were divided into 4 groups of 4–6 individuals, ensuring an equitable mix of patient representatives and healthcare professionals. Each group was facilitated by a JLA advisor who supervised discussions on ranking the highest and lowest priorities, encouraging participants to share their reasoning. An iterative ranking process ensued, with participants reassigned to new small groups during breaks to exchange perspectives, fostering broad participation. During the breaks, JLA advisors consolidated rankings for each group to create an updated list for subsequent discussion. In the final round, JLA advisors presented the combined rankings, and participants reflected on the consensus priorities.

### Patient and public involvement

Patient and carer representatives played a continuous role throughout the process. They contributed to defining the scope and actively participated in reviewing all patient-facing media. Their involvement extended to all steering group meetings and decisions. Collaborating with patient organisations, they played a key role in ensuring a diverse range of patient and carer groups were reached for the surveys and the final workshop. In the dissemination phase, patient representatives will assist in sharing the PSP findings and collaborating with patient and charitable organisations to formulate specific research questions based on the final priorities for future funding.

## RESULTS

### Initial survey and evidence-checking

417 responses were received from 95 patients, 37 relatives and carers, and 285 healthcare professionals. The median age of respondents fell within the 35–44 age category, 215 (51.6%) were male, 191 (45.8%) were female and 8 (1.9%) preferred to self-describe or not to say. The majority of respondents were from the UK (372, 87.9%), with responses received from South Africa (17, 4.0%), the USA (8, 1.9%), Australia (8, 1.9%), the Netherlands (6, 1.4%) and 1 response was received from Austria, Ghana, Ireland, Kenya, Saudi Arabia, Sierra Leone, Tanzania and Trinidad and Tobago, with the location of four responses unknown. Further details of participants are available in table 1. They submitted a total of 1572 unique research uncertainties. After the removal of 103 out-of-scope submissions, 1469 remained. Out-of-scope submissions can be viewed in online supplemental file 5.

The steering group reviewed 55 summary questions, condensing them into 53 indicative questions. Following evidence checking, none of the questions were deemed to be adequately addressed by existing research, and therefore, all advanced to interim prioritisation.

### Interim survey

373 responses were received from 258 healthcare professionals, 85 patients and 30 relatives or carers, with some participants belonging to more than one category. The median age of respondents fell within the 35–44 age category, 180 (48.3%) were male, 179 (48.0%) were female, 1 (0.3%) preferred to self-describe and 6 (1.6%) preferred not to say. The majority of responses received were from the UK (322, 86.3%), with responses received from the Netherlands (15, 4.0%), Australia (14, 3.8%), South Africa (9, 2.4%), Ireland (3, 0.8%), one response was received from Canada, Germany, Italy, New Zealand, Pakistan, Singapore, Switzerland, the USA, with four responses from an unknown location. Further details of participants are available in table 1.

The steering group reviewed the rankings and based on previous experiences of PSP workshops it was agreed that 19 questions would be taken to the final workshop.

### Final consensus workshop

The final workshop was attended by 16 healthcare professionals; physiotherapists (n=5), surgeons (n=4), emergency and prehospital clinicians (n=3), psychologists (n=2), a paramedic and an occupational therapist as well as 10 patient and carer representatives (9 had personal experience of major trauma and 1 was a carer). This included three healthcare professionals from the steering group. Attendees included participants from the UK, Ireland, the Netherlands, South Africa, Australia and Greece. Further demographic data from participants were not collected.

The order of the final 10 priorities was agreed by consensus. They are shown in box 1. The full list of the top 19 can be viewed in online supplemental file 6. The indicative questions that fell outside of the 19 discussed at the priority-setting workshop can be viewed in online supplemental file 7.

## DISCUSSION

The results of this International PSP have established the top 10 priorities for research in major trauma. The JLA process employed in this initiative ensures that the top 10 reflect the shared priorities of patients, their carers and relatives, and healthcare professionals. The research priorities indicate a shift towards holistic, patient-centred questions. Commonly featured priorities in these exercises include greater attention to cohesive teamwork, psychological support and ensuring research outcomes are important to patients. Additionally, the prevention and treatment of pain, minimising surgical complications, and optimising rehabilitation are other commonly observed priorities.

This study exhibits numerous strengths, leveraging the well-established JLA methodology with both qualitative and quantitative dimensions. Notably, while there have been prior prioritisation studies in major trauma,[16 17] this study stands out as the first to report international

**Table 1** Demographics of survey participants

| **Demographics** | | | |
|---|---|---|---|
| Initial survey | n=417 | Interim survey | n=373 |
| Experience | | Experience | |
| Healthcare professional | 285 (68.3%) | Healthcare professional | 258 (69.2%) |
| Patient and/or carer | 132 (31.7%) | Patient and/or carer | 115 (30.8%) |
| Gender | | Gender | |
| Female | 191 (45.8%) | Female | 179 (48.0%) |
| Male | 215 (51.6%) | Male | 180 (48.3%) |
| Prefer not to say | 7 (1.7%) | Prefer not to say | 6 (1.6%) |
| Prefer to self-describe | 1 (0.2%) | Prefer to self-describe | 1 (0.3%) |
| Unknown | 3 (0.7%) | Unknown | 7 (1.9%) |
| Age | | Age | |
| 15–24 years | 5 (1.2%) | 15–24 years | 11 (2.9%) |
| 25–35 years | 88 (21.1%) | 25–35 years | 81 (21.7%) |
| 35–44 years | 140 (33.6%) | 35–44 years | 107 (28.7%) |
| 45–54 years | 90 (21.6%) | 45–54 years | 77 (20.6%) |
| 55–64 years | 61 (14.6%) | 55–64 years | 55 (14.7%) |
| 65–74 years | 19 (4.6%) | 65–74 years | 18 (4.8%) |
| 75–84 years | 3 (0.7%) | 75–84 years | 9 (2.4%) |
| 85+ years | 0 (0%) | 85+ years | 3 (0.8%) |
| Prefer not to say | 7 (1.7%) | Prefer not to say | 5 (1.3%) |
| Unknown | 4 (1.0%) | Unknown | 7 (1.9%) |
| Country | | Country | |
| UK | 372 (87.9%) | UK | 322 (86.3%) |
| South Africa | 17 (4.0%) | The Netherlands | 15 (4.0%) |
| Australia | 8 (1.9%) | Australia | 14 (3.8%) |
| USA | 8 (1.9%) | South Africa | 9 (2.4%) |
| The Netherlands | 6 (1.4%) | Ireland | 3 (0.8%) |
| Austria | 1 (0.2%) | Canada | 1 (0.3%) |
| Ghana | 1 (0.2%) | Germany | 1 (0.3%) |
| Ireland | 1 (0.2%) | Italy | 1 (0.3%) |
| Kenya | 1 (0.2%) | New Zealand | 1 (0.3%) |
| Saudi Arabia | 1 (0.2%) | Pakistan | 1 (0.3%) |
| Sierra Leone | 1 (0.2%) | Singapore | 1 (0.3%) |
| Tanzania | 1 (0.2%) | Switzerland | 1 (0.3%) |
| Trinidad and Tobago | 1 (0.2%) | USA | 1 (0.3%) |
| Unknown | 4 (1.0%) | Unknown | 2 (0.5%) |

research priorities encompassing the views and wishes of patients personally affected by major trauma. The robustness of the research is underscored by adherence to the JLA methodology, facilitated independently by a JLA Adviser, thereby upholding principles of transparency and equal inclusion. Distinctively, this research prioritisation exercise takes an international and multidisciplinary approach, encompassing over a dozen countries. The respondents, steering group and the overall approach of this priority-setting partnership reflect the requisite multidisciplinary collaboration essential for addressing patients with challenging injuries.

Regarding limitations, soliciting responses from patients in emergency settings is challenging, with previous PSPs receiving <20% of submissions proportionally.[18, 19] With an international audience less accustomed to patient involvement in research, this remained a limitation for this PSP. However, with 247 responses from patients or their carers over the two survey rounds, representing 31% of all responses, there is confidence that the patient voice

## Box 1 Top 10 international research priorities for major trauma

- ⇒ How can different specialties and teams work better together to improve patient care for major trauma patients (eg, prehospital, intensive care, therapists)?
- ⇒ How can the detection and treatment of complications of surgery be improved (eg, using technology or novel strategies to detect infection)?
- ⇒ How can psychological input for major trauma patients and their families be improved?
- ⇒ What outcomes are important to patients after major trauma?
- ⇒ What are the most effective and safest methods for pain relief after major trauma?
- ⇒ How can early involvement of physiotherapy, occupational therapy and other allied health professionals be used to improve patient outcomes following major trauma?
- ⇒ How can the care of older major trauma patients and those with existing medical conditions (eg, bone health and falls assessments) be improved?
- ⇒ How can support and communication be improved for patients and their families after major trauma?
- ⇒ How can volunteer or peer support benefit patients after major trauma?
- ⇒ Which prehospital interventions improve major trauma patient outcomes?

has been heard and represented. The JLA consensus approach, while inclusive, may not fully assess the feasibility of research priorities, and the final consensus workshop is susceptible to individual dominance, though the JLA facilitator role helped to temper this. Despite the largest group of people experiencing major trauma being over 65 years old in the UK, this was an under-represented group in patient responses. Of the 190 JLA PSPs, this is one of the only PSPs to take an international approach. A notable example is the liver glycogen storage disease PSP, which harnessed an existing international network established by necessity to research an ultrarare disease. In contrast, unlike the well-established UK Major Trauma Network, international trauma collaboration is in its infancy. The serious and life-changing injuries associated with major trauma, while fortunately less common than simple injuries, pose challenges for conducting high-quality research, particularly performing randomised controlled trials with sufficient power and precision. The inclusion of diverse representation aimed to create a broad international clinical network capable of addressing the priorities, once established.

Inherent challenges arise when attempting to consolidate research priorities across a range of healthcare settings. In many low-income and middle-income countries, the need for treatment vastly outstrips the supply of qualified healthcare personnel, treatment accessibility and resources.[20] Additionally, public health and transport policy and violence reduction initiatives would likely have a greater impact on reducing the burden and disability of major trauma than the subsequent treatment of injuries.[1 2] However, public health and treatments specific to resource-limited environments were excluded from this PSP, maintaining focus on target funders' scope for research applicable, at least in part to the UK and other high-income countries. The combination of diverse participation, including patients, has shaped more patient-centric priorities emphasising collaboration and communication rather than specific interventions for early survival after major trauma.

The prominence of priorities centred on communication, family and peer support, and psychological assistance is unsurprising. Recovery from major trauma injuries is a complex concept with physical, psychological and sociofunctional dimensions.[21] Previous PSPs and qualitative reviews have found that the sense of uncertainty exacerbates patients' physical and mental vulnerability after major injuries.[21 22] The inclusion of a priority considering early therapeutic intervention demonstrates the importance that patients and clinicians place on rehabilitation for positive patient outcomes, although successful recovery and rehabilitation are currently difficult to define or measure.[23 24]

The need to investigate the treatment of older patients after trauma is reflective of the ageing population in high-income countries: Data from TARN have demonstrated a demographic shift, with the median age of trauma patients increasing to 64 years of age in the UK.[3 4 19 25] Conversely, despite including children within the scope and having relevant steering group representation, responses from children or about the care of children were sparse. While several of the top 10 priorities may be relevant to children, further specific priority-setting exercises for this population may be advisable. The lack of discrete, injury-specific priorities likely relates to the appeal of broader questions to a diverse patient and healthcare audience but is also a feature by design of the steering group. In several cases, the steering group favoured merging injury-specific questions into combined, more widely relevant questions, for instance, in those related to prehospital treatment or treating surgical complications. For instance, priority 2 encompasses initial submissions related to preventing surgical sepsis, accelerating fracture healing and moderating the immune response to trauma and so research teams should be encouraged to think expansively if considering addressing these priorities. Similarly, several aspects of recovery, therapy intervention and rehabilitation were felt to be encompassed by priorities 1 and 6.

This PSP has successfully established international research priorities in the field of major trauma. The results will be disseminated to clinical and research teams as well as funding organisations including the NIHR Evaluation, Trials and Studies Coordinating Centre. Over time, barriers to conducting high-quality research in emergency settings have been progressively addressed, including the implementation of exceptions from informed consent for emergency research and the incorporation of novel study designs.[9 10] Nevertheless, international teams aiming to address these priorities are likely to need to secure funding from various organisations and navigate diverse regulatory frameworks. Despite these challenges, this priority-setting exercise has set a definitive, patient-centred tone, providing a road map for researchers to enhance the treatment and outcomes for patients following major traumatic injuries.

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**Acknowledgements** The steering group would like to thank all the patients, carers, families, friends, healthcare professionals and partner organisations who contributed to this work. The steering group gives thanks to all other participants at the final workshop for their hard work in achieving consensus on the final top 10 (Ben Dawson, Benjamin Watts, Catherine Hilton, Catherine Clark, Christian Holmes, Claire Baldwin, Clifton Henry, Debra Macphee, Elizabeth Meredith, Gary Brennan, Gary Smith, Hamez Gacaferi, Hannah McBrown, James Baker, Jessica Pawson, John Nicol, Laura Healy, Maritz Laubscher, Markos Valsamis, Maryrose Tarpey, Melissa Webb, Naveed Kordmahalleh, Rachel Morris, Reshma Punjabi, Rhiannon Cole, Shauna Lennon, Simon Graham).

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**Funding** This work was supported by AOUK&I grant number NSCG1V7R (£22 025). This work acknowledges the support of the National Institute for Health Research Barts Biomedical Research Centre (NIHR203330).

**Competing interests** None declared.

**Patient and public involvement** Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

**Patient consent for publication** Not applicable.

**Ethics approval** This research received a favourable opinion from the South West—Cornwall & Plymouth Research Ethics Committee—22/SW/0095. Participant informed consent for survey respondents and workshop attendees was not required or obtained.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** Data are available in a public, open access repository. https://www.jla.nihr.ac.uk/priority-setting-partnerships/major-trauma-international/.

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